
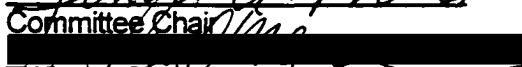





**AN ANALYSIS OF THE PHYSIOLOGICAL ASSUMPTIONS IN
VOCAL INSTRUCTIONAL SYSTEMS FOR ACTORS**

by

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Abstract

Vocal instruction for actors is a growing specialization within college theatre programs in the United States. Theatre voice has typically been taught by master teachers, some of whom eventually publish texts which outline their instructional systems. These published theatre voice texts have become standards in the discipline of theatre voice over the past 10-30 years and a mere handful of them are the primary required texts used in a large number of theatre voice classes in U. S. colleges and professional training schools. For the most part, these texts (along with their authors) have been accepted without question as the undisputed authorities in the field of theatre voice without serious critical discussion or assessment of their objective, methods, procedures, or efficacy.

This study examines eight of the most popular vocal training texts used in theatre voice classes in American colleges and professional training programs from the perspective of vocal anatomy and physiology. These include Edith Skinner's *Speak with Distinction*, Evangeline Machlin's *Speech for the Stage*, Arthur Lessac's *The Use and Training of the Human Voice*, Kristin Linklater's *Freeing the Natural Voice*, Cicely Berry's *Voice and the Actor*, J. Clifford Turner's *Voice and Speech in the Theatre*, Michael McCallion's *The Voice Book*, and Patsy Rodenburg's *The Right to Speak*.

Instructional methodology, functional descriptions, and exercises relating to the physiological processes of respiration, phonation, resonance and articulation are examined and compared to current literature about those functional processes in the field of voice science. Additionally, each system is examined to assess the degree to which it advocates vocal health and the manner in which it recommends that vocal health be pursued.

Recommendations for selecting an appropriate vocal training system are proposed based on a student's desired learning outcomes, possible methodological preferences, and preferred mode of learning.

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CHAPTER 1

I

Introduction

The goal of vocal instruction for the actor and professional voice user has been the attainment of a serviceable and pleasing voice, which easily responds to the demands of the situation and to the performer's intentions. For the actor, this has included the ability to form sounds clearly and distinctly, and to produce voice with sufficient intensity and loudness to be adequately heard and understood in a wide variety of performance spaces. In addition, the actor is expected to have a pleasing tone quality, best defined by a lack of characteristics often viewed as defective in the voice, including hoarseness, breathiness, scratchiness, or other pathological conditions. Finally, the actor's voice must be able to respond to the demands of performance which can require alterations of the pitch, tone, or rhythm of the natural voice. These alterations could also include the use of accent, dialect, or the depiction of non-native speech; the portrayal of charged emotional states with their accompanying vocal impersonations; the athletic rigor of extended periods of talking, singing, chanting, or speaking in verse; or the use of the voice as a sound instrument able to make any number of percussive, rhythmic, or sustained tones or noises. There are also those occasions when the actor must produce vocal characterizations that depict diseased or dysfunctional voices, causing the healthy voice to impersonate the unhealthy.

To accomplish this immense set of vocal gymnastics, the actor must develop awareness of and sensitivity to her own voice and her ability to produce variations of normal vocal characteristics on demand. This is a lot to ask of a healthy voice, because many of the techniques to achieve these results can potentially cause

damage to the voice (Raphael 87). What is more often the case, however, is that we ask an unhealthy voice, one that has already been abused by tobacco smoke, drugs, alcohol, prolonged periods of stress, lack of rest, vocal abuse, or poor or insufficient training, to sound normal and healthy, in addition to responding to the demands of performance. Indeed, actors voices are most frequently strained and fatigued by conditions that are only too common among rehearsal and performance environments, according to Raphael and Scherer (125). These conditions include long working hours; screaming, shouting, or fighting on stage; and having to speak over high levels of background noise and/or music. Thus, voice training faces a perplexing paradox: it must develop and extend the range of the voice's natural abilities so that it can function in an environment designed to cause stress and strain on the voice. Compounding this external pressure is the internal pressure actors face knowing their career often hinges on their vocal skill and physical ability.

The function of voice training, then, should be to address these very demands, that is, to assist actors in achieving the desired quality of voice and control over the characteristics of voice demanded by their particular role or vocal task, while preserving and promoting the health of the voice. According to Beverly Johnson, a voice teacher at Julliard,

I do not believe that one can be taught to sing or to speak. We can teach people to make sound; to correct faulty phonation, but we cannot make an artist. . . [We can] help find a way to improve technique or to make sure that a voice will be healthy and last a long time (Johnson 9).

If this dual purpose of vocal instruction were to be embraced by vocal coaches, then instructional techniques should theoretically both extend the normal capabilities of the voice to achieve performance demands while educating about and preserving the health of the voice as part of the process.

This is not always the case, however, because many of the training systems

in use over the past 20 years address only the first of these requirements, and by and large neglect the latter. Indeed, even in those approaches that do address vocal health, accurate and detailed information about vocal anatomy and physiology is not considered an essential component of the instructional course. For example, Norman Punt's highly detailed work on vocal anatomy and physiology for the singer and actor is intentionally written more for voice teachers than for voice students. While his work implicitly argues for greater knowledge of both structure and function among vocal practitioners (singers and actors in particular), he explicitly denies it is of much use were it to be included in a course of instruction because "actors and singers, . . . are sensitive, excitable people--readily influenced, and prey to their emotions and reacting violently to changes in environment (Punt 1)." This instability, according to Punt and Raphael, is the result of highly "volatile or emotional" personalities (Raphael 87). Any attempt at self-diagnosis, according to Punt, would be misguided because

The singer's [and actor's] throat is subject to a multitude of strange sensations which he usually tries to analyze, often with the handicap of very erroneous ideas of structure, function and what he calls 'voice production'. Almost assuredly he becomes obsessed with such notions, which serve only to increase his anxiety and may lead to injurious habits or treatments (Punt 1).

Thus, while Punt believes that more detailed knowledge about the voice would surely be beneficial, he argues that the typical singer or actor is not emotionally mature enough nor sufficiently professional to make use of it. Despite Punt's doubts, actors can generally assess when their voices are in danger, but often avoid seeing a medical practitioner until the damage is quite progressed because they lack accurate knowledge (Raphael 88).

It would seem, then that if actors were armed with accurate ideas of vocal structure and function they could work in collaboration with medical vocal specialists to ensure the health of their voices and the continuity of their professional careers. In

addition, they would have a sound base of understanding about the voice to provide the basis for future growth and training. Mills argued as early as 1950 that an understanding of speech science dramatically improves voice instruction, and "students who have a basic understanding of voice production . . . are interested in one another's problems and [are] cooperative in group work for ear training, breathing, phonation, and resonance (Mills 379)."

Rubin and others have argued that artists can learn a great deal from voice scientists, who can assist them in both the training and assessment of their voices, and in the maintenance of their vocal health (Rubin 99-101). Indeed, Stern has argued that

though we in Theatre Voice and Speech need not be speech scientists, we must not deny the science of speech. We must recognize our responsibility not only to art, but to the pursuit of accurate understanding. Even if we find metaphor and subjective terminology to be useful pedagogical devices . . . we must never permit our students to accept such explanations as functionally accurate. Perhaps by following such guidelines, we will reduce the confusion of our students and increase the credibility of our training techniques (16).

A greater collaboration between speech science and theatre voice instruction has been promoted in recent years by the work of the Voice and Speech Trainers Association (VASTA), and The Voice Foundation during their annual Symposia. The Julliard Symposia, begun in 1971, was formed for the purpose of encouraging vocal specialists from all disciplines to engage in a meaningful dialogue about the voice (Gould 3) and to find ways to "promote the health of the student and improve the teaching of singing and speech (Johnson 5)." Mills summarized this need 40 years ago when she wrote

I shall, therefore say in answer to the question, Do we need more science or more art in voice and diction: that the question should be: How can we integrate the artistic and the scientific approaches in the teaching of voice and diction? (381)

How then, are the myriad vocal instructional systems now in use integrating "art and science" in their theoretical approaches and their practical applications? Because there is little agreement among vocal practitioners as to how the voice should be trained, what the goals of training should be, what techniques should be employed to achieve desired results, and even what terms to use to describe vocal structures and functions (Stern 14; Gould 3), it is unlikely that there would be any consensus about the role science should play in the instruction of Theatre Voice. Why is there so much variety? Why is there so little consensus? And perhaps most importantly, why has the issue of vocal health been apparently neglected by those systems which have proven to be both popular and effective?

The answer lies both in the history and practice of vocal training in American colleges, universities, and professional training programs. In the past, vocal instruction in American higher education has largely been the province of either Speech Departments or Vocal Music Departments, rather than Theatre Departments. Vocal training has been designed primarily for the public speaker or singer, and little special consideration is given to how the demands placed upon the actor may differ from those placed upon the public speaker or singer. Vocal instruction *specifically for actors* was largely unknown except for those acting classes that incorporated information on voice and/or movement, and the more traditional courses in singing (Lewis 57), voice and diction, oral interpretation, or choral reading.

Courses in vocal anatomy and physiology were also available for speakers and singers, but application of information from one discipline to the other was often difficult because scientists and artists lacked a common vocabulary about the voice. In describing some of the first tentative attempts at bringing the various voice disciplines together to begin a dialogue Gould explains, "we did not know how to talk to each other. We had no common language. We had no common exchange. There

were a few voice teachers, and none of us knew what the other meant when he spoke professionally (Gould 3)."

Actors were not, however, without models or teachers to assist them in honing their vocal skills. Prior to the creation of specific actor training programs in the early and mid-twentieth century, most actors learned their craft in apprenticeships to other actors whose vocal techniques they copied or adapted. A standard for stage speech modeled after the practice of important or popular British and American actors, gradually developed. Experienced actors became both acting instructors and vocal coaches to aspiring young actors in professional and later in educational theatre settings.

Because no governing or professional accrediting body existed to certify or standardize knowledge needed by vocal trainers, anyone with an interest in voice and a bit of experience or desire could instruct. Standards for both theory and practice were those of individual instructors based on their own experience, and "schools" of training developed as disciples of particularly gifted teachers trained additional students using "the master teacher's" philosophy and techniques. Systems that developed out of this practice slowly gained reputations of excellence and spread, were adapted and merged with other systems, or fell from favor and disappeared.

Few teachers or training regimens received widespread acceptance or recognition until works specifically and exclusively addressing Theatre Voice began to be published. Among the first American works that became widely available was Edith Skinner's *Speak with Distinction*, first published in 1942. Other important American works include Arthur Lessac's *The Use and Training of the Human Voice*, published in 1960, and Evangeline Machlin's *Speech for the Stage*, published in 1966. The most recent important Theatre Voice text is Robert Barton and Rocco Dal Vera's

Voice: Onstage and Off, published in 1995. A few other American texts address Theatre Voice, but have not had wide distribution and have exerted little influence on the discipline. They include Peter Kline's *The Theatre Student: The Actor's Voice* (1972), Robert Wetterstrom's *Speech For Actors* (1978), and Harry Hill and Robert Barton's *A Voice for the Theatre* (1985). Other works are available that address accent, dialect, phonetics or pronunciation, along with many popular self-help books on vocal improvement whose focus is on the more generalized speaking audience rather than specifically for actors.

British and European vocal instructional methods have long been respected in the American theatre. British schools of actor training predate their American counterparts by more than 100 years and the respect accorded the English language in British schools spawned a great many courses and programs, specifically in Theatre Voice, to perpetuate the long and illustrious history of English drama and theatre. Because much of the repertoire of the American theatre included both classic and modern British and European plays, the adoption of training methods originating from these traditions was highly desirable. British teachers whose works became influential in America included Rose Bruford (*Speech and Drama*, 1948), Clifford Turner (*Voice and Speech in the Theatre*, 1950), Cicely Berry (*Voice and the Actor*, 1973), Kristin Linklater (*Freeing the Natural Voice*, 1976), and most recently Michael McCallion (*The Voice Book*, 1988) and Patsy Rodenburg (*The Right to Speak*, 1992).

While vocal instruction specifically for actors was becoming more accepted and techniques associated with vocal improvement were being published more frequently, each system still reflected drastically different theoretical and philosophical approaches to instruction and radically different methods and exercises devised to achieve "good voice." Even the necessity of vocal instruction was

questioned. While voice has always been a component of acting, voice training--especially in the American theatre--has not always been viewed as integral to the education and development of professional actors. It has been embraced or rejected in accordance with the mode of acting style and training presently in vogue (Withers-Wilson 1). The value placed upon voice and speech training for the actor and the methods of approaching that training have long been topics of discussion and debate.

This debate has proven to be very confusing for students who may desire vocal training as part of their academic or professional education, and lack the background to make informed choices about the kind of training to seek or the value that training is likely to have for their future careers. The field of voice is complex to begin with and becomes more muddled by the variety of training methods and the many disciplines across which the research and study of voice has been spread (Brodnitz 280-81). Teachers who are skilled in only one technique or who lack familiarity with other instructional systems, practitioners, or methodologies, or who are unfamiliar with the scientific literature relating to vocal training, vocal function, and vocal health will be of limited use to students who seek a broader understanding of their options, or who attempt to find a training methods that fits their particular learning style (Barton 282-83; Raphael 101).

Students ought to be able to understand the options available to them when seeking a vocal training course. Potential consumers should be able to understand the different philosophical and methodological approaches to voice that each system employs to achieve results. Students should have a clear idea about what they can hope to accomplish within any given program and how long it will take before they can expect to see results. Perhaps most important of all, students should have some standard or benchmark they can use to both understand the components of any given system and to evaluate a training system's methods and potential results.

Because contemporary training systems are so diverse, the only apparent common denominators are vocal anatomy and physiology. In other words, if we can explain or describe a given training system in terms of the manner in which it achieves control over vocal structures, the effects it produces on vocal function, and the acoustical changes it produces in human speech, then we have gone a long way both to understand the discipline of Theatre Voice and to standardize a vocabulary that allows us to discuss highly diverse systems in a meaningful way across academic disciplines.

Such a description does not question the efficacy of each system, because the use of scientific jargon or a technical understanding of vocal production is not a requirement for a system to work well for students. But it does allow both students, teachers, and researchers to engage in a meaningful dialogue about vocal training and creates a foundation upon which both skill in voice and preservation of vocal health can be addressed in a consistent and integrated manner.

II

Scope and Intent of This Study

Familiarity with the history and development of vocal pedagogy in American theatre training programs and the practice surrounding the training of theatre voice teachers help to explain why so little standardization has occurred in the discipline of theatre voice. Specialized training for teachers of theatre voice did not exist in this country until quite recently and is rooted, for the most part, in European, primarily British, theatrical practice, particularly the London actor training academies of the nineteenth and twentieth centuries. These schools draw on both the rhetorical traditions of the orator and public speaker whose models were drawn from the

eighteenth century London stage. They also draw upon the professional apprenticeship model developed in the London and Continental theatres going back as far as the sixteenth and seventeenth centuries. In recent years, teachers in actor training academies incorporated research into vocal anatomy and physiology with their own experience as vocal coaches to devise systems adapted to the body of classical and contemporary dramatic literature that is a well documented part of the English theatre (Martin 154-170).

The American theatre, however, has no such classical canon of its own upon which to draw inspiration for its peculiar theatrical styles. Founded on popular entertainments and classical revivals of foreign plays, the American theatre found its only indigenous form in the American Musical, which drew more on the skills of the singer, dancer, and comedian than on the classically trained actor. Historically, American actors sought out a singing teacher and a dance master more often than a speech coach, unless their voices were injured by illness or misuse.

Consequently, most voice teachers started out as actors, directors, or acting teachers who discovered they had a knack for the subject. No American schools currently offer a program to train theatre voice instructors, and those who seek that career find they must piece together an interdisciplinary program drawing on courses in theatre, voice and speech science, communication disorders, linguistics, music, and classical studies.

At present, only The Central School of Speech and Drama in London offers a program specifically designed to educate theatre voice and speech trainers and coaches (Barton and Dal Vera 304-305). The Rose Bruford College of Speech and Drama, founded in 1950, was unique in that it offered a joint acting and teaching degree (Martin 165). The college no longer offers a teaching certificate, however, since regulations governing teacher training programs brought the combined program

to an end in the mid 1970's. In the United States, there are no formal training programs on the college or university level, however, private teachers of voice including Kristin Linklater and Arthur Lessac offer advanced training and certification in their methods. According to Barton and Dal Vera, teachers certified through these courses are reliably proficient in those systems (305).

In addition, teachers may now join The Voice and Speech Trainers Association (VASTA) or The National Association of Teachers of Singing (NATS) whose publications and workshops foster and disseminate current research in the field of theatre voice and work to establish standards educators can draw upon to enhance the credibility of the discipline. The Voice Foundation also serves as an important link between physicians, scientists, pathologists and vocal coaches through its annual Symposia and the publication of its proceedings, and the publication of its professional journal, *The Journal of Voice*.

While more and more resources become available to train voice teachers, most theatre departments do not have a vocal specialist on staff, offer very few voice classes, or rely on more traditional voice and diction or phonetic transcription and ear training courses offered in speech or music departments (Morgan 18). Those theatre programs that have either the funding or the commitment to include specialized vocal instruction (in addition to their regular acting course work) typically seek out individuals trained in a specific method. An informal survey of the job advertisements for voice teachers in theatre programs over the past eight years confirms this. The majority of job listings seek someone trained specifically in Lessac, Linklater, Berry or Skinner methodology, or a combination of these. Few advertisements seek a theatre voice specialist without specifically naming a system or technique. This suggests that despite the increase in training resources for voice teachers, most voice programs recognize a relatively select group of systems as

credible. Skillful teachers trained in those methods are in great demand both in the United States and in Britain (Martin 170), despite the fact that "many of the best teachers in the field today do not slavishly hold to one method, but will synthesize aspects of them all (Barton & Dal Vera 300)."

The published texts or training manuals which describe the systems that seem to be the most popular in the advertisements for theatre voice teachers are *texts that describe systems* that have been in use for at least 20 years or more and have developed a following of both teachers and students who attest to the usefulness and effectiveness of the system. While teachers who employ these systems continue to experiment, refine and elaborate on them, publication of their efforts is scant. Thus, there is a dearth of qualitative or quantitative research into the efficacy, techniques, and methodology of vocal instructional systems when compared to the vast array of research in voice and speech science that has mushroomed during the same period.

The charge could be brought that these systems may not reflect or incorporate the vast amount of research into voice and speech that has been accomplished in the years since their publications, thus perpetuating early misconceptions about the voice, maintaining the isolation of one system from another, and hindering attempts at devising standards for instruction and teacher training. While this charge does not necessarily negate the efficacy of any instructional method, it may draw into question some of the assumptions about vocal structure and function on which these systems are based. For example, speech scientists have discovered that there are only a few characteristics of the voice over which we have conscious and voluntary control (Punt 2-10), and, therefore, there are only a few aspects of our voice we can change or train (Johnson 5-10). We cannot change the physical parameters of the vocal mechanism, the vocal folds are not

altered in size, the muscles do not become bigger, nor are the resonators changed in appearance (Anderson 28). Training, however, does include a sensitizing process to discover what those changeable facets are and the extent to which a highly sensitive individual can exercise control over them. In other words, vocal training develops *skill in the use* of the vocal mechanism. In addition, the increased emphasis on the need to incorporate vocal health and wellness into voice training programs suggests urgency in examining if there is a need for revision of the current texts employed in theatre voice classes in American colleges.

Current trends in voice and speech education, including the creation of VASTA and the Voice Foundation's annual Symposia, as well as the publication of the work of scholars in theatre voice (Martin, Withers-Wilson, Raphael, Barton & Dal Vera) and voice science, have made it possible to begin a dialogue about the discipline of theatre voice and to examine what published works in the field of theatre voice reveal about the role of vocal structure and function in actor training.

It is appropriate, therefore, to reexamine some of the major vocal instructional systems in use in American actor training programs to see how American voice instruction has been influenced by the attempt to incorporate scientific knowledge about the voice into their methodologies. Specifically, how and to what extent has that knowledge been reflected in each system's theoretical approach and practical methodology? Beverley Johnson argues that

one of the most outstanding errors in most systems of teaching is that the student is plunged immediately into an attempt to control physiological and acoustical phenomena, without any accurate understanding of the subject. . . It would seem to me that the first consideration in teaching voice should be a simplified but accurate and scientific presentation of voice physiology and enough acoustical knowledge, both theoretical and applied, to enable the student to understand the problems involved (9).

This study will examine to what extent the eight most popular training manuals

do just that. Information relating to three of the most widely researched areas in speech science and theatre voice will be examined. Chapter Two will look at the topic of Respiration and the production of an adequate breath stream to support vocal production. It will look at what each system teaches about respiration and how each system attempts to manipulate the respiratory apparatus to produce vocal improvement. The Third Chapter will explore Phonation, or the production of laryngeal sound, and the Fourth Chapter will examine Resonance and Articulation, or the manner in which laryngeal sound is shaped and resonated to form meaningful speech under the control of the actor. In addition, since impairment in any of these three areas (respiration, phonation, and articulation) can adversely affect the actor's voice (not to mention his or her career), the extent to which each system addresses or ignores vocal health and wellness in their instructional methodologies, theoretical and philosophical approaches, and practical application will also be noted.

This study will limit its focus to those published instructional manuals designed primarily for actors that are currently in use in theatre voice training programs in American colleges and professional theatre training schools. It will not examine works of a more general nature or those that focus primarily on public speakers or singers. Literature that examines instructional pedagogy for the singer and public speakers is far more abundant than that which addresses the training needs of the actor, and an ongoing dialogue between singing teachers and voice scientist has been strong over the past two decades. Although there are some similarities in instructional methodology, voice training specifically for the actor has been limited until recently. While such training is becoming more common, publication of training manuals, vocal instructional texts, and research related to the training of actors' voices is still scarce.

The following section briefly surveys the origins and development of theatre

voice training in American institutions of higher education, as a basis for understanding the relationship between speech science and theatre voice in contemporary training systems. The assumptions about vocal structure and function that underpin these systems grow out of this eclectic and often confusing mixture of academic disciplines and professional practices.

III

Brief History of Voice Instruction in American Higher Education

Because no single systematic approach to voice and speech training exists in American actor training programs today it is not surprising that there are nearly as many methods or approaches as there are teachers (Raphael 111; Morgan 29). Some training regimens are the direct descendants of the elocutionist movement of the eighteenth and nineteenth centuries, which includes speech training, often referred to as "voice and diction," as well as those schools of thought which dealt solely with "artistic expression," often referred to as "voice culture." Others grew from the emerging science of phonetics, or combined the study of phonetics with the rhetorical drills of the elocutionist. Some systems grew out of vocal music instruction, or a combination of singing, choral speaking, and oral interpretation of literature and poetry. Numerous eclectic approaches attempted to gather bits of all of these traditions to formulate a training regimen with attention to both science and art, phonetic analysis, ear training, music, and adherence to standards of usage. Finally, a few systems emerged out of both professional and academic acting and movement classes, or as the result of techniques developed through experimentation with theatrical forms in the early and mid-twentieth century (Scheckner, Grotowski, Artaud, Brook). All of these traditions have had a significant influence on both the

theory and practice of contemporary vocal instruction.

With such an eclectic history, it is difficult to determine where, if anywhere, a line can be drawn between vocal training specific to acting and voice training for speech - typically referred to as voice and diction - because voice and diction classes were often designed especially for performers. Even some of the specialized voice training which grew out of acting and movement classes embraced the techniques, methodologies, theoretical foundations and applications derived from the more traditional speech courses. Only with the addition of an exclusive emphasis on performance material and the integration of strictly theatrical movement and text analysis can we say that the two forms of voice training became sufficiently differentiated. A brief look at the traditions that directly led to the creation of voice training specific to acting can shed light on the diversity of methods and the intensity of the debate that surrounds them.

Withers-Wilson characterizes the history of American vocal instruction as a borrowing, translation, and adaptation of the British models of voice born in the elocutionary movement of eighteenth century England and brought to America after 1750. Elocution first appeared as an academic subject at Harvard University in 1756. While the elocutionists were more interested in educating orators than actors, it was to the stage that early elocutionists like Thomas Sheridan and John Walker turned to find models for the elegant, refined and "natural-sounding" voice which they sought to emulate (Withers-Wilson 3-4). Sheridan, who felt that the actor David Garrick epitomized the ideals that he sought to advance, described the art of elocution.

A just delivery consists in a distinct articulation of words, pronounced in proper tones, suitably varied to the sense, and the emotions of the mind; with due observation of accent; of emphasis, in its several gradations; of rests or pauses of the voice, in proper place as well-measured degrees of time; and the whole accompanied with expressive looks, and significant gesture (*Lecture on Elocution*, London 1762, qtd. in Withers-Wilson 4).

Elocution became well established as a discipline during the nineteenth century and dominated practically all American speech education until nearly 1900. The voice was trained by and large for performance in a highly stylized manner, and imitation was the common method of instruction (Anderson 27).

In its waning years elocution was often charged with perpetuating artificialities and ornamentations. Indeed, this type of florid delivery achieved such popularity that display became an end in itself (Rasmus 254). In the late 1800's McIlvaine (1872), Chamberlain (1892), and others attempted to "challenge the concepts of elocution and . . . [encourage] an unaffected delivery responsive to clear thinking (Rasmus 255)." Voice and diction, the modern grandchild of elocution, embraced the emerging science of phonetics and ushered in the scientific age of voice training. It began as early as 1827 when the American elocutionist Dr. James Rush published *The Philosophy of the Human Voice* that included the rules and principles of effective delivery, a scientific description of the physiology of vocal production and a system of notating speech sounds. According to Anderson,

Rush not only pioneered in applying the scientific method to the study of voice and speech production but also offered a sound approach and keen observation to demonstrate that the expressive action of the voice can be described, if not explained, in relatively precise, objective terminology. In a day when teaching was done largely by precept, "hunch," and imitation, Rush did much to establish speech and voice training upon a firm basis (27).

Rush's disciple, the actor and teacher James Murdock, and his associate William Russell established a school of elocution in Boston in 1840 employing Rush's theories and methods of elocution. Samuel Silas Curry, a student of Steele Mackaye's and Professor of Oratory at Boston University along with many other teachers of elocution rebelled against Rush's and Murdoch's methods as being too mechanical. Instead they promoted the inspirational or "think-the-thought" school of

elocution referred to as the "Expression Movement."

The contention of this school was that if the voice is only left free, it will respond naturally to the inner dictates of thought and feeling. The main concern was to free the voice, as part of total bodily expression as a medium for an outward manifestation of inward activity. Little formal voice training was believed necessary (Anderson 27).

While Curry was more interested in artistic vocal expression than in voice science, he none-the-less attempted in his publication *Mind and Voice*, to explain the voice in terms of anatomy, physiology, and physics. "He just didn't have the science," states Anderson, "nor was he in real sympathy with the scientific method; his teachings contain much more *mind* than *voice* (28)."

Despite this criticism of Curry's theories, his approach to voice was highly influential and has formed the basis for one of the most popular modern training systems in use today in both America and Britain. Kristin Linklater's immensely popular system is based upon the premise of *freeing the voice*.

It was at this point that the controversy between science and art began to galvanize teachers into two camps: those who sought "naturalness" in vocal expression, and those who sought to understand the voice through scientific inquiry into vocal structure and function. This debate points up the duality of the task of voice training, because the two sides of the controversy represent the two aspects of voice: function and expression.

The vocal mechanism must be freed of defects and made into a responsive and effective instrument. Hence the teacher needs a solid background in voice science and speech correction. In addition, however, the teacher must be concerned with what the individual *does* with his voice; for vocal expression is profoundly influenced by the thoughts, attitudes, and purposes of the speaker. These aspects of voice are considerably more obscure and difficult to analyze or describe than pitch, loudness, or quality (Anderson 28).

The instructional methods that evolved during the ensuing period, between 1890 and 1920, championed either science or art, or attempted to utilize both. Many of the

instructional techniques developed during this transitional period were in great part the result of trial and error.

Elocutionists as well as the proponents of "voice culture" discovered that certain procedures, exercises, or mental images produced desirable effects, often for reasons unknown to the teacher. While some teachers attempted to find out why these techniques worked, others who were "more zealous than intellectually sound, attempted to remodel the human body and revise the laws of physics to lend plausibility to their theories and methods of voice production and training (Anderson 28)."

Some of this pseudo-anatomy and pseudo-physiology still survives in some voice texts. These questionable assertions point up the need to incorporate as much science as we can into the teaching and training of the voice. But it also means that research must be done to explain why some "non-scientific" instructional strategies are so effective. Clearly the voice is more complex than a mere reduction to scientific terms or artistic images would suggest. Ultimately the two sides must reunite.

But the controversy between science and art was not the only influence affecting how voice was being taught. The change in style from expressionistic oral interpretation to a more naturalistic and realistic style was also being driven by a similar trend in both dramatic literature and theatrical practice (Hewitt 257). While American naturalism and realism lagged behind similar trends in Europe, the impact was none-the-less profound. Elocution withered and died as a movement as the plays and actors that spawned it fell from favor.

The naturalistic school of performance and production that developed in the early twentieth century promoted a very different style of vocal expression, and training programs changed to address these new demands. Teachers drew upon the lessons learned from both the "artistic expression" and "scientific method"

schools of thought. With an emphasis on ear training and armed with the newest information on vocal anatomy and physiology, actors could receive detailed instruction in all facets of vocal delivery, including breathing, tone production, vocal quality, intensity (projection), knowledge of the vocal mechanism, and diction, relying upon exercises and techniques which grew out of the rhetorical and theatrical traditions of the past (Rasmus 255).

One of those responsible for this change in instructional methodology was the Australian William Tilly, who came to the United States from Great Britain to teach at New York's Columbia University in 1918. A student of Henry Sweet, one of the creators of the International Phonetic Alphabet, William Tilly profoundly influenced the teaching of speech by the introduction of phonetics, ear training, and the introduction of standards of pronunciation. Two of Tilly's students were to set the direction of actor voice training for the next 50 years. Margaret Prendergast McClean and Edith Skinner became the nation's leading authorities on dramatic interpretation and Theatre Speech beginning in the 1920's and lasting throughout most of the twentieth century. While the work of Edith Skinner continues to influence vocal instruction today in many academic departments and professional training schools, her fellow student Margaret McClean was the first to publish a work on voice and speech.

A strong proponent of the science of phonetics, McClean published *Good American Speech* in 1928, which stressed standards of pronunciation based on a pronunciation standard somewhere between Standard British and Standard American speech. Often referred to as Mid-Atlantic or Transatlantic, it became the standard for both pronunciation and training in stage and films throughout the country until it began to be challenged in the late 1950's and 1960's by changing trends in theatre and film.

Withers-Wilson suggests that the emergence of regional theatres in the

1960's with their emphasis on plays that go beyond the scope of naturalism and realism, and revival of the classics, demanded versatile skilled actors with highly trained voices. Voice training, however, had been falling out of favor with many acting teachers and directors during the 1950's as they embraced the "Method" and rejected training in what Skinner had called Stage Speech or Standard American pronunciation. According to Withers-Wilson, "Method" teachers tended to view voice training as principally speech training. As such, they regarded voice training for the actor as potentially harmful to the expression of true character emotion and character revelation (Withers-Wilson 12-13). In doing so they de-emphasized the need for the development of the vocal instrument and increased the reliance on typecasting actors. "Actors were cast because of their vocal eccentricities, not in spite of them (13)."

With the emergence of Regional Theatres like the Guthrie Theatre, the Arena Stage, and the Long Wharf Theatre, directors struggled to hire actors who were sufficiently skillful to handle the vocal demands of the works of Brecht, Genet, Beckett, Ionesco, Albee and Pinter, along with classic revivals staged in the popular repertory format. The need for actors with highly trained voices and teachers to train them attracted the attention of Kristin Linklater, who left the London Academy of Dramatic Arts in 1963 and set up a private voice studio in New York. She trained seven students as teachers during this first year, including Fran Bennett who went on to serve as the voice and movement director of the Guthrie Theatre for the next 12 years (Withers-Wilson 14-17). Her work signaled a real turning point in American vocal instruction.

Although Linklater's landmark text, *Freeing the Natural Voice*, was not published until 1976, her influence was immediately felt through the teachers she had trained who began using her techniques in schools throughout the country in the mid

1960's. In addition, the popularity and apparent effectiveness of Linklater's instructional system had three other significant effects on American vocal instructional practice. First it altered how instructors viewed vocal instruction by placing greater emphasis on the art of voice and less on the science of voice. Secondly, it led the way to popularizing other British voice teachers, like Clifford Turner and Cicely Berry. Finally, it stimulated American vocal instructors to develop comprehensive (and in some cases non-traditional) instructional schemes, which emphasized both voice (sound production) and speech (word formation and utterance). The phonetic-based systems promulgated in the first half of the century by Skinner and McClean had focused entirely on speech.

The first of these influences was particularly important. Instructional methods were dramatically influenced by Linklater's techniques. Her theory that the voice should not be trained, but should be freed, dramatically departed from traditional thought about how voices could best be improved. Up to this point, potential voice instructors studied vocal anatomy and physiology, phonetics, voice and diction, and voice science in preparation for teaching speech and voice. The early adage that "one who knows the science ergo can apply the art (Rasmus 259)" dominated instructional practice throughout the first half of the century. But Linklater's methods drew that premise into question. Training could be accomplished, not by accumulating knowledge about the voice and learning techniques to control it, but by freeing the voice of all its learned habits, tensions, and restraints, and allowing its natural beauty to emerge as a result. Her system, derived from the teachings of Iris Warren at the London Academy of Music and Dramatic Art, stressed the science of voice production, but also added a strong psychological dimension allowing that one must "free" the voice by removing those psychological blocks or inhibitions that stifle its artistry. Unlike her colleagues in the British theatre training schools, Clifford Turner

and Cecily Berry, Linklater felt there was no need to have a strong technique, because once the voice becomes freed it will naturally respond to any given circumstance.

While Linklater's approach was revolutionary, it was not altogether unknown. Samuel Silas Curry had advocated a similar approach as early as the 1870-80's when he founded the expression movement. Interested in the science of psychology, Curry perceived the interconnection between the mind, voice, and body and "was the first teacher to advocate specific training for the mind (Coger, qtd. in Withers-Wilson 7)."

In this century, as early as 1953 Anderson wrote that knowledge of voice science alone was not enough, "the skill to apply that knowledge to the problems of voice development is equally necessary (26)." And in 1949 Mills had argued that voice teachers needs more than just scientific knowledge. They need imagination, artistic appreciation, and a good voice.

I should prefer not to say whether the artistic appreciation or the scientific knowledge is the more important. However, if in selecting a teacher of voice, it became necessary for me to choose between a person of rich, clear, flexible, easily produced voice, and artistic judgments, but without knowledge of the facts and principles of Voice Science, and a scholar in the science of speech, with a poorly produced, dull unpleasant or inflexible voice, I should choose the former. I say this because I have observed unscientifically trained teachers with good, resonant voices get excellent results in voice training and, conversely, other teachers, well informed in Voice Science but with poor voices, get no results at all. . . . I shall, therefore say in answer to the question, Do we need more science or more art in voice and diction: that the question should be: How can we integrate the artistic and the scientific approaches in the teaching of voice and diction? (Mills 381)

While Linklater's methods may have influenced how voice would be taught in some American theatre programs, her importance was not strictly pedagogical. She was the vanguard of other British teachers and vocal instructional systems whose importance and popularity would rival her own, including Clifford Turner, Michael McCallion, Cicely Berry, and most recently Patsy Rodenburg.

Clifford Turner developed his approach to vocal training first as a student of Gwynneth Thurburn at the Central School of Speech and Drama (founded in 1906 by Elsie Fogerty) and later as an instructor at the Royal Academy of Dramatic Art in London. His work, *Voice and Speech in the Theatre*, was first published in 1950 and revised in 1956 and again in 1977 after Turner's death. Unlike Linklater, he placed great emphasis on technique and held that a sound understanding of vocal function was an essential element in the creation of a natural and flexible voice. An important influence in England, Turner had minimal impact on American vocal instruction, according to a survey by Willie Morgan, who reported that only 3% of all American actor training programs surveyed used Turner's text in 1980.

Cicely Berry (*Voice and the Actor*, 1973; *The Actor and His Text*, 1987) also came out of the Central School in London as a colleague of Turner and became the voice director of the Royal Shakespeare Company, a position she continues to hold. Like Turner's, Berry's system places great emphasis on strong technique and close attention to text. Berry, who had worked with Peter Brook on the landmark production of *A Midsummer Night's Dream* in 1970, believed that the thought behind the voice was more important than technical training and that all work should flow from the text which, when closely studied, would provide all the clues necessary for rhythm, tone, and style.

A student of Berry's, Patsy Rodenburg, also came out of the Central School and became the head of the Voice Department at Britain's Royal National Theatre. Her work addresses voice in a more eclectic manner and attempts to discover the natural voice by dispelling the bad habits which keep the actor from employing their "right to speak." While she clearly is writing from the context of a theatrical vocal coach, her text, *The Right to Speak: Working with the Voice* (1992), appears to address a wider audience of professional and non-professional voice users, much as the

popular how-to manuals of Lillian Glass (*Talk to Win: Six Steps to a Successful Vocal Image*, 1987, and *Say It Right: How to Talk in Any Social or Business Situation*, 1992) are directed to a more populist audience. Her work is basically a psychological approach to vocal instruction, somewhat akin to Linklater's and Berry's. Rodenburg's companion volume on language and text, *A Need for Words*, published in 1993, looks more closely at text and technique.

Michael McCallion also taught at the Royal Academy of Dramatic Art in London for twelve years in the 1960's and 1970's, and published his work, *The Voice Book*, in 1988. Strongly influenced by the Alexander technique, his work is also more general in focus "for actors, public speakers, and everyone who wants to make the most of their voice." His work relies on physical sensation and movement, much as Lessac's system does, but he relies on more traditional voice science as the basis for his technique.

The unique characteristic of these British teachers and their instructional systems was that they dealt almost exclusively with vocal training for actors. Prior to the 1960's most American vocal training was based on the "voice and diction" model being taught in most Speech Departments or the "standard usage" model popularized by Edith Skinner and further promoted by Evangeline Machlin. Indeed, of the six most popular texts in use in American theatre training schools in 1980, four were essentially Voice and Diction texts (Eisenson, Fisher, Anderson, and Mayer). Only two (Lessac and Linklater) were vocal texts addressed solely to the training of actors' voices (Morgan, 9). Despite this, several important American teachers and systems exerted tremendous influence on theatrical vocal instruction. Perhaps the most influential of all American teachers of voice was Edith Skinner.

As mentioned earlier, Edith Skinner, a proponent of "Good Speech," studied phonetics at Columbia University in the early 1920's. A professor of voice and

speech at Carnegie Mellon beginning in 1939, Skinner's influence on voice instruction was immense. In 1968 when John Houseman and Michel St. Denis opened the Drama Division of the New York Julliard School, Edith Skinner was hired to teach speech, along with London-trained drama teacher Elizabeth Smith, who taught voice.

Skinner was the leading proponent of Mid-Atlantic or Theatre Speech, a dialect between standard British and standard American speech, for American classical actors. All but lost in the 1950's, Theatre Speech was castigated as contrived, artificial, and inappropriate for the new genre of vernacular works appearing in the regional theatres. Despite the criticism, Skinner's work offered the most comprehensive and detailed approach to articulation available in the American theatre, combining solid ear training, phonetic transcription, and precise formation of vowels and consonants, and continues to be used in many schools today.

Linklater's approach which shunned technique was the logical replacement for Skinner's and others' technique-based vocal systems. Its emphasis on freeing the voice rather than acquiring new technique provided a new and more flexible approach that could easily adapt to the eclectic repertoire emerging in regional and professional theatres. Vocal training, out of favor in the 1950's and early 1960's, was rediscovered when regional theatres and theatre festivals began to emerge across the country and needed actors with skillful voices to perform in classic revivals. The mumbly, dialect-laden, inarticulate voices of the 1950's lacked the power, stamina, and technique to perform classical plays. While some theatres and schools turned to Linklater and the new British imports, others sought out Edith Skinner's work again. Dependent upon phonetics, ear training, and rigid standards of pronunciation, Skinner's method relied heavily on an understanding of vocal function.

In 1986 Theatre Speech was resurrected again in a dialect handbook written by Robert Hobbs, *Teach Yourself Transatlantic; Theatre Speech for Actors*. Hobbs

states that Transatlantic or Theatre Speech is "a neutral dialect which is neither American nor British and which is used as the proper speech style in a wide variety of plays (ix)." Hobbs differs from Skinner, however in his repudiation of International Phonetic Alphabet (IPA) as a tool for learning pronunciation. Hobbs claims that the IPA is too technical and too difficult for actors to learn and prefers to use the diacritical marks found in any dictionary to aid in proper pronunciation.

Another important American vocal coach is Evangeline Machlin, who taught at the School of Fine Arts at Boston University and was the former Director of Speech Studies at the Neighborhood Playhouse School of the Theatre and lecturer in speech at Columbia University. Machlin's book *Speech for the Stage*, published in 1966, follows Skinner and McClean's tradition of Stage Speech emphasizing both phonetics and standards of pronunciation honed to perfection with drills. She expands upon Skinner's work, however, by including a thorough discussion of respiration, vocal production, and resonance with the more traditional material on articulation. She is the first American author to create a comprehensive training system addressing both speech and voice, and her work found great popularity in many colleges and universities across the country.

Perhaps the most important contemporary American teacher and theorist in vocal instruction is Arthur Lessac, whose text, *The Use and Training of the Human Voice*, published in 1960, is the logical descendant of the American Theatre Speech movement. A professional singer, Lessac studied speech pathology and physiology at NYU with Dr. Wilbur Gould and depended largely upon an understanding of vocal function in devising his system. Lessac's system of vocal instruction, based on sensory images, physical manipulation of the vocal tract, and kinesthetic feedback, draws heavily upon his musical training and background, especially in the creation of the imagery associated with consonant sounds and the tone production involved in

the formation and phonation of vowels. In Morgan's survey of voice programs in American colleges and professional training programs, nearly one-fifth of the voice teachers responding to the survey were strongly influenced by the Lessac system, and over one-third of the instructors in professional programs were adherents of the Lessac system.

Lessac taught at the State University of New York beginning in 1970, and later set up his own Institute where he trains voice teachers in his techniques. Part of the success of Lessac's method is his insistence on highly trained instructors who utilize his program of instruction, and the integration of his system with movement, acting, and textual elements in actor training programs. Indeed, his follow-up text on movement, drawing heavily on the movement principles of Laban, the Alexander Technique, and T'ai Chi, integrates voice and movement as a combined field of study for actors using his method.

Thus, the history of vocal training in American theatre education up to this point has been dominated by an eclectic array of teachers and methods drawing on a variety of sources, theories, and pedagogies. While each of these systems has its adherents and its detractors, the lack of any professional coordination in the field of voice or vocal instruction for actors has resulted in a disjointed and often haphazard approach to the discipline across the educational spectrum. The problem is two-fold. First, because there is no consensus about what to teach actors about how to use their voice in the discipline of Theatre Voice (a term I will use to describe vocal instruction geared primarily for actors), there are no American teacher training programs, apart from the training institutes of Linklater and Lessac, to prepare theatre voice teachers. Secondly, until the recent creation of VASTA (Voice and Speech Trainers Association) and the Voice Foundation, there were no professional bodies to provide authority, research, or professional standards for the discipline. As a

discipline, it lacked credibility.

Training for voice teachers is still lacking in college and university theatre programs, and private institutes like Lessac and Linklater's have attempted to fill the need in a small way, but only within their particular systems. More work is needed, especially in the more than 850 departments of speech and theatre in the United States. In an attempt to assess exactly what was happening in those departments, Willie Morgan conducted a study in 1980 whose purpose was to "get a perspective on the current status of voice/speech improvement teaching in higher education (1)."

Two hundred thirty-seven instructors supplied data about their instructional practices representing 26% of all the departments in the United States that offer degrees in speech and theatre. An additional 10% of the departments contacted reported that they offer no courses in this area (29). Morgan's study found that most programs which offered vocal instruction used one of only a handful of texts. Over two-thirds of the trainers in professional programs relied on either the Lessac or Linklater-Warren approaches, and another fourth were most strongly influenced by other British professional teachers, including Cicely Berry and Clifford Turner. Among the remaining influences, although in relatively small numbers, was vocal music instruction, and a few disparate eclectic approaches (9).

In addition, Morgan found that about half of all instructors (in both academic and professional programs) in his survey stated that traditional speech science and theory courses influenced their teaching of voice/speech improvement (8). Morgan found, however, that fewer than a third of the teachers in professional training programs indicated that speech science was a primary influence on their instructional technique. These instructors were more likely to have been trained in one of the specifically theatrical voice techniques, like Lessac's, Linklater's, or Berry's and were less likely to have a strong background in Voice Science of Vocal Pathology.

Additionally, Morgan's survey seemed to validate the notion that teachers departed little from the techniques they learned as students in their own training. Thus, Morgan's study tends to suggest that the perpetuation of individual systems of voice training, especially in professional training schools, by instructors with primarily theatrical voice training and little background in Voice Science, is at least partly responsible for the continued separation of Science and Art in the teaching of theatre voice.

Apart from Morgan's attempt to assess the state of American vocal training for actors in 1980, no one has attempted to take a comprehensive look at American vocal instructional systems until quite recently. Several recent works that have attempted to examine the nature and development of vocal instruction in the theatre have also tried to make sense out of the confusing array of vocal training systems. Jacqueline Martin's *Voice in Modern Theatre* (1991) and Nan Withers-Wilson's *Vocal Direction for the Theatre* (1993) are important examinations of twentieth century voice and speech practice.

Martin, a research fellow at Stockholm University, takes an international perspective tracing the development of vocal delivery from its origins in Greek rhetoric to its modern applications in British and European training academies. Martin also examines the theoretical approaches to acting and voice, particularly with respect to the classic texts, the speaking of verse, and modern productions of Shakespeare. She points out the disparity in training systems used in the London training schools by comparing and contrasting the goals and techniques of Cicely Berry and Kristin Linklater (Martin 171-79).

Withers-Wilson, formerly a professional actor, teaches voice, acting, and dramatic literature at Loyola University of Chicago. She looks exclusively at the history of American voice training and the role that the vocal director plays as a

member of the collaborative production team in the American regional and educational theatre. Despite a fairly thorough discussion of the past she deals little with current systems of vocal instruction, and does not analyze, describe, or even identify the various systems in place in contemporary American college theatre programs.

Raphael (1994) and Barton & Dal Vera (1995) have also attempted in a small way to shed light on the differences between the many existing systems of vocal instruction in an attempt to demystify the method and intent of each system and to help those seeking vocal instruction to understand what is available before they seek out a particular instructor or system.

In her recent article, a "Consumer's Guide to Voice and Speech Training" (1994), Bonnie Raphael briefly describes three training systems (Skinner, Lessac, and Linklater) in addition to the traditional Voice and Diction approach to training. For each method, she briefly points out the basic approach to training and what a student might expect to learn in the system. She mentions a few other systems and instructional methods but provides no details about them.

In addition, Raphael is the first to suggest that a student's learning style (auditory, visual, or kinesthetic) could incline them to be more receptive to learning in one system more than in another, and she articulates possible recommendations about compatible systems and learning styles (101-2). Likewise, Barton and Dal Vera (*Voice: Onstage and Off*) make similar recommendations that students may wish to select a training method that is consistent with their optimal learning mode (282-83).

Raphael also points out the role of the speech therapist and other medical specialists in the care and training of the professional voice. She notes that the clinician's intimate knowledge of anatomy and physiology, speech science, and medical knowledge about voice disorders and their treatments make them particularly suited to work with professional voice users. While she notes that some critics

argue that clinicians do not understand the demands of performance and that actors are uncomfortable with the clinical setting in which a therapeutic approach to voice remediation typically occurs (103), she advocates an understanding of vocal structure and function as part of more generalized vocal training.

Like Raphael, Barton and Dal Vera describe (in a bit more detail) the systems represented in the publications by Skinner, Lessac, and Linklater, as well as the works by Cicely Berry. They include a valuable comparison of the solutions given by each author to five common voice and speech problems that students are likely to encounter in their training. They examine how the four systems address (or don't address) nasality, talking too fast, weak projection, dropped final consonants, and breath and support of tone. In addition, they compare various qualities of each system (e.g. approach, notation system, focus, goal, philosophy, etc.) in a brief chart which points up the fundamental differences of each system (291-300).

Throughout their text, Barton & Dal Vera include side boxes which provide some details of vocal anatomy and physiology related to respiration, phonation, and articulation. In addition, they include an entire section about vocal health and caring for the voice, and refer to vocal health issues throughout the instructional portion of their text. Despite this uncharacteristic attention to speech science and vocal health, there is not room in this relatively small treatment of the subject for extensive details or for examining the approaches of other systems beyond a mere overview.

The current study, then, seeks to further this work by examining the eight main instructional texts in theatre voice from the specific perspective of vocal anatomy and physiology to discern both the role of structure and function within the individual method and the degree to which the system addresses the vocal health of the actor. In addition, this study will provide a more detailed comparison of what each system teaches about respiration, phonation, and articulation, as well as an analysis

of how each system attempts to bring about the modification of habitual vocal behaviors through procedural learning techniques which are often unique to a specific system.

It is precisely this desire to demystify and understand the current systems, as well as a desire to provide students with clear choices about instructional programs, that guides this current analysis of vocal instructional systems from the perspective of vocal function. As the academic discipline of Theatre Voice moves from its infancy to its adolescence, more teachers will be needed who are trained in a variety of techniques, methodologies, and systems, including a sound understanding of vocal anatomy, physiology, and pathology. It will no longer be enough to be a disciple of one master teacher or to be competent in only one technique, a practice which fosters dependency and limits options. Voice teachers who will meet the needs of future students must now be able to integrate many of the elements of voice, speech, song, movement, text, and the creative impulse of performance into an immensely varied repertoire of contemporary and reinterpreted classic works, and they will need to draw on both the practical lessons of the past and the current and future research in the discipline. Vocal health can no longer be relegated to another discipline, but must become a central fixture in the pedagogy of the future to ensure both the fitness and finesse of the actor's vocal instrument.

Not only are artists paying more attention to science, but researchers in the field of voice science are taking a greater interest in the specialized needs and vocal demands of the actor and in creating alliances between performing artists and voice scientists. The extensive work by Punt (1979), Brodnitz (1988), Brown, (1988), Field-Hyde (1950), Hixon (1988), Raphael (1985 and 1987), Rubin (1988), Sataloff (1991) and others points to both the increased need and desire to address both the aesthetic demands placed on the theatre professional and the physiological issues of

vocal health. Most importantly, alliances are being formed between performing artists and voice scientists that will ultimately influence how voice students and voice teacher are trained in the coming years.

CHAPTER 2

Respiration

[The voice] is a sound that is produced by the interaction of the vocal organs. Air is expelled under pressure from the lungs and made to vibrate by the vocal cords. The sound that emerges from the glottis is modified and reinforced by the resonating spaces above the vocal cords (Brodnitz 280).

I

The Impulse to Speak

The production of human voice requires the interaction of a *power source*, a *vibrator*, and a *resonating cavity*. Respiration (breath) provides the *power source*, the vocal folds in the larynx are the *vibrator*, and the oral, nasal and pharyngeal cavities (mouth, nose and throat) act as the *resonators*. A description of the minute anatomy and complex physiology of each of these vocal structures is possible due to the incredible strides made in voice science in the last century.

An understanding of both structure and function is an immense asset to both voice teacher and student as it provides insight into the largely automatic process of producing vocal sound and molding it into recognizable speech. The process of producing voice begins with a *thought* or an impulse to speak that sets the complex vocal architecture into motion. Voice then is more than just moving muscles and bones, but also involves complex neural-chemical commands and paths to relay instructions. Clearly structural and functional knowledge *alone* is insufficient to adequately understand this enormously complex human process, and the task grows larger when we factor in the desire to improve vocal effectiveness or repair a damaged voice to meet the demands of performance. Acting is more than just

speaking, and speaking is more than just breathing in and out.

Volitional voice begins in the cerebral cortex where interactions among centers for speech, and musical and artistic expression establish the command for vocalization. The "idea" of the planned vocalization is conveyed to the precentral gyrus in the motor cortex, which transmits another set of instructions to motor nuclei in the brain stem and spinal cord. These areas send out the complicated messages necessary for coordinated activity of the larynx, thoracic and abdominal musculature, and vocal tract articulators (Sataloff 15).

This translation of "idea" into "action" is the most astonishing and least understood phase in the speech process. But the ability to "establish the command for vocalization" is precisely at the center of nearly every vocal training system. It forms the basis for the theoretical approach to training and the practical application of exercises to generate positive change in an area we are unable to describe in any but the vaguest terms. Nearly every training regimen begins with training in respiration and relaxation. The "command for vocalization" is closely tied autonomically with the positioning of the body to inspire rapidly (Baken, Hixon, in Zemlin 92) and deeply enough to accommodate the intended vocal response. In other words, when the impulse to speak occurs, whether spontaneously or consciously, the first thing the body does is prepare itself to inhale.

As children, turning spontaneous impulse into speech is for the most part automatic in our daily interactions. We think little of the respiratory process since it automatically responds to our needs (assuming we are in good health and sound mind). Consequently our active responses to those spontaneous impulses are authentic and honest. But as we "grow up" we become more disconnected from those spontaneous impulses and their natural expression by the myriad societal barriers which interrupt our natural expressiveness. Culture defines narrow parameters in which expression of natural impulses becomes acceptable in both public and private discourse. Knowledge and acceptance of those cultural display

rules permit free and unimpeded access to others within a culture in an effort to ensure cultural and social stability and harmony. But cultures seldom tolerate the unrestricted display of those impulsive and often strong emotions that tend to be a normal part of most relationships. When these emotional outbursts occur, there is strong social corrective pressure exerted to restrain or cut off the expression. So we learn to control both physical and vocal expressiveness associated with our emotions and passions in our daily interactions.

But theatre rarely shows people in socially appropriate situations and settings. Indeed, it is the rebel within us that dramatic art so often celebrates in artistic form: humans at their most passionate and at their least reasonable. Thus, in performance situations we must "conjure up" an impulse – not from a spontaneous response to the situation, but from a conscious and calculated response designed to imitate a spontaneous response – based loosely on a "memory" of what that impulse felt like when last we truthfully experienced it. Amazingly, our body and voice responds to these "conjured impulses" (Linklater and Berry both refer to this as *the need to communicate*) with nearly the same authenticity as it does to the real thing.

After the impulse to speak comes the breath response, and most vocal training programs begin by sensitizing the actor to the connection between the impulse and the breath response, often accompanied by training in relaxation. This process can include sensitizing the actor to the tactile sensations associated with breath, as in Lessac's method; instruction in techniques to strengthen and control the musculature related to rapid inspiration and controlled exhalation, as in Skinner, Machlin, and Turner's systems; and metaphorical or image-based instruction to develop a connection between the impulse or idea in the mind of the actor and the "command to vocalize" or breath response executed by the actor's brain and autonomic nervous system as seen in Linklater's, and to some extent, Berry's

approach. Additionally training includes learning to hear (externally), feel (internally), and sense (empathically) the voice in order to use that feedback to make adjustments in the vocal process. Some systems place more emphasis on one of these skills than the others, but all instructional systems employ some method of self-monitoring and some method of imagining the vocal apparatus at work. Even those systems which rely heavily on technically correct descriptions of anatomy and physiology still must employ imagination to picture the organs and tissues inside each person and to envision them as working, sound producing, living structures rather than static illustrations on a page or lifeless samples in a specimen jar.

II

Structure and Function

The act of drawing air in and out of the lungs through the mouth and nose is a complex and still incompletely understood process. Yet both past and current research has shed much light on both the anatomy and physiology of the respiratory function and the role it plays in providing the power behind speech. This section provides a brief explanation of the respiratory process in preparation for a closer look at what each of the major vocal instructional systems teach about respiration and the role of breath in the actor's process.

It is a bit difficult to look at respiration separately from phonation and articulation because they are interrelated and simultaneous processes. But because these elements often receive separate emphasis in instruction and the pedagogy designed to increase sensitivity in each area can be different, it is not impossible to examine the role of each physiological process and the structures associate with that

process separately.

In singing and speaking, the lungs supply a constant stream of air that passes between the vocal folds and provides power for voice production. Inhalation is an active process which uses muscles of the thorax, abdominal wall, and diaphragm to increase the size of the thoracic cavity creating a condition of low pressure within the pulmonary alveoli (or air sacks within the elastic tissue of the lung). This momentary drop in pressure (relative to atmospheric pressure) causes air to come rushing into the lungs to equalize the pressure within the lungs with the air outside of the lungs. Quiet expiration (without speech) is a largely passive process, as the muscles of inspiration relax, allowing the thoracic cavity to return to its pre-inspiratory size, creating a momentary condition of high pressure in the lungs. This pressure forces air to be expelled through the open vocal folds to return to a state of equilibrium in the lungs between inside and outside air pressure.

During active expiration, that is, when speaking or singing, the abdominal muscles either raise the intra-abdominal pressure forcing the diaphragm upward, or lower the ribs and sternum to decrease the dimension of the thorax or both (Sataloff 13). This action forcibly decreases the size of the thoracic cavity, building up pressure beneath the larynx where the vocal folds are held tightly closed. This pressure provides the force necessary to set the vocal folds into the vibratory cycles we recognize as speech sounds once they are resonated and amplified by the pharyngeal, oral, and nasal cavities.

The primary muscles of active expiration are *the abdominal muscles* which include the external oblique, internal oblique, rectus abdominus and transversus abdominus. The external oblique, located on the side and front of the abdomen, pulls the lower ribs down and raises the abdominal pressure by displacing abdominal contents inward and upward. The external oblique muscle is an important muscle for

support of singing and acting voice tasks, according to Sataloff, who advocates special attention to this muscle in voice training.

This muscle is strengthened by leg lifting and lowering, and other exercises, but is not developed effectively by traditional trunk curl sit-ups. Appropriate strengthening exercises for the external oblique muscles are often inappropriately neglected in voice training (13).

The internal oblique is a flat muscle in the side and front wall of the abdomen which lies beneath the external oblique. When contracted, the internal oblique drives the abdominal wall inward and pulls down on the rib cage. The rectus abdominus muscle runs parallel to the midline of the abdomen from the sternum and upper ribs to the pubic bone. Contraction of the rectus abdominus also forces the abdominal contents inward and lowers the sternum and ribs. The transversus abdominus is a broad muscle located under the internal oblique on the side and front of the abdomen. Its fibers run horizontally around the abdomen. Contraction of the transverse abdominus compresses the abdominal contents, elevating abdominal pressure (Sataloff 13; Zemlin 72).

The abdominal musculature receives considerable attention in vocal training. These muscles can be strengthened and toned to permit fine adjustments in muscular control over exhalation. Exercises and drills which focus attention on abdominal muscles are part of the regimen to control both the pace of exhalation and the subglottal pressure needed to increase intensity (loudness) and vary frequency (pitch) on the laryngeal level. Control over these muscles is often referred to as "abdominal support," and it is used to maintain an efficient, constant power source.

Sataloff states that there is disagreement among voice teachers as to the best model for teaching support techniques.

Some experts describe positioning the abdominal musculature under the rib cage, while other advocate distension of the abdomen. Either method may result in vocal problems if used incorrectly, but distending the abdomen (the inverse pressure approach) is especially

dangerous, because it tends to focus the singer's muscular effort in a downward and outward direction, which is ineffective. Thus, the singer may exert considerable effort, believing she is practicing good support technique, without obtaining the desired effect. Proper abdominal training is essential to good singing and speaking, and the physician must consider abdominal function when evaluating vocal disabilities (13-14).

In addition to working the abdominal muscles, respiratory training also includes sensitizing the actor to the movements of the upper thoracic musculature, ribs, shoulders, and diaphragm. Much discussion centers around the locus of control for breathing in the diaphragm or lower ribs, etc. "Clavicular breathing," or breathing centered in the shoulder and neck area, and "thoracic breathing," associated with the upper chest, are often spurned as ineffective and inefficient types of breathing for actors. While it is true that tension in the neck and thorax can reduce efficiency, muscles which contribute to respiration are also located in these areas and are routinely tensed and relaxed in the respiratory process. Research reveals that the downward and forward movement of the diaphragm during inhalation accounts for from 29% to 63% of maximum inspiratory capacity (Zemlin 61). In other words, the movement of the diaphragm is only part of the picture, and muscles in the thorax and neck should not be dismissed as they play an integral role in respiration.

During inhalation the dimensions of the thoracic cavity increase in three planes. The vertical dimension is increased by the contraction (downward and outward) of the dome-shaped diaphragm. The side-to-side diameter of the thoracic cavity is increased by raising the curved ribs, and the front-to-back diameter is increased by simultaneous forward and upward movement of the sternum (52). In other words, when you inhale you raise and protrude the rib cage creating more space, and you lower the diaphragm compressing the abdominal viscera which creates more space. As the thoracic dimensions increase

the lungs are held bound to the thoracic wall by virtue of pleural

linkage, [and become] expanded. As a result, a negative pressure is momentarily generated within the pulmonary alveoli, and with the upper respiratory tract open, air rushes into the lungs until the intraalveolar pressure is the same as atmospheric. When this has happened, the muscles of inhalation cease to contract somewhat gradually, the dilated thorax-lung complex rebounds to generate a slightly positive intraalveolar pressure, and the air is exhaled. Quiet breathing requires active muscle contraction during the inspiratory phase, but the expiratory forces are passive, or nonmuscular (55).

This cycle is repeated about 12 times a minute for adults, when at rest (i.e., not speaking or singing), primarily by the action of the diaphragm in quiet breathing. Muscles that raise the ribs (located mostly in the thorax) are inspiratory and muscles that lower the ribs (primarily abdominal) are expiratory. It is clear that the thoracic and abdominal muscles are just as important as the diaphragm when attempting to determine the locus of control over breath.

While the movement of the diaphragm is of central importance in the inhalation process, the control over that movement may not be as simple as some instructional systems would suggest. As noted earlier, when the diaphragm is contracted it increases the vertical dimension of the thoracic cavity. Because of pleural linkage, the lungs are stretched, producing negative alveolar pressure. Also, there is a decrease in volume and an increase in pressure within the abdominal cavity. According to Zemlin, the descending diaphragm acts like a piston, compressing the abdominal viscera and causing them to be displaced downward and forward against the abdominal wall, which may distend during inhalation (61).

Although we seemingly have considerable voluntary control over the rate and depth of breathing, *there appears to be little if any voluntary control over diaphragmatic action*, according to [Wade and Campbell] who examined diaphragmatic movements in physiotherapists and singing teachers who believed they had voluntary control of their diaphragms. Although these subjects were able to control rib movements during breathing, there was no evidence of voluntary control over the . . . diaphragm. . . . Regardless of its significance in humans, *a functional diaphragm is not essential for breathing* (Agostoni, 1964), and there is considerable compensatory potential provided by other musculature. The most frequently cited accessory

or auxiliary muscles of respiration seem to be the intercostal muscles of the thorax and the scalene and sternocleidomastoid muscles of the neck (Zemlin 62-63).

We do have considerable voluntary control over independent movement of the thoracic structures and the abdominal wall. Campbell and Wade's research also showed that thoracic breathers do not demonstrate a marked increase over diaphragmatic breathers in the activity of the intercostal musculature. In other words, we probably use the same muscles to a similar extent regardless of the perception that one structure controls breathing more than another. Many training programs admonish students to "breathe from the diaphragm" and avoid "clavicular or thoracic breathing," but both actions are necessary for maximum inspiratory volume. If only 29-63% of the thoracic inspiratory volume is accounted for by diaphragmatic movement, then movement of the ribs and sternum must account for the remainder.

A final area where training can be of great help is in increasing the ability of the lungs to use the air available to it. The primary respiratory difference between trained and untrained singers and actors is not increased total lung capacity, as popularly assumed (i.e., the stereotype of the "big chested" actor or singer). Rather, the trained singer may learn to use a higher proportion of the air in his lungs, possibly increasing his respiratory efficiency (Sataloff 12).

Tidal volume is the amount of air inhaled and exhaled during any single expiratory cycle. This volume varies with exertion. On average adult humans exchange about 500 cc of air per breath at rest. When we speak, we increase the amount of air we take in and the amount we expel. This accounts, in part, for the inspiratory and expiratory reserve volumes. The vital capacity of the lungs, then, includes all three of these volumes. What is left over is the residual volume, which is the air that remains in the lungs and airways even after maximum exhalation. We cannot use residual air. An actor may be able to increase the amount of his or her

vital capacity that they use by using more of their reserve capacities making available breath more efficient. A technique to achieve this, called rib-reserve breathing, advocated by Machlin and Turner, among others, will be described later.

Several major conditions affect vital capacity, and therefore should be considered in training to increase capacity utilization. The first two conditions are unchangeable, but the next two are highly variable within the individual and can be successfully targeted to increase capacity utilization. First, vital capacity increases until the mid 20's, then begins to decrease with age. Actors who train to increase capacity while young will carry that increased capacity with them throughout their professional careers, even though their overall capacity decreases with age. Secondly, the build of the individual affects their capacity, with larger individuals having greater capacities than smaller persons. By the early twenties an individual has reached his adult build. It is for this reason that many vocal trainers do not recommend intensive vocal training prior to attainment of maximum body development. Age and build are not factors we can moderate with training, but we can learn to take the best advantage of the benefits that are a product of age and build to develop the best voice possible.

The position of the body can also affect vital capacity, and this is an area over which we have considerable control. We have the greatest capacity while standing and then sitting up, and the least capacity while laying on the back and upside down. Finally, the strength of the respiratory musculature influences capacity, because stronger muscles can enlarge the thoracic dimensions during inhalation more than weaker ones (Zemlin 78). Most training programs should, therefore, contain exercises which develop upper body and thoracic muscle control, along with strengthening the abdominal musculature for controlling exhalation. As will be seen, however, few training programs advocate aggressive body building, and some

(especially those systems which tout that we already possess all the power we need) fail to mention the role of muscle strength in the respiratory process.

In addition to body position and muscular development, we can influence (and in this case degrade) our capacity utilization by disease, stress, and ingesting drugs and other substances, including tobacco. These can negatively impact both volumes and capacities and limit strength. In addition, smoking decreases cilia action in the trachea while increasing mucous production resulting in increased risk of lung infection and the potential for partial or complete airway obstruction. Coughing no doubt attempts to forcibly correct this situation, causing irritation to the lungs, trachea, vocal folds, throat, and mouth in the process. The respiratory lining also contains protective phagocytic cells which ingest dust, bacteria, and other debris. Smoking injures these cells (Zemlin 36-37). Clearly, maintaining the health of the respiratory tract is just as important as any other aspect of respiratory training for actors who plan to rely on their voices for their livelihood.

III

Methods

According to Rasmus (255) the Greeks and Romans early recognized the important relationship of proper breathing to effective speaking and developed exercises to increase vocal effectiveness. Given the dimensions of ancient amphitheaters and the conventions of costume and mask, it is clear that the ancients must have successfully developed the skills necessary to project both sound and character over a great distance. The elocutionists drew heavily upon the classical models, promoting exercises to increase "breath support" as the most essential part

of training. They proposed scores of practices including maxims admonishing students to "inspire deeply," "take a large amount of air," and other forms of exercise including "chest percussion" and general calisthenics. Many of these practices disappeared as the status of elocution declined and as their efficacy was drawn into question.

From this tradition of respiratory exercise, however, two groups of drills appeared which continue in use today. The first of these, according to Rasmus (255) involved the *control of expiration*. Techniques for controlling respiration were only first described in the late nineteenth century. The second group of exercises concerns *diaphragmatic or "central" control of breathing*. There is still much discussion about the role of the diaphragm in breathing, as mentioned earlier, and consensus is still far off on this issue. Many teachers, nevertheless, continue to have their students develop this type of breathing.

At the 1987 Symposium for the Care of the Professional Voice, Robert Neff Williams of the Drama Division of The Julliard School outlined a basic regimen for training in breathing technique compatible with the majority of results of scientific studies of respiration for singers and actors (Williams 36). He proposed that "meticulous training in breathing techniques is essential for actors." While he allowed that many approaches to teaching breathing exist, the basic requirement is "a sequential system of exercises that identify and isolate the parts of the respiratory process that strengthen and control the breath and that incorporate breathing into performance (36)."

Williams advocates that actors-in-training do two kinds of breathing exercises. Athletic breathing exercises train the muscles for strength, flexibility, and control "so that breathing becomes habitually easy and full, allowing them the freedom to act." He also describes a series of what he calls aesthetic breathing exercises "which

help to establish rhythm, use breath to phrase and interpret, and clarify the integral part breath plays in the impulse to any word or action, from the broadest to the most subtle (37)." Breathing exercises involve the whole body resulting in "centered breathing" suggesting that feeling, voice, and movement all begin in the center of the actor's body.

According to Williams, the particular exercises chosen are less important than the sequence or progression chosen for those exercises (37-38). One such progression Williams uses at Julliard includes the following series of steps: 1) relaxing the mechanism (physical alignment, Alexander technique, and muscle relaxation); 2) slowing the process (awareness of inhalation/exhalation process); 3) sensing the process (feel the physical action of breathing, eliminate unnecessary tension in upper chest, shoulders, and neck); 4) interrupting the process (only a learning device -- hold breath to check for tension); 5) adjusting the timing (quick inhale, long exhale); 6) checking for steadiness (smoothly continuous breath stream without being forced); 7) adding articulation (sounds, phrases, and later bits of text; endless repetition of the same line with attention to minute changes in the breath process or the vocal production); and 8) progressing to text (longer pieces with complex structure and rhythms; start simple, move to more complex).

According to Williams, this 8-step process should not be rushed. Ideally it takes about two academic years to cover it all and should include -- if possible -- singing lessons to further the work in breath support and control. Williams' strategy for training the respiratory function is similar in some respects to earlier models with its strong emphasis on breath support as central to training the voice, and the inclusion of the classical elements of "control" and "centralized breathing" mentioned earlier. He departs, however, from the classical models of the elocutionist by insisting on an understanding of the structure and function of the vocal system and a

connection with the impulse to word or action. According to Williams, "actors work well only if they understand the reasons for doing breathing exercises and the aims of these exercises (36)."

Edith Skinner, *Speak With Distinction* (1942, 1966, rev. 1990)

Edith Skinner, William's predecessor at Julliard and the originator and chief proponent of Stage Standard Speech, barely mentions respiration in her now classic handbook, *Speak With Distinction*. She assumes the actor already has developed good breath support and concentrates on what occurs above the larynx rather than below it. To be fair, Skinner's work is primarily concerned with "speech" and not "voice." Her approach teaches precise ear training as a means of achieving narrowly prescriptive standards of pronunciation and close phonetic transcription of Spoken English.

Actors trained in this method have a sensitivity to language at its most elemental level—the phoneme, or smallest unit of speech sound. Their articulation is precise; their pronunciation is uniform to a high standard (Barton & Dal Vera 284-85).

Skinner's methods appear to be based upon a clear understanding of vocal structure and function, but she does not elaborate upon that basic information. The production of voice "involves the coordination of breathing, vibration and resonance," and that "a good voice is one that is firmly supported by the breathing mechanism in the body, specifically the interplay of the diaphragmatic and intercostal muscles." Speech, then, is "articulated breath, or breath that is shaped by the articulators into the sounds of language (Skinner 3)."

Skinner refers to the breath stream produced by exhalation as "The Excitor" (as does Turner), or the force that triggers the production of voice.

The respiratory muscles, mainly the diaphragm and the intercostal muscles, regulate and control the supply of air necessary to produce

voice. An efficient inhalation of breath is both inaudible and invisible throughout all areas of the face, neck and throat. An economic use of exhalation gives rhythmical endurance and support of tone (Skinner 3).

The rapid, silent inhale is one of the few breathing techniques mentioned in Skinner's text, although she provides no advice or exercises on how to achieve it. Skinner's "economic use of exhalation" refers to control of the muscles used in exhalation to ensure a smooth, rhythmic breath stream capable of producing articulatory precision, but she does not specify which muscles (diaphragm or intercostals) are employed in inhalation as opposed to exhalation. Nor does she mention the role these muscles perform or include any mention of the abdominal muscles which have more to do with controlled exhalation than either of the two muscle groups she does name. Again, while her text is filled with numerous exercises designed to achieve articulatory precision, there is no word on how to achieve the smooth, controlled exhalation which she feels is so essential for precise articulation.

Similarly, Skinner briefly defines what she calls the *vibrator* (vocal folds), the *resonators* (cavities of the chest, throat, mouth, and nose), and the *articulators* (lips, lower jaw, tongue, and soft palate) noting that "*complete cooperation is necessary between the excitor and the articulators, the only two parts of the voice and speech process that the speaker can control directly (3).*" Skinner's method, then, concentrates on articulation because it can be easily controlled. The movements of the lips, jaw, tongue and soft palate could not only be directly controlled by the actor, but they could also be described, illustrated, duplicated, and notated making it possible to achieve a precision of control in this area not possible in all other areas of vocal production.

Because there are no exercises in *Speaking With Distinction* dealing with breathing, breath support, or breath control, presumably the instructor who would use this workbook would supply that component of the instruction, because the text

alone is not an easy self-study book. Indeed, the meticulous attention to ear training and standards of pronunciation demanded by this instructional program would require the assistance of a skilled teacher. Skinner's colleagues and successors at the Julliard School, Robert Neff Williams (along with Elizabeth Smith), whose elaborate breath training regimen is described above, has meticulously supplied that component in his own instruction while conceding that "her principles and methods . . . should continue to instruct and inspire all actors who aim for the highest standards of theater speech (Williams, qtd. in Skinner 406)."

Finally, Skinner makes almost no mention of the integration of speech with the acting impulse or the creation of character, although it is clear from the exercises and selections she employs and the care she takes in handling rhythm and emphasis that such integration is her implicit if not stated goal. In the "Introduction to the Student" she states

The challenge to the actor is to imitate new sounds; to retrain the way the actor hears in order to acquire the best speech habits possible. Good habits of speech will enable the actor to make informed choices that are appropriate to whatever character, style of play or production concept the performer comes across during a career (ix).

In the narrowest sense, this work offers a highly specialized technique for developing a specific "sound" or dialect, which, when incorporated into an actor training regimen, should result in precise, clear, and impeccably spoken language. Skinner does suggest further study at the end of the text and lists works by Berry, Benedetti, and Stanislavski for the study of interpretation and text and the works of Berry, Linklater, and Turner for the study of voice production. As Barton and Dal Vera put it, Skinner's text alone "is not the basis for a comprehensive approach, (285)" but it has traditionally been employed as a component of many training programs since first published in 1942.

Evangeline Machlin, *Speech for the Stage* (1966, 1980)

Like Skinner, Evangeline Machlin's training program develops a technique based upon imitation of standardized speech sounds, stressing listening as a technique for both ear training (self-correcting), and observation as a technique to improve imitation skills. This method is a modern and technologically updated descendent of the elocutionist "mechanical school." In *A Rhetorical Grammar, or a Course of Lessons in Elocution* written in 1787, the author, John Walker, describes his instructional method.

Far be it from me . . . to imagine that any rules will supply the want of a good master. . . . The surest way to make [young people] read well, is to let them hear good reading, and to make them imitate as closely as they can. This is the plain simple path of nature, and never fails of success, if trod with assiduity and perseverance (Gray 4).

While Machlin's instructional method remains essentially unchanged from earlier elocutionary models, her content is sufficiently different in both scope and substance. She employs the technological innovation of self-recording using a tape recording machine (she is writing before the widespread use of cassette tapes) to assist the "master" or instructor who figures so prominently in Walker's scenario quoted above. Additionally, she extensively advocates listening to LP records of great actors performing classical roles or reciting literary or poetic selections.

Skinner, too, advocates similar observation and imitation, but does not include the technological approach which is so integral to Machlin's instructional method. In addition, Machlin includes a complete program of voice training in addition to speech training. This makes her one of the first American instructional authors to publish a work advancing a complete vocal instructional program for actors, a significant innovation in the history of American theatre voice.

Machlin emphasizes respiration as a means to achieve projection, or a "vigorous throwing out of the sounds that make up the words you speak." Such

projection is a natural act and occurs when "you open your mouth wide and let the sounds out freely (17)." Accordingly, natural loudness is quite easy to achieve and can be quickly acquired if the actor is willing to unlearn all the restraints imposed upon him or her to be quiet.

You must remove the blocks, let down the barriers, and strengthen the movements. Your own natural, unhindered speech is large enough for the stage. Speak freely, open your mouth wide, and let your speech tones ring out almost as in song. This increase in volume will be immediate and significant (19)."

While Machlin does suggest a variety of exercises to develop this "natural loudness," little discussion of respiration or the role it plays in achieving this "natural" projection is included.

Curiously, an understanding of the function of the respiratory system and control over respiratory function is to be achieved in Machlin's system primarily by self-observation. Actors are told to observe their patterns of movement which occur during speech by observing themselves in a mirror. During this observation, actors are told to probe their own bodies with their fingertips in an attempt to sense the direction and depth of their respiratory movements. In addition, actors are urged to listen to their own speech noting changes in quality as they alter any movement (29).

A sketchy and hard-to-read diagram of the vocal tract is provided with very little explanation, and actors are told to "relate the facts they [the diagrams] present to what you see, feel, and hear as you speak. This should give you a clear picture of what is happening and good understanding of how you may control it for best results (29)." This would be difficult to do at best, because neither the drawings nor the explanation which accompany them indicate what the structures are, how they work, how they interact with one another, or how one is to gain control over them.

Because breathing is a natural act, according to Machlin, and will occur when blocks or barriers are removed, there is little reason to discuss the function of the

system; yet Machlin does venture a brief description of the respiratory system. She states that the "power mechanism" of speech is the lower respiratory tract which includes the diaphragm, lungs, and trachea. Machlin states the main muscle of inhalation is the diaphragm, likening it to "an air pump, flattening itself downward on its work stroke, then relaxing upward (30)." At the same time, she explains, that "the ribs at the sides swing up and out sideways, pulled by the intercostal muscles. They act like a bellows, helping to widen the chest cavity (30)." Air then rushes into the lungs. Curiously, however, while acknowledging the diaphragm to be the primary muscle of inhalation she cautions students that they need not "learn to breath" from the diaphragm because they already do so.

Do not allow anyone to tell you that you need to learn to breathe with the diaphragm for speech. You know how to do this already and have always known it, for there is no other way. . . .The act is controllable because the diaphragm, which normally works independently as the heart does, may be taken over and made to pump harder or faster by the conscious brain. This conscious control is important because strong, swift inhalations are needed for powerful speech (31)."

This explanation suggests that diaphragmatic motion is both automatic and controllable. She does not, however, explain how this change from autonomic to controllable movement occurs or how or when it is "taken over."

Machlin explains exhalation as the reverse of the inhalation process, with the lungs being squeezed "like a tube of toothpaste" by the recoil action of the diaphragm and the return of the ribs to their lowered position. The current of air produced by this action is "made to drive the vibrator mechanism by being forced through a much-narrowed opening between the vocal cords or folds (32)." The primary difference between breathing for life and breathing to speak has to do with rate. Breathing to speak requires inhales that are quicker and exhales that are longer. Machlin's highly simplified and metaphorical description of the inhalation and exhalation process provides little useful information upon which to build an understanding of the

respiratory function, and she often confuses more than enlightens. She provides no reference or sources to document her claims or anatomical diagrams.

Machlin advises that students need to understand both the "process in general, . . . and the detailed special functions of each part (34)" of the breathing mechanism. Yet the text provides only the most simplistic description of the "process in general" and there are no explanations of "the detailed special functions of each part." Machlin proposes that the student can acquire this knowledge through the brief descriptions she provides along with observations of their own bodies, outlined in four "Exercises for Observation of the Speech Mechanism in Action."

The first of these exercises asks students to observe the degree of expansion of the thorax and the abdomen following vigorous physical activity and during vocalization. Students are directed to use their fingers to feel the vibrations in the pharynx, cheeks, and nose while vocalizing, whispering, speaking softly, and during unvocalized liping of words. The final two exercises ask the student to observe the articulatory behavior of a television broadcaster and then observe themselves speaking in a mirror. While these exercises may increase the student's sensitivity to subtle movements, they could just as easily be missed if one's observational powers were unclear about what to look for, or if one mistakes movements unrelated to respiration with the intended function. Clearly the aid of a skillful instructor is needed to provide the missing explanations of structure and function, to direct the student in what to look for in these observation exercises, and to make the connection between observed behaviors and intrinsic functionality.

Like Linklater, Machlin states that a reduction of blocks and barriers will permit the natural strong voice to emerge. The primary method she employs to eliminate these obstacles is muscle relaxation. "Freedom from tension in the throat and in the breathing mechanism also releases the actor's natural voice. . . The removal of

tension thus becomes the first step in the actor's speech training program (37)." This relaxation of the vocal tract not only releases the natural voice but is the primary contributor to "pleasantness of speech" or good vocal quality. "If there is tension in any part of it, in the breathing muscles, trachea, larynx, throat, or mouth, there may be a constriction of the passage for speech at the point where the tension exists. This will block its natural outflow (37)." This is a difficult assertion on a number of levels. Because the body is never really free of muscular tension, especially respiratory muscles which can require deep contraction, it is hard to imagine the degree of relaxation which is inferred. Because so many muscles are involved in the respiratory process it is hard to imagine exercises which could be specifically targeted to reduce muscular tension in the vocal tract.

Despite this, Machlin attempts to provide a series of exercises to induce muscular relaxation throughout the body. She states that freedom from tensions becomes habitual on the stage from long practice of this simple series of exercises which relax the whole body and the vocal tract.

Machlin states that it is relaxation that keeps the voice healthy during the stress or exertion of performance.

Lack of this relaxation in the untrained speaker makes him become hoarse. . . . Strain causes body fatigue and tension which soon spreads to the vocal tract. Huskiness begins, and laryngitis and complete loss of voice may follow. . . . Only the repeated practice of relaxation, both through the day and shortly before each performance, will safeguard you from the possible onset of hoarseness (39).

The series of relaxation exercises call for the contraction and release of muscle groups throughout the body, performed in prone, sitting and standing positions. A series of transition exercises include isometric stretches of the torso, head, arms, and face, ending with the recitation of a poem which is to be spoken "with deeply relaxed tone (46)."

While both Machlin and Linklater talk about "freeing the natural voice" Linklater eschews technique while Machlin prescribes it. The basis of Machlin's breathing technique is timing. Quick full inhales should be followed by slow, smooth, and strong exhales. Machlin instructs students to inhale at the precise moment when they feel themselves running out of breath and the sense of the line allows it. Exhalation requires no more muscular action than the natural "elastic recoil" of the diaphragm and ribs to sustain the column of air. "Usually no conscious effort need accompany the release. Control needs to be applied in inhalation only (48)." This contradicts much of the research which claims that respiratory control by means of the abdominal muscles (during active/voiced exhale) is one of the aspects which sets trained speakers/singers apart from untrained speakers/singers (Brown, Hixon, Hoit).

There are special circumstances, allows Machlin, when the actor must extend the time period between inhalations and can draw upon reserves by contracting the abdominal muscles allowing the student to "empty the lungs far more fully than usual. You will be able to speak in full voice much longer than you normally do before you inhale again. In contrast to the natural exhalation accomplished by release, this controlled exhalation is accomplished by contraction (48)." While passive recoil is operative during the respiratory cycle in breathing for living, in breathing for speaking the abdominal musculature is almost certainly at work regardless of how long you speak on a breath. Thus the image that exhalation is like squeezing a tube of toothpaste may be misleading. You cannot squeeze more out of the tube than it contains. Just as it is impossible to get the last dab out of toothpaste tube, so it is impossible to speak on the residual volume air. Indeed, postural diagrams shown in her book give very little indication of how to control those abdominal muscles to secure the long breath, because they are already in play. As Sataloff cautions, concentration of abdominal distention takes focus away from the process and can

result in more harm than good (13).

Machlin, unlike Williams, does not support the centralized breathing, or control of exhalation paradigms of respiratory instruction. Like Linklater, she believes breathing is a natural act but requires a specific technique. Proper spacing of inhalations appears to be the basis of her respiratory technique (50). Special technique for screams, cries, or shrieks require an extra full breath carefully timed to just precede the utterance, followed by "forced exhalation" on the utterance itself.

Machlin explains,

Set your mouth in the shape of the word, pull in hard and suddenly at the waist, and drive out the sound as a cry. The force of the contraction will send the air up the trachea and through the vocal cords suddenly and sharply. The words . . . will be ejected like a dart from a blowgun (51).

This does not sound like a controlled exhalation, but a blurted one which could be unpredictable and potentially damaging. Machlin denies that damage should result if performed properly, because

all the force comes from a single sharp contraction of the muscles of the abdominal wall. No force at all is used in the throat. This makes it possible for you to scream without strain and without any danger to the larynx (51).

Like screaming, laughter also requires a special kind of control of exhalation identical to panting. "The contractions are both the cause and the effect of laughter, and once started will produce the natural laugh (51)." Sobbing is a variant of laughing, best described as spasmodic, vocalized, panting ejections of air. Machlin employs a variety of breath control exercises which lead up to special exercises for screaming, laughing and sobbing. Students are told to practice the exercises daily until the technique is mastered.

The breath control exercises designed to develop these techniques include timing drills which vary the rate of inhalation and exhalation during a variety of

movements and vocalizations, ending with drills to gain practice in forced (contracted) exhalation for screams, laughs, and sobs.

Most of Machlin's breath control and support drills employ passages from Shakespeare or poems (particularly romantic or epic) and sonnets, as Machlin feels (like Berry) that a connection to the text should be established at the very earliest phases of vocal training. In addition her love of language is evident in the selection of classical passages for drill and the precise ear training and close IPA transcription demanded as part of the voice work.

While Machlin's system is fairly comprehensive and appears to advocate for basic understanding of vocal structure and function, little explanation is provided and self-study would be difficult. Finally, respiratory technique is both repudiated on one hand (breathing will occur naturally when blocks are removed) and embraced on the other (precise timing of inhalation and exhalations). This could lead to some confusion.

J. Clifford Turner: *Voice & Speech in the Theatre* (1950, 1956, 1977)

According to Turner, the voice is an instrument the actor must learn to play upon. The training process teaches actors the technique needed to play upon their vocal instruments with precision and power. Turner's comprehensive vocal system deals with both voice and speech, training the actor to achieve

a technique which will embody the essentials of his art, but which cannot in the nature of things be in any way final or conclusive, for a technique matures only with the development and maturing of the imagination by which it is controlled and whose servant it is (Turner 3).

Both the impulse to speak as well as the means by which the actor responds to that impulse are central features in the training process and Turner attempts to address both throughout his text.

The physical utterance consists of both voice and speech. Turner defines Voice as "the quality of the tone by which a speaker may be identified (3)." He labels the components of the vocal process "the excitor [breath stream], the vibrator [vocal folds], and the resonator." Machlin used the very same terms but describes them functionally. Turner, whose work precedes Machlin's, describes these three components metaphorically, comparing them to musical instruments, particularly the violin. "The whole instrument behaves perfectly providing its natural functioning is not interfered with, and is developed on correct physiological principles (6)." This is the first of many contradictions in Turner's work. While he states here that the voice will work fine without interference, he also states that the voice will not function well on its own. He suggests here that an understanding of correct physiological principles is essential in training, yet repudiates the need to have detailed knowledge of vocal structure and function – just prior to providing detailed descriptions of it.

In Turner's most recent edition of his text, four aspects of utterance are to be considered in training the voice:

the breath, the note, the tone, and the word. Each must be developed on its own merits, and in the right order, and related to the rest during this process. Breath is the excitor and relates to the lungs, the note refers to the vibrator or vocal cords, the tone and word are both resonators, but the tone is the "sum total size" of the throat, mouth and nose, while the word is the "variable shapes and contacts" in the mouth and nose (9).

Training in breathing must be undertaken for the untrained mechanism will not automatically do what is required of it. Technique is essential to Turner's process, and unlike either Machlin or Linklater, he does not presume that it is the result of blocks or barriers to natural expression, but results from a lack of skill. In addition, projection of the voice presents quite separate demands from those associated with normal utterance, and additional breath is required to be heard at a distance. According to Turner, the "untrained speaker obtains this additional breath incorrectly,

and . . . is unable effectively to control its output with consequent deterioration of tone quality (9)."

Skill is achieved by developing habitual behaviors consistent with good voice. "Good voice and speech is a habit and requires regular and consistent practice in order to maintain and develop the technique (Morrison in Turner 137)." Habitual behaviors are modified by repetition and practice until they become automatic. Turner states "the essence of a technique is that all movements should be consciously directed until a new habit is formed. Therefore we have to decide which movements of the breathing mechanism will bring about the best results in the voice, and repeat these movements under the direction of the will until they become habitual (10)." Thus, Turner employs classic behavior modification techniques to identify, reinforce, and ultimately, to habituate desirable vocal behavior.

Turner includes both of the classical requirements of vocal training -- obtaining "sufficient capacity" and the "ability to control the breath" with firmness and controlled power (9) -- in his training method. Central to his technique for attaining both sufficient capacity and breath control is timing: the actor must rearrange the timing of the normal breathing cycle for a quick inhale and long exhale (10).

Turner states that a detailed knowledge of vocal structure and function will not aid the actor, because it is the impulse that drives the movements of the vocal tract to respond to the actor's demands. Whatever knowledge of and control over the respiratory function is needed will result from observation of the actor's own body and exercise. With respect to the respiratory process Turner states,

It is quite unnecessary here to embark on a detailed explanation of the anatomy of the breathing organs. Such knowledge itself in no way enables correct breathing to be achieved. In any case, the breathing movements are very easily observed, and no amount of explanation of how they are brought about will ensure correctness of movements (10-11).

Turner appears to suggest that knowledge of the respiratory process is valuable, even though it is not essential in the development of technique to control the process. Despite this, he provides a relatively detailed description of the respiratory process. Air is drawn into the lungs when the size of the chest is increased by means of contraction of the muscles which move the ribs and contraction of the diaphragm downward. He notes that not everyone breathes the same way or makes use of both chest expansion and diaphragmatic contraction (and his system is one of the few which openly acknowledges these differences). These movements must be "developed and controlled" to establish the "technique" needed for proper respiration.

Development of this technique begins with a fairly detailed explanation of the physiology of the muscular movements involved in moving the ribs and diaphragm. Actors should develop the ability to extend the chest laterally and forward, without lifting the shoulders.

It is the outward movement of the ribs which should be encouraged. Any tendency to lift the rib cage vertically as a whole must be resisted and there must be no raising of the shoulders . . . which results in shallow breathing. . . Lateral movement, then, is to be encouraged and vertical movement resisted (11).

It is unclear if this type of movement can actually be achieved because the ribs are expanded outward with the same movement which lifts them upward. While it is possible to expand the thorax without lifting the shoulders, the interrelationship of these muscles is complex, and isolation as Turner would suggest, may not be possible in all individuals. However, when working from the perspective of "impression" rather than actual function, focusing on lower chest expansion may create the appropriate response even though it is functionally confusing.

Lateral expansion should be felt at a "central" level according to Turner. The actor can identify this expansion by feeling the ribs with their fingers at the sides of the chest. "The sensation should be that the whole of the back widens through from

side to side. The wrong sensation is that the ribs and breastbone are thrust forward in front (12)." This exercise should be repeated until the sensation is achieved that the ribs spring out effortlessly to their maximum excursion with no movement whatsoever of the upper part of the rib cage. Again this is a curious instruction from a functional perspective, but metaphorically describes the desired "impression" which will produce the response Turner is seeking from the actor.

In addition to lateral expansion of the thorax, Turner adds that proper respiration is achieved by nasal inspiration and silent oral expiration, combined with relaxation of the jaw and vocal tract. These movements, combined with proper diaphragmatic contraction produce appropriate capacity for active respiration.

According to Turner, downward movement of the diaphragm should be "sensed" without distention of the abdominal wall. It is not clear, however, what the diaphragmatic movement is or where the control is occurring. Indeed, according to Turner there may be little movement to actually observe "as the diaphragm is frequently sluggish, and the extent of its downward movement and the ease with which this can be induced varies considerably between one individual and another (13)." While it is heartening to see that he acknowledges individual differences in anatomy and function, it does little to clarify the role of the diaphragm in the respiratory process. He suggests that there must be an "equalizing and balancing" between the movements of the diaphragm and the ribs to enable the actor to acquire full capacity. According to Turner,

the diaphragm is attached by its circumference to the lower ribs, so that when these move outward they draw the edges of the diaphragm with them. The extent of the downward movement of this muscle is thereby restricted. There is, however, no diminution of the breath capacity, since the lack of downward movement is compensated for by the increase in the size of the area in which the diaphragm moves (14).

Turner fails to note that the inversion of the diaphragm's "dome" accounts for the

increase in vertical dimension of the thorax. This confusion is further exacerbated by his suggestion that women use their ribs too much and men use their diaphragms too much. He contends that each should use more of the other type of movement to improve breath support. In addition, proper breath support is developed by deep breathing exercises which "develop the bellows of the instrument." Using a 3-count the actor must 1) push ribs outward, 2) descend the diaphragm, 3) the ribs descend and the diaphragm is raised simultaneously, thus deflating the lungs. This is repeated with a slow rhythmical count. Slow regular practice is the method for learning this technique. When this is achieved, the two inspiratory motions (ribs and diaphragm) can be performed simultaneously to obtain full capacity, and the expiratory actions are isolated: The diaphragm is raised, then the ribs are lowered. Isolating these movements helps achieve control. Ultimately, both ribs and diaphragm always move simultaneously.

Additional control is achieved by gradually increasing the amount of time taken to exhale and decreasing the time used to inhale. These quick inhalations and slow exhalations become automatic with practice. Turner cautions the actor to move slowly and to delay any pacing of exhalation "until you are able to direct breath to the right place in the right way (12)." By gradually increasing the duration of the exhalation, the actor gains the power to control breath along with increased capacity.

One additional technique Turner advocates for gaining control of exhalation is called "rib-reserve breathing." To accomplish this the actor is instructed to take a full breath by expanding the chest and lowering the diaphragm. To exhale, the diaphragm rises, but the ribs do not descend but remain expanded. The object is to do all of the work of inhalation and exhalation with the diaphragm keeping chest muscles completely still in the expanded position(16). This permits the ribs to come into play to

produce more expired air when needed. Rib-reserve breathing is only possible because the abdominal muscles can contract to permit controlled exhale while the diaphragm is returning to its relaxed position.

In inhalation, the diaphragm is active and contracts and the abdominal muscles yield by relaxing; but in breathing out, the diaphragm is passive, and will return to its arched position only at the rate at which the abdominal muscles contract. These may be brought under the direct control of the will, and so the rate at which the breath passes out of the lungs can be determined (17).

In addition, rib-reserve breathing is silent and invisible. Gasps for air at the end of long passages are avoided, as are chest heaves and shoulder raising. It keeps the abdominal muscles from distending the abdomen, thus controlling the figure as well as the voice (23). Throughout Turner's text, when he refers to breathing he is implying rib-reserve breathing and assumes that the student will master this technique before continuing on with any additional voice work.

Relaxation must be developed along side breath control, argues Turner. He goes so far as to claim that "extreme cases of tension lead to loss of voice and often to permanent impairment of the vocal cords (18)." The student must develop the power to relax at will, especially in rehearsal and performance conditions which tend to induce tension rather than relaxation. Relaxation exercises, similar to those used in most vocal instructional systems, relax muscle groups through isolation stretches while in a relaxed prone state. "The mind should actively be recording the ease resulting from such deep relaxation so that the sensation may be recalled at will (20)."

When respiratory technique and deep muscle relaxation is mastered the actor then progresses on to extensive text work employing these new patterns of breath support and control.

Arthur Lessac, *The Use and Training of the Human Voice: A Practical Approach to Speech and Voice Dynamics* (1960, 1967)

Lessac's system is extremely comprehensive, integrating all aspects of sound production, articulation, body alignment and movement into his method. It requires the assistance of a highly skilled instructor trained in the system, because it can be difficult to understand, and nearly impossible to tell on your own if you've "got it right." It provides a strong physical and sensory way of locking the "correct" sound in. "This is a technique in the fullest sense of the word, and in contrast to approaches that value freeing and liberating the voice, this method is formal and structured (Barton & Dal Vera 287)."

Unlike Berry, Turner, Machlin, and others, Lessac does not emphasize text work, and unlike Skinner, he generalizes standards of pronunciation rather than prescribes them.

Lessac works from the premise that careful observation of how the body wants to function – how it would function in the absence of adverse conditioning – is the best guide to the production of beautiful sounds. Used naturally, the voice will create vibrations that can be felt in the hard palate, the sinuses, the forehead, and eventually throughout the entire body. When voice and speech become an inner physical experience, their connection to the emotions become clear (Barton & Dal Vera 286).

Lessac states that much of the respiratory system is not under the control of the actor and is, thus, not responsive to training. Specifically, he states that the "diaphragm, breath stream, and vocal membranes—cannot be manipulated because they produce no controllable physical sensation in the trachea and larynx. Only controllable actions are responsive to training (Lessac 13)." The act of respiration and the movement of breath from the lungs through the bronchial tubes and trachea until it puffs through the vocal membranes in the larynx (vocal folds) are beyond conscious control. We have only partial control over supplementary breathing.

We have complete conscious or voluntary control over postural

actions that aid respiration, including loosening of the knee joints, rotation of the pelvis, firming of the abdominal wall, expansion and extension of the back during inhalation and exhalation, and maximum chest expansion without chest or shoulder elevation; the actions of the cheek muscles, lips, jaw, and tongue that form and control the spatial relationships within the oral cavity affecting tonal quality and vowel formation; the sensation of the vocal sound waves vibrating in the hard palate and bone of the nose, forehead, and sinuses; and the habit pattern of overriding the auditory mechanism (13).

His method relies upon actors being able to retrain their ears to "hear" their own voices. Lessac argues that because we hear our own voices more by bone conduction than by air conduction, the ear is unreliable in judging sound until it is retrained. Thus, a trained ear – provided by a skilled Lessac-trained teacher – is essential in this early phase of training to tell actors when they have the sound right and to assist them in identifying and memorizing the sensation associated with the correct sound (15-16).

Lessac's method of training deals only with actions and energies that can be controlled consciously and intelligently. He defines three major categories of these actions: Structural action, tonal action, and consonant action. When correctly performed, speaking and singing are physically effortless. "When the three are properly integrated, they help to relieve physical tension, and the very act of speaking brings with it a sense of well-being and vitality (17)."

Correct breathing and correct posture are essential and interrelated in Lessac's system. He argues that well-conditioned habit patterns of breathing are necessary for speech. Correct posture increases the size of the chest circumference, resulting in less crowding of the internal organs of the thorax, making "the whole body . . . feel lighter and more comfortable (27)." Lessac advocates a slightly curved spinal alignment called the "C-curve" (28) which has been considered controversial by many teachers and voice scientists because it "runs contrary to most current anatomy/physiology/kinesiology texts (Barton & Dal Vera 287)."

Despite this criticism, Lessac believes this posture to be the most natural and appropriate for the formation of correct structural and tonal action.

For a beautifully projected voice, Lessac writes that exhalation must be kept to an irreducible minimum. He claims that strenuous pumping or pushing of the diaphragm or the abdominal muscles have little to do with volume or projection of tone, and thus should be avoided. He states that if you speak well you will breathe well.

If you become aware of the use of breath while singing or speaking, you are already indulging in extraneous and harmful manipulation of the breath. The best tones will be felt when a minimal amount of breath is used, an amount so minimal as to deny conscious use of it (30).

He proposes that controversial studies conducted in the late 1950's which suggest that vocal cord vibration might be stimulated entirely by neural impulses may eventually be proven to be true. Findings from these studies argue that breath may not be needed to produce vocal fold vibration if they can be stimulated into vibration by neural impulses. Whether true or not, he insists that "breath control does not regulate voice production--rather, voice production regulates breath control (30)."

Respiratory muscles including the diaphragm must be kept in peak condition according to Lessac. This is one of the few systems which stresses the involvement of the entire body in the process of sound production and demands athletic rigor and conditioning to maintain peak usage of the vocal apparatus. Lessac assumes that the actor will acquire this level of personal conditioning prior to embarking upon voice class and maintain it throughout instruction.

Lessac's own exercises are designed to teach the student to feel the natural breathing function. Students are placed in situations where they must create structural action sensations during the exercises and then are encouraged to remember the sensations. Students are asked to pay particular attention to their postural alignments while supine and to focus on the action-sensation of the

movements at the side waist during breaths as abdominal muscles move in and out. "Stand and repeat the feeling and you will repeat the action that produced it (31)." This notion of identifying a "sensation memory" as a basis for achieving a desired posture or action is at the heart of Lessac's technique.

Lessac employs a whole series of exercises which place the body in bent over positions where natural breathing is automatic and emphasis is placed on learning and memorizing the action-sensations associated with back expansion rather than chest expansion and the firming of the abdominal muscles, along with the "correct" slightly convex C-curve postural alignment (40-41). He does include two exercises in exhalation control and duration-capacity improvement, but both are very gradual and meant to develop habitual breathing patterns through daily repetition and precise practice.

While Lessac's system is the most technically thorough system of all which have been examined so far and his knowledge of anatomy and physiology appears to be extensive, his descriptions of breath and muscle action are far more metaphorical than actual. Indeed, he spurns actual physiological description because he states it does not help any in the training of voice.

This training system has been criticized for being hard to integrate into the actor's process, because inspiration is drawn from the actor's body and sensation memories rather than from the text. Like Skinner's dogmatic attention to pronunciation precision, Lessac stresses procedural precision in body alignment and tonal and consonant action sensations. Indeed, the Lessac system is dogmatic and precise and requires much training to achieve mastery. While Skinner's method requires acquiring the correct sound, Lessac believes the correct sound will come of its own accord if all other ideal conditions are created in the actor's body to make it a receptive place for sound.

Cicely Berry, *Voice and the Actor* (1973); *The Actor and His Text* (1987)

Berry claims not to have a method or a system and admits to there being many right ways of speaking, rather than just one as Lessac, Machlin, and Skinner do. She is the least dogmatic of the group. A sharp contrast to Lessac, Berry's emphasis is on dramatic text rather than on the human body as the point of departure for the actor, and as such she believes that a deep connection with the text will reveal not only what to say but how to say it. She has a deep understanding of the actor's process and incorporates voice work into that process rather than separate from it. That process focuses on the character's need to communicate, looking at voice from a more psychological and motivational perspective than Lessac who looks from a purely technical perspective. (His work is much harder to incorporate into the actor's process.) Similarly, Patsy Rodenburg refers to the actor's right to speak, a similar psychological approach to voice work.

Berry is adamant about technical vocal work as well as text work. Her books contain many exercises to obtain mastery over technical skills related to body placement, posture, relaxation and breathing, and articulation. The essential core of her work, however "lies more in her relationship to text and language, focused by the material she selects to explore and the attitude of openness with which that exploration proceeds (Barton & Dal Vera 288)."

There is nothing prescriptive about her approach and she claims to have none, despite the fact that many schools advertise for teachers who employ the "Berry Method." According to Barton and Dal Vera, Berry can be credited with finding the bridge connecting the best of the formal voice work of the past to the liberating techniques of the present because her work contains elements of both.

In her first book, *Voice and the Actor*, work starts traditionally with relaxation, breathing, lip and tongue muscularity exercises, and moves on to freedom and

flexibility. Always the work is connected back to the text. For example, breathing is linked with the structure of thought and phrasing, which implies that the actor who runs out of breath is really not exploring the structure of the thoughts efficiently (Martin 172). She does not emphasize the emotional side of the technique but does make many connections between the psychological need for humans to communicate and the means by which that need is fulfilled.

Berry employs many exercises for relaxation, including the Alexander technique for releasing tension, breathing for greater capacity, and other exercises for developing resonance. According to her, "the breath is the initial impulse, which strikes against the vocal cords in the larynx . . . and makes them vibrate (Berry 9)." The sound waves which are produced from this vibration can be resonated in the chest, the pharynx, the mouth, nose, and bones of the face, and sinuses. Unlike Turner, Berry states that we must never look upon the voice as an instrument, because that implies something exterior to the actor to be played upon. Voice is the psychological extension of individuals and, thus, will be complex and unique to each actor.

Berry states that the impulse to produce breath is the need or desire to communicate. The stronger the desire, the greater the breath. But it is also a physical action involving the use of certain muscles, and like an athlete, exercising those muscles can increase the efficiency of the sound.

For Berry, how breath is produced is not as important as how it is used, and consequently there is almost no discussion of either the structures of the vocal tract or the physiology of the vocal mechanism. A diagram of the body showing the parts of the vocal tract is imprecise, hard to read, and lacks detail. It purports to be a cut-away of the upper thorax, but none of the structures revealed are recognizable or accurately drawn. The description of the respiratory process is obscure and

metaphorical and related more to impulse than to function.

With the voice, you depend on the breath to start the sound – not too much for that would make the sound breathy, not too little for that would make the attack glottal and the tone hard, but right and clean using all the breath to make sound (19).

Berry's discussion of respiration is primarily one of placement. Actors are encouraged to focus on breathing from the lower chest rather than the upper chest, expanding the lower ribs and back to provide the room for increased capacity. "If you find the breath at the base of the ribs, especially at the back and in the stomach as the diaphragm descends, then the whole frame of the body becomes part of the sound as it contributes to it with its resonance (21)." She makes a point that breath is not isolated from the impulse to speak or from the physical presence of the actor. They are linked psychologically and physically. She goes so far as to state that if your breathing is limited to the upper part of the body, your voice will reflect only part of you.

Breathing, then, functions both physically and psychologically, for the act of inhaling is an act of reaching down to your center for the sound.

The breath goes in, and the sound comes out – you are touching down to your center, you are finding the 'I' of your voice. When you find this it is as though you belong, you are present in what you are saying. You will then find the breath touching off the sound like a drum. You will find that you will not have to use a great deal of breath, because the breath will be made into sound. It is economy of effort. When you find this absolutely right use of breath the voice will be effortless, it will impel itself. This is where your true energy is. This is what I mean by rooting the voice (22).

Berry prescribes a series of very specific exercises designed to create a sense of freedom rather than a sense of technique. All work on relaxation and breath is designed to release tension and prepare the actor to use the breath that will be naturally produced as a result of the impulse to communicate. All work relates ultimately to the text, and the text is introduced very early in the exercises, much

earlier than in any other system, to allow that connection to be part and parcel of the technique.

For Berry, the development of the voice goes through three stages. First, "you do exercises for relaxation, breathing and for the increased muscularity of the lips and tongue, all of which free you and open up the voice almost as you do them (11)." The second stage is more complex and personal because it involves applying this freedom and flexibility to the actor's work. Voice must become part of the actor's whole process and cannot at that point be considered in isolation. Part of the work in this second stage is physical but part is psychological. Tension and limitations, according to Berry, always come from a lack of trust in yourself. The actor should approach each role "with no preconceived ideas of how it should sound, no holding on to the voice that you know. It is only by being in a state of readiness that the voice will be liberated (13)."

The third stage of the development of the voice is when you have achieved a unity of physical and emotional energy. This comes when actors realize that the energy they need is in the muscles themselves, and when freely permitted to respond to the impulses and intentions of the text, they will. The aim here is only to simplify. Berry concludes that "in the end getting the best out of your voice is a straight matter of doing exercises, you often have to go through a complex phase to know why the exercises are needed . . . you have to sort out the problems and needs of communication before the exercises can be effective (13)." The voice needs to be allowed to come out freely without being pushed too much.

Berry's exercises are designed to habituate both muscle control and muscle sensation while inducing a relaxed state. She insists that the actor must be aware of the separateness of muscles and what they do, but makes no attempt to identify any of the muscles or their function in the respiratory process, except for the diaphragm,

and this is referred to in only the vaguest of terms. Clearly it is the sensations perceived in various parts of the body (names are non-technical, e.g., tummy for abdomen) rather than muscular action that she must be referring to.

She proposes breathing from the lower chest and back, without letting the upper part of the chest move, and creates a series of exercises to provide sensory experience to reinforce this image of where the breath originates. Once this sensation is memorized, diaphragmatic action is introduced. Control of this action is image-based as well, and she states that you cannot feel the diaphragm directly, "but you can feel the muscles at the top of the stomach which it displaces when it moves down (25)." No further discussion of the diaphragm is given except to indicate that breath should originate low in the body and the actor should "become familiar with the feeling of the sound springing from the diaphragm (26)."

Berry does mention that the movement of the ribs and the diaphragm occur simultaneously and does not advocate rib-reserve breathing (Turner advocates this type of breathing) where the ribs are held out firmly and the diaphragm recoil alone generates the exhaled breath. She calls this unreal and tension-producing and discourages it.

The final series of breathing exercises employ the use of text, first simple then more complex – always classical verse. Emphasis is placed on the breathing process rather than the phrasing or meaning of the words, as it is intended to act as a bridge between just doing exercises and applying the breathing to words. She summarizes the exercise process this way:

You have opened the rib cage by stimulating particularly the muscles between the ribs, by waiting for them to need to move, so that they spring out of their own volition and not by you pushing them out. You have also felt the back widening as you do so. You have drawn the air into the deepest part of the lungs, conscious of the spine lengthening down to its root as you do so. You have also been conscious of air being drawn in through the nose, down through the

bronchial tubes and the bronchioles to fill the space in the lungs. You have felt the air going deep into the stomach as the diaphragm goes down, and felt some movement of the stomach muscles to allow for this. And you have used all this resource to make sound. . . You have done it standing still and moving about (32).

The remainder of the work on breath is application of breath to text of increasing difficulty, reinforcing the postural and body alignment, relaxation and breath-image sensations introduced in the initial exercises.

Kristin Linklater, *Freeing the Natural Voice* (1976)

Linklater's method is completely different from Berry's in both practice and philosophy. Her method is based on the teaching of Iris Warren whose work during the 1930's popularized the science of voice production as part of the training for British actors. It was revolutionary for its time as the first program of instructions which added the elements of communication theory and psychological understanding to the physiological principles already popularized by the great teacher Elsie Fogerty in the early 20th century. Fogerty had systematized a method of speech training based on accurate physical mechanics of the voice. But Warren moved from the external controls to internal psychological ones, which helped British actors avoid straining their voices when expressing strong emotions by helping them unblock (Martin 175).

Linklater's approach – based on the work of Warren – is a mix of organic physiological action and psychotherapeutic freeing, meant to liberate the voice. It is in no sense a technique, but rather a freeing of the voice from all boundaries without prescribing any particular form, style or sound. Her system doesn't deal with the development of the voice like Lessac and Machlin's, but rather with the removal of blocks (Barton 290).

Neither Berry nor Linklater believes in the correction of "faults" in a proper

style of pronunciation (like Skinner and Machlin) or even a correct way to speak. Both attempt a psychologically integrated approach. Berry does so by means of text, while Linklater does so physically through a step-by-step series of exercises that gradually liberate the actor to allow the voice to freely follow whatever impulse is felt. Almost the reverse of Berry, whose method is psycho-physical, Linklater's method is almost entirely metaphorical. This is also in sharp contrast to Lessac's method which is anatomically-based and prescriptively focused on the results of training rather than the process. Linklater focuses on the process alone, suggesting the voice will take care of itself without recourse to technique once blocks have been removed. "The action of freeing the actor is more subtle than that of building gross technique, and actors need to have patience, commitment, and a focus on the process rather than on the result (Barton 290)" when studying the Linklater method. Work in this manner must be done under the guidance of a skilled teacher. Because of the subtle and detailed nature of the work, a Linklater teacher requires years of training to become proficient.

Linklater's second book deals with the technique for working with text which she eschewed in her first book. She comes full circle, meets up with Cicely Berry, and deals with form and content in a forming and shaping phase designed to follow the freeing phase.

Linklater states that the inner muscles of the body must be free to receive the sensitive impulses from the brain that create speech. "Tensions acquired through living in this world, as well as defenses, inhibitions and negative reactions to environmental influences, often diminish the efficiency of the natural voice to the point of distorted communication (Linklater 1)." Her method is totally dependent upon physical awareness by means of exercises that systematically isolate, exercise, and relax each part of the body so the skeleton rather than the muscles do the work.

Because Linklater's method is emotional and metaphorical, naturally the voice is described metaphorically rather than scientifically. She does provide an accurate, detailed, scientific description of respiration at the start of her text, but with a disclaimer that quickly shifts to metaphorical descriptions which she acknowledges will make "the voice scientist quail" but which has proven in her experience to be the "best approach for the voice user (7)."

Breath is "the source of sound" and is made by releasing a "sigh of relief." The actor's "center" is his or her energy center which houses breath, feelings, and impulses. An imagined "pool of vibrations" in the lower half of the torso is released on the sound 'huh' by manually jiggling the sound out (80). This is called a "touch of sound," and once established, provides the basis for speech as it is amplified by stimulating different areas of vibration in the lips, cheeks, nose, forehead, top of skull, back of neck, throat, and chest. Learning takes place through a slow period of sensitizing and awareness training to allow the actor to perceive habits and register new experiences.

Michael McCallion, *The Voice Book* (1988)

Lesser known than some of the other texts examined, McCallion's and Rodenburg's systems are two of the newest British offerings available to voice students. They have not been widely used in American college and professional training programs, but they do represent both a distillation of techniques from other systems as well as a few new developments. The first of these newer system, devised by Michael McCallion, places a great deal more emphasis on respiratory structure and function than seen in any of the previously mentioned works.

McCallion's work contains much detailed information on vocal structure and function along with a comprehensive system of voice and speech training. He

describes the respiratory tract in great detail, although his complete discussion of respiratory physiology is placed in an appendix at the end of his text. None-the-less, it is the most detailed, thorough, and accurate treatment of the topic of any of the systems considered.

McCallion states that very little breath work is needed by the actor who engages in regular vocal use. It is only when the actor is called upon to develop some degree of athleticism in the voice that additional work must be done. "For this, you not only need to release the breathing mechanism into correct functioning, but also to develop that mechanism so that it is strong (35)."

McCallion's breath work focuses on the three basic tasks which breath performs in supporting the voice.

The first is to ensure an adequate supply of oxygen to the blood while we go about our strenuous business. . . The second task is to supply enough breath at the right pressure to pass through the glottis (the gap between the vocal cords) and then between the speech organs so that we can give out enough sound to fill a theatre comfortably with clear speech; an extension of this is making sure that we have enough control to be able to use the voice athletically . . . The third task is to make sure that the breath is responsive to the shape of the thought we are trying to express and to the emotion that goes with the thought, and this calls for us to master the uses offered by the changeability of the breathing pattern (36).

He goes on to explain each of these basic tasks in detail and provides considerable structural and functional detail along with accurate diagrams of the lungs. Before beginning his extensive breathing exercises, he discusses numerous 'breathing problems' which he feels actors should address before proceeding with the breath work.

Not being able to get the voice out is the first problem he addresses. This occurs when an actor takes in a huge breath and holds it, rather than releasing it to power speech. While some breath is used to produce a 'shallow sounding' voice, most of the air remains locked in the chest. Running out of breath is the second fault

addressed. This occurs, he argues, mostly from damage to the breathing system caused by illness or smoking, or "phonation or tuning is poor and so too much air escapes on all the speech sounds (41)." This can also occur if the lungs cannot achieve full expansion due to poor posture or underdeveloped muscles in the chest or abdominal regions.

The primary respiratory technique advocated by McCallion is The Release. This technique concentrates on exhalation, because he argues that inhalation comes pretty naturally. Like Rodenburg, McCallion feels that most problems result from holding the breath or "fixing it" in the chest, and that releasing the breath by releasing the expiratory musculature in a smooth and controlled manner will solve most of these problems.

The exercises for release and breath control begin with detailed self-observation in a mirror to be able to discern respiratory behavior by watching how it affects the exterior of the body. The remaining exercises work the abdominal muscles, the thoracic musculature and focus attention on expanding the sides and the back to permit full rib expansion during inhalation and clean smooth release of the abdominal muscles during exhalation.

McCallion states the way in which these exercises are performed is more important than the mere fact of doing them (58). Because much of the work is designed to improve posture and strengthen muscles, it is essential that proper alignment and rhythm are maintained throughout the exercise process. While he argues that actors can monitor their own progress effectively by becoming careful self-observers (he does provide model diagrams and photographs of actors doing the exercises correctly), it would be valuable to have an experienced instructor assist to ensure actors are 'doing it right.'

McCallion's approach is simple, straight-forward, and clearly explained, both in

terms of structure and function and in terms of the actor's intention or need to produce voice which responds to the thought or impulse to communicate. He has been able to successfully combine fairly traditional image-based instruction with more technical descriptions to provide a user-friendly system which anyone could employ, with or without an instructor, to improve respiratory behavior for speech.

Patsy Rodenburg, *The Right To Speak* (1992)

Patsy Rodenburg provides a comprehensive series of classical exercises designed to increase capacity, control, and support of breath in association with relaxation and release of tensions. While her technique employs some of the "liberating" principles of Linklater's approach and much of the psychological connection between voice and the human need to communicate extolled by Berry (Rodenburg refers to it as a "right to speak" rather than a "need to communicate"), it includes extensive breath work. Little, however, is revealed about respiratory structure and function.

Rodenburg states that her approach is simple and non-technical. She shuns other voice texts as being "terribly clinical and strain too hard to be like medical texts. These are useful for practitioners and teachers but harder for the general reader (ix)." She goes on to say that her own students "variably get lost or lose interest" when attempting to work with other texts. While she speaks fondly of the tremendous influence of her friendship with Gwynneth Thurburn, she rejects much of Clifford Turner's technique who was the direct protege of Thurburn.

Rodenburg's relationship with Cicely Berry seems to have a more important influence on her technique, however, than her friendship with Thurburn.

No one in voice work today can deny the immense contribution that Cicely Berry has made. Almost single-handedly she has made the work both respectable and exciting for actors, theatre directors,

educationalists and students alike. Her vigor and imagination have moved the voice coach from the periphery of the performance process to a place more central (xiii).

While both of these teachers have influenced her work greatly, Rodenburg's own approach attempts to adapt her own voice training (in the tradition of Turner, using bone props and rib-reserve breathing) at London's Central School of Speech and Drama, by adding to those 'rediscovered' aspects of so-called 'classical' voice training which have evolved over the past two-hundred years of vocal instruction (xiii).

In Rodenburg's system, breath work is a conceptual as well as a physical act. While exercises are employed to work the abdominal and thorax muscles responsible for inhalation and exhalation, her system employs the image of "placing the sound" by means of breath. "Breath for the very practiced voice should come from its lowest and deepest source, the pelvis area, and then be propelled up through the abdomen, chest, throat and out of the mouth producing a rainbow of different sounds (117)." Rodenburg remarks that most speakers have the same problem. They are "cut off from the breath. We speak supported by short bursts or fragmented gasps of breath that overburden the whole vocal process and cut down its efficiency as a mechanism (117)."

Rodenburg describes the inhalation and exhalation process very simply and without any functional detail. When you inhale, "the lungs fill and expand as the sides, back and front of the ribcage open, the diaphragm move down and out and the lower abdominal muscles release. All this in one superb motion. With large and deep breathes . . . you can feel this movement right down into the groin area (145)." When you exhale, "all the body's muscles move in together, converging simultaneously again, to support the exhalation of breath (145)."

Much of the breath work in Rodenburg's text relates to achieving the

sensation of an honest natural breath (145–46). The "naturalness of breathing" becomes corrupted and perverted by life's pressures. Speakers tend to hold breath, rather than taking it steadily in and out. This is the fault which Rodenburg concentrates on correcting in addition to seeking a breathing center point deep in the bowels -- literally -- as the source of breath.

Rodenburg does not concern herself with much breathing technique beyond sensitizing exercises, a fairly extensive relaxation series, and some work on expanding capacity and control of breath. Most of her work is conceptual, and she argues that students must change their thinking as much as they change their behaviors. Like Linklater, she argues that "when the body is free then the breath needed simply drops and falls into place. The process is quite organic and you will never need to think about it or force the process (147)."

Rodenburg tends to come full circle, employing much of the terminology and technique of traditional systems, like Machlin and Turner, and some of the reductionist approaches of Linklater and Berry, while acknowledging the kinesthetic exercises and resonance work of Lessac and to a lesser extent McCallion. In addition, she admires the rigorous adherence to pronunciation standards that is advocated by Skinner, but does not embrace ear training or phonetic transcription of Skinner and Machlin, and she uses British Received Pronunciation as her model. Her system is a synthesis of elements from nearly all of the systems examined thus far. She employs a strong psychological approach (each person must exercise his or her right to speak) to vocal training and employs information on structure and function very sparingly.

IV

Survey of Respiratory Instructional Techniques

In his survey of vocal instructional practices, Morgan found that instruction in respiratory technique and relaxation was an important element taught early in most voice courses in acting programs. Thirty-six percent of all teachers surveyed indicated that they address this area within the first two-three weeks of their courses (Morgan 10). Interestingly, he found that more teachers in professional actor training programs than in traditional academic college voice programs emphasized respiratory exercise early in their courses. Non-professional programs included such training but were more likely to do it later in the course of study. Forty-two percent of non-professional programs begin their courses with analysis of students' speech and voice and identification of areas that need personal improvement.

When asked where the impulse to speak originates, four out of five instructors indicated that the impulse source was in the area of the abdomen or diaphragm (12). In addition, about half of all instructors use the term diaphragmatic most often to describe appropriate control over breath during voice exercises (15). It appears from the data that most instructors place great importance on the respiratory tract as both the source of sound as well as the source of the impulse to create sound. Thus, it is not a surprise that nearly every training method mentioned, as well as numerous other lesser known methods, rely upon respiratory training as integral to the production of good voice, particularly in the development of unstrained projection of the voice (increased volume). The majority of instructors in his survey teach relaxation and breathing techniques both separately and integrated with phonation

and tone sustention practice (13).

Research into the differences in respiratory function between trained and untrained actors suggests that this training makes a difference. Watson, Hixon, and Maher ("To Breathe or Not to Breathe" 1987) found that trained speakers used no more capacity than untrained speakers when speaking, reading, or reciting from a text. They did however use more capacity than untrained speakers when performing a Shakespearean monologue and during periods of increased loudness. They concluded that the biggest differences found between world class Shakespearean actors and other speakers were their ability to develop high alveolar pressures for prolonged periods and to make very rapid adjustments, including quick inspiration, quick onset of utterance, and sustained high alveolar pressure within breath groups. Untrained actors tended to use less abdominal displacement, less variation in respiratory patterning, and less efficient use of phase transitions (271). They additionally concluded that these differences were far more likely to be the result of training and experience than "naturally occurring."

While many teachers indicate that their teaching is influenced by traditional speech science and theory concepts (Morgan 8), more teachers in professional training programs indicate their greatest influence is Linklater's approach (39%), Lessac's system (33%), or other British professional teachers like Turner or Berry (23%). Teachers in non-professional programs are more likely to be influenced by Voice and Diction texts, rather than theatre voice texts, and they are likely to include more detailed information on respiratory structure and function. This is supported not just by the greater emphasis on speech science in traditional voice and diction curricula, but by the finding in Morgan's survey that teachers feel students respond better to exercises led by the instructor than to lengthy discussions about theoretical reasons for doing them (10). Thus, if you attend a professional acting school you

are less likely to have specific training in voice science within the voice class. Non-professional voice programs are more likely to include elements of voice science in their voice classes because additional voice work may not be offered in other acting classes or additional voice classes.

Remarkably, the great variety of techniques, methods, approaches and emphases employed in the instruction of breathing for speech is impressive. Yet running through each of these systems, no matter how different they appear to be, is the fact that inhalation and exhalation are controlled by nerves and muscles to which the actor has only limited access. Those which can be consciously controlled often act as a focal point for managing those which we cannot directly access. Rapid inspiration, slow and controlled exhalation, and creation of sufficient capacity and breath pressure feature prominently in each system, despite inconsistent use of terminology and metaphorical (and in some cases imaginative) descriptions of vocal structure and function. The classical elements of vocal training still remain: good voice is the product of controlled expiration and concentration upon diaphragmatic or "central" control of breathing.

CHAPTER 3

Phonation

Energy, in the form of a relatively steady state or unmodulated stream of air from the lungs, passes into the trachea and finally into the larynx. The larynx is the principal structure for producing a vibrating air stream, and the vocal folds, which are part of the larynx, constitute the *vibrating elements*. Rapid opening and closing of the vocal folds periodically interrupt the air stream to produce a vocal or glottal tone within the pharyngeal, oral, and nasal cavities. Modification of the configurations and therefore, the acoustical properties of these cavities, which are known collectively as the vocal tract, transform the relatively undifferentiated glottal tone into meaningful speech sounds (Zemlin 99).

I

History and Background

Although some early elocutionist writers like James Burgh, John Mason and John Walker (Gray 4) have mentioned proper phonation as a necessary characteristic of effective voice, not until the 1800's did speech teachers begin to write about the importance of coordinating breathing and tone production (Rasmus 255). Prior to this time most teachers and writers were interested primarily in the vocal effect. By the middle of the nineteenth century some teachers, like W. Russell, R. I. Fulton, T. C. Trueblood, J. H. McIlvaine and William Chamberlain, began to show interest in the processes involved in producing the effect. As a result of this interest, numerous empirical techniques were devised to combine this new knowledge of vocal function with the teaching of vocal effectiveness. Some of these techniques included whispering, gradually phonating vowel sounds, and yawning to maintain "openness of the tone passage." Although somewhat modified, most of these techniques have continued in use today (Rasmus 255-56, F. T. Russell, 39-55).

The early twentieth-century teacher Samuel Curry (*Mind and Voice*, 1910) added further empirical drills, such as relaxation of the throat, the laryngeal musculature, the jaw, and back of the tongue. All of these exercises later received support from the investigations of the voice scientists who, in their study of the nature of vocal cord vibration and vowel formation, showed that vocal efficiency reaches a maximum peak under conditions of relaxation (G. Oscar Russell, *Speech and Voice*, 1931).

In an attempt to explain the way in which sound is produced by the larynx, investigators and writers of both the past and present have attempted to compare the acoustical properties of the voice to musical instruments, whose workings are fairly well understood. Consequently, the voice is often likened to stringed instruments, like a violin, or wind instruments, like an oboe. It is, however, really more like a brass instrument (functionally speaking) than a woodwind. The vocal folds chop the airstream into short bursts of airflow where the vocal folds correspond to the trumpeter's lips. The vocal source signal is similar to the sound a trumpeter would make with only a mouthpiece. The voice, in contrast, is the output from the trumpet's bell (Baken 19).

For many years this musical analogy was used as a means of explaining phonation. More recently, however, research has revealed an array of detailed information about laryngeal function and tone production. Despite this abundance of accurate and detailed information about the structure and function of the larynx, most theatre voice instructional systems do not describe the larynx in much detail, if at all.

This is not the case, however, in most voice and diction texts, which typically have included extensive and detailed descriptions of the larynx and associated voice structures. Ward Rasmus, the former Director of the Speech and Hearing Center at San Jose State College, wrote as early as 1955 that

the important current practice of informing students about the structure and function of the speech mechanism started with some of the later elocutionists such as Fulton and Trueblood. Advances in physics, anatomy, physiology, and psychology have presumably added such support to this idea that most current voice teachers insist that students know how the vocal mechanism performs (257).

Theatre voice instruction, attempting to distance itself from the more traditional voice and diction courses, apparently also abandoned the practice of teaching about laryngeal function. While most theatre voice systems acknowledge the larynx as the source of the vocal sound, they fail to identify it as the source of vocal pitch, loudness, and many of the vocal characteristics associated with vocal quality. In addition, almost none of the systems examined discussed vocal health and ways to avoid vocal abuse, despite the fact that most vocal dysfunction results from laryngeal abuse, irritation, or swelling. While a few systems identify the various components of the larynx and surrounding structures, most do not feel that knowledge of laryngeal function is necessary.

II

Position & Function of The Larynx

The larynx, in conjunction with the breath stream, is where the source signal originates. It is located above the trachea and below the hyoid bone at about the level of the third, fourth, fifth, and sixth cervical vertebrae. The larynx is a modification of the upper most tracheal cartilages which form a highly specialized valvular mechanism that opens and closes the air passageway. The position of the larynx varies with age, sex, head position, and laryngeal activity. The position of the larynx moves over a maximum range of 7 cm when the neck is flexed and extended.

Biologically the larynx is an intrinsic part of the respiratory system and

protects the lower respiratory tract. Acting like a valve, it prevents air from escaping the lungs, prevents objects from falling into the lungs, and forcibly expels foreign substances which try to enter the larynx or trachea by releasing a sudden burst of compressed air to clear any blockage. The larynx also closes tightly to permit thoracic fixation. This allows increased abdominal pressure to be held to assist in heavy lifting and to evacuate visceral contents (defecation, urination, vomiting, and childbirth). More importantly for speech, it is a highly specialized organ capable of utilizing expired air for the production of voice (Zemlin 35).

The larynx is a highly versatile structure capable of rapid and subtle adjustments and produces sound over a very wide range of pitch and loudness. Mechanically, however, it is "no more than a variable resistance to the flow of air in and out of the lungs (Zemlin 100)."

Within the larynx, the vocal folds are long, smoothly rounded bands of muscle tissue which may be lengthened or shortened, tensed or relaxed, and abducted (separated) or adducted (approximated or brought into contact with each other along their length). The muscular, vibrating portion of the vocal fold is quite long and well suited for sound production. The space between the folds is called the glottis and can be easily increased or reduced in size by the movements of the folds.

During normal breathing the folds are spaced rather widely apart during inhalation and exhalation. "The larynx produces glottal tones by generating a rapid series of short-duration air pulses, which excite the supralaryngeal air column so as to produce a complex tone (Zemlin 100)." The folds are closed restricting air flow from the lungs. The forces of exhalation produce increasing air pressure beneath the folds. When pressure reaches a sufficient amount, the folds are literally forced apart, releasing a puff of air into the vocal tract. Pressure below the folds is lessened and the elasticity of the tissue allows the folds to snap back into their

adducted position ready to be forced apart again when pressure has again built up. This is one cycle of vocal fold vibration. During normal phonation this sequence occurs at a rate of 100-125 complete vibrations per second for men, 210-220 for women, and higher for children.

The high rate of vibrations-per-second of the vocal folds tends to resemble the characteristics of a vibrating string, and consequently the vocal folds are often equated to the strings of a violin, because mass per unit length and tension in relation to length determines the rate of vibration. But the larynx is an aerodynamic structure and only partly complies. Rather than vibrating like violin strings, the vocal folds separate and collide (Zemlin 142). The number of times they do so in any given second (their frequency or cycles-per-second) determines the number of puffs that escape. This is referred to as the *Fundamental Frequency* (FF, the average number of cycles-per-second) of the voice and is measured in hertz (Hz). The time interval from the start of one cycle to the start of the next is called the "period" and is measured in milliseconds. The frequency of vocal fold closing and opening is related to pitch. The greater the FF, the higher the perceived pitch of the voice.

The intensity of phonation (perceived as loudness of the voice) is related to the force of the impulses (or puffs). Other factors help determine loudness, such as subglottal pressure and glottal resistance. Intensity increases (or sounds louder) when the force, pressure, and resistance increase.

Numerous factors affect the sound produced at the glottal level. They include the pressure that builds up below the vocal folds (subglottal pressure), the amount of resistance to opening an airway presented by the vocal folds (glottal impedance), the volume velocity (or speed) of airflow at the glottis, and supraglottal pressure, or pressure above the glottis. The sound created at the vocal fold level is really a buzz, similar to the sound produced when blowing between two blades of grass. This

sound -- known as the glottal source signal -- contains a set of harmonic partials and is responsible in part for the acoustic characteristics of the voice. The vocal tract above the glottis accentuates or attenuates the harmonic partials, acting as a resonator, reinforcing some of the partials and damping others. The vocal tract is largely responsible for the quality and variety of the sounds produced.

Resonance (which primarily occurs in the vocal tract above the larynx) is not strictly a phonatory function. Some systems associate resonance or sound reinforcement with phonation while other systems associate resonance with articulation. Clearly, phonation, resonance and articulation are closely related as all three must be present to create "speech." For the most part, however, phonation will be examined separately from resonance, except where such a division is not made in a particular system. Such will be noted when discussing the individual systems below.

The larynx is one of the most complex structures in the entire speech and hearing mechanism. Despite its location in the neck, it seems to be surprisingly vulnerable and is easily abused. It is subjected to the same diseases as the respiratory tract and is dried out through the breathing process. Breathing in polluted air, drinking alcohol, smoking, and engaging in vocal abuse, all contribute to dysfunctions in the larynx (Zemlin 125).

III

Physiology of the Larynx

The larynx consists of one bone, numerous cartilages and muscles, both within and outside of the larynx proper. The extrinsic muscles of the larynx are

primarily responsible for the support of the larynx and for fixing it in position. The intrinsic muscles are largely responsible for the control of sound production.

The larynx is suspended somewhat from the hyoid bone, which also serves as the superior attachment for some extrinsic laryngeal muscles. It is also the inferior attachment for the bulk of the tongue musculature. Twenty-two or twenty-three muscles are attached to the hyoid bone, and it is unique in that it is not directly attached to any other bone in the skeleton. Thus, it is a highly mobile structure. The hyoid bone and the structures which make up its cartilaginous framework vary considerably from person to person in size, morphology, and symmetry.

Intrinsic muscles of the larynx are responsible for abduction, adduction, and tension of the vocal folds. Extrinsic laryngeal musculature maintains the position of the larynx in the neck. It includes primarily the strap muscles. Since raising or lowering the larynx may alter the tension or angle between laryngeal cartilages, the extrinsic muscles are critical in maintaining a stable laryngeal skeleton so that the delicate intrinsic musculature can work effectively. In the Western classically trained singer, the extrinsic muscles maintain the larynx in a relatively constant position. Training of the intrinsic musculature results in vibratory symmetry of the vocal folds, producing regular periodicity. This contributes to what the listener perceives as a "trained" voice (Sataloff 9).

The intrinsic laryngeal muscles include the *vocalis muscle* which adducts, lowers, shortens, and thickens the vocal fold, rounding the vocal fold edge. Adduction (closing of the folds) from *vocalis* contraction is active, and it tends to lower vocal pitch. The posterior *cricothyroid muscle* abducts, elevates, elongates, and thins the vocal fold. All layers are stiffened, and the edge of the vocal fold is rounded. The *lateral cricoarytenoid muscle* adducts, lowers, elongates, and thins the vocal fold. All layers are stiffened, and the vocal fold edge takes on a more angular or sharp contour. The *interarytenoid muscle* (arytenoideus) primarily adduct the arytenoid cartilages. The *cricothyroid muscle* is largely responsible for longitudinal tension, a very important factor in control of pitch and to some extent loudness.

Contractions tend to increase vocal pitch (Sataloff 9-11).

The extrinsic muscles of the larynx include those above and below the hyoid bone. The *infrahyoid muscles* (below) act to lower or pull down the hyoid bone. The *suprahyoid muscles* (above) tend to raise the hyoid bone. Coordinated interaction among the extrinsic laryngeal muscles is needed to control the vertical position of the larynx, as well as other conditions such as laryngeal tilt (Sataloff 11-12).

The paired intrinsic laryngeal muscles help change the shape of the glottis and influence the vibratory behavior of the vocal folds. Abductor muscles separate the vocal folds for respiratory activities, the adductors approximate (close) the vocal folds for phonation and protective purposes.

The intrinsic laryngeal muscles are responsible for two types of internal laryngeal adjustments. *Medial compression* is the extent of force with which the vocal folds are brought together at the midline, and the degree of stretching forces is called *longitudinal tension*. A combination of these two adjustments plus a variable air supply account for the versatility of frequency and intensity in the human voice.

Because function and structure are so inextricably bound to one another, the basic anatomy of the larynx provides us with valuable information regarding the mechanics of voice production (Zemlin 135). The onset of phonation occurs in two phases: *Prephonation Phase* and *Attack Phase* (142-43). During the prephonation phase the vocal folds move from abducted to either an adducted or a partially adducted position. As the folds approximate they begin to obstruct the outward flow of air from the lower respiratory tract during exhalation, and subglottal pressure begins to build up. The velocity of the air, as it flows through the glottal constriction, is raised sharply.

The folds are blown apart from the bottom to the top in a rhythmic action. As the glottis opens, the space between the folds has reduced pressure from the space

just above and below it (the Bernoulli effect) which has the effect of sucking the lower margins of the glottis back toward the midline. These lower walls of the facing edge of the folds also have natural elastic properties which cause them to spring back to their original position. As the cycle proceeds the lower portion of the folds close as the upper edges of the folds are still being blown apart.

The upper portion of the vocal fold contains the highly elastic vocal ligament. As the edge of the vocal fold is pushed farther from the midline, the ligament is stretched, and like a rubber band, the more it is stretched, the stronger is the tendency to snap back to its original shape. This restorative force begins to overcome the outward pushing force of the air pressure, which has been weakening by the approximation of the lower portions of the folds. The glottis returns to its closed shape ready to repeat the cycle. This is called the myoelastic-aerodynamic model of phonation (Baken 23-27).

The folds do not move in synchrony. The lower part is always a bit ahead of the upper part; it separates earlier and returns to the midline earlier. Called a vertical phase shift, this dis-synchrony is critical in maintaining phonation. In addition, the loose mobile cover of the vocal fold does a lot of the movement. If there were no vocal fold cover (mucosal covering) phonation would not be possible (Baken27).

The second phase of phonation, the Attack phase, begins with the vocal folds adducted or nearly so, and extends through the initial vibratory cycles. Complete obstruction of the air passageway is not necessary to initiate phonation (Zemlin 144). For example, there are three ways the air stream can be released during the attack phase: simultaneous attack, breathy attack, and glottal attack.

Simultaneous attack is a healthy balance between the respiratory and laryngeal mechanism. The airstream is released just as the vocal folds meet at the midline. The voice sounds normal, natural, and healthy with no discernable negative

vocal quality characteristics.

In breathy attack the air stream is released before vocal fold adduction is completed, and much air is wasted prior to actual phonation. While a breathy attack is not dangerous to the voice, it is ineffective and results in a weak, breathy sounding voice.

Glottal attack occurs when pressure builds behind the adducted folds resulting in an explosive vocal tone with a sudden onset of phonation. A rough and unpleasant vocal quality may be associated with abusive use of glottal attack. It is not always easy to hear glottal attacks, although they occur frequently in some languages, and glottal arrests and releases are common in English.

A. Frequency and Intensity

The larynx is very versatile and it is capable of producing tones over a wide range of frequencies and intensities and with different modes of vibration. Changing the fundamental frequency of the voice, that is, raising or lowering the pitch of the voice, is done by varying the rate at which the glottal wave repeats. The most efficient way to do this is to modify the mechanical properties of the vocal folds, and to a lesser extent, alter the pressure of the air supply.

The vocal folds are stretched or elongated by the contraction of the cricothyroid muscle. When the folds are longer, they separate more quickly, shortening the cycle, resulting in a higher fundamental frequency (FF) perceived as a higher pitch. The vocal ligament will also snap back more quickly because it is under greater tension contributing to the higher fundamental frequency. The thyroarytenoid muscle (vocalis muscle) can also be contracted and stiffened contributing to this rise in fundamental frequency (28-29).

Because the voice is aerodynamic as well as biomechanical, modifying the air

pressure can also change the fundamental frequency. Raising the pressure increases vocal intensity, but there is a strong tendency to increase fundamental frequency as well. Singers and speakers must often compensate for this increase in pitch when attempting increased loudness (29).

Laryngeal tones vary in pitch over a range of almost two (or more) octaves in normal conversation. Because the pitch or fundamental frequency is the average rate of vocal fold vibration, typical ranges for male and female adults can be determined. Males typically have a fundamental frequency of about 130Hz and females have a fundamental frequency of about 220Hz. Each person's voice is unique, however, and tends to center around a relatively small range of pitches (often stated as one to three octaves). Some teachers believe that each individual has an *optimum pitch* or natural level determined by the physical characteristics of the individual larynx and vocal tract. It is typically located about one-fourth of the way up the total singing range. Many voice teachers believe that speakers typically sound best when they speak at or near their optimum pitch, because they are taking advantage of the inherent characteristics of their own particular vocal mechanism.

To raise and lower the pitch of the voice, the vocal folds must lengthen and shorten when adducted. The folds are longest when abducted (open). In this position their average length is about 15-20mm in men and 9-13mm in women. They shorten when they adduct for phonation. Folds lengthen as pitch rises, but they never get longer than their abducted length. As the folds increase in length, any given point along the folds decreases in mass, resulting in an increase in frequency which is perceived as pitch. An increase in tension of the vocal folds is just as responsible for pitch increases as length and mass changes. In fact, length and mass changes may result from the elastic tissue of the folds yielding to the marked increase in tension (Zemlin 152).

When the folds are tensed and elongated to produce higher-pitched tones some predictable changes occur. The folds lengthen and change from round, thick lips to narrow bands. Although the folds seem relaxed, almost flaccid during phonation, they are actually stiff and rigid, especially at higher pitches. The glottis appears as more of a variable slit, and only the medial edges of the folds seem to engage in vibration (Zemlin 154).

At higher pitches, the folds often fail to approximate completely. This results in a breathier voice quality at higher pitches. Higher pitches are accompanied by higher subglottal pressure, but pressure alone does not increase pitch. Increased medial compression must also be present to raise pitch.

To lower pitches two forces are at work. The inherent elastic properties of the tissue helps lower pitch, once the stretching force has been removed. A further increase in tension of the vocal folds must be produced to actively shorten the vocal folds by means of contracting muscles. To lower pitch below the habitual pitch the vocal folds must relax and thicken (Zemlin 156). This occurs by means of the musculature of the vocal fold itself. Raising and lowering the position of the larynx during phonation of extremely high- and low-pitched tones occurs in some but not all individuals. The extrinsic laryngeal muscles do this.

Vocal intensity is a function of the amount of excitation that the glottal waves deliver to the air in the vocal tract. The greater the amplitude of the glottal wave, the more intense the vocal signal. Raising the pressure of the air supply pushes more air through the glottis. Thus, increased lung pressure translates into greater vocal intensity. The folds must also be stiffened to resist the greater air pressure. The result is that intensity increases are produced by a carefully regulated interaction of a higher driving pressure (aerodynamic) and an increased glottal resistance (biomechanical) to flow (Baken 30).

The loudness of the voice under normal speaking conditions typically spans about 30 decibels but is capable of a span of as much as 70 decibels. The sound intensity level of the voice will increase by about 8-12 decibels when subglottic pressure is doubled. The duration of the closed phase of the vibratory cycle increases with vocal intensity and subglottal pressure also increases with increases in intensity. The extent of the lateral excursion of the vocal folds increases with intensity for some subjects and remains unchanged for others, but the force with which the vocal folds meet at the midline increases for all subjects as voice intensity increases. This means that medial compression is increased and that the larynx is offering increased resistance to air flow. The result is that subglottal pressure must be increased in order to overcome the increased glottal resistance (Zemlin 159-60).

At low pitches the intensity of the voice is raised by an increase in glottal resistance by means of medial compression of the vocal folds, which requires elevated subglottal pressure. At high pitches glottal resistance is already high, so intensity is controlled by the rate of air flow through the glottis (Zemlin 160). This is achieved through the forces of exhalation. Muscles must forcefully adduct the vocal folds, and increase glottal tension. The increases in pitch that often accompany increases in intensity of phonation can be accounted for by the greater tension of the vocal folds (160). Intensity ranges are dependent upon pitch; that is, it is harder to be loud at the lower extreme of one's pitch range. Most intensity occurs in the middle to upper part of one's pitch range.

In addition, articulatory constrictions during conversational speech are continually influencing the pressures available to the glottis. Consequently, there is a real limit to the loudness of the voice, especially when articulating voiced consonants.

B. Registers and Vocal Quality

Zemlin defines registers as a particular mode or type of vibration within a range of pitches. Pitches outside of this range require an altered mode of vibration to appropriately accommodate the succeeding range (163). According to Brodnitz, vocal quality is often the primary characteristic of voice register, because the voice changes quality when moving from one register to another. If voice quality is the criterion used to distinguish registers, then it must apply to speaking voices as well as to singing voices (164).

Registers, then, are expressed as quality changes within an individual voice and have a variety of names which attempt to identify the vocal quality which is perceived. From low to high, they may be called vocal fry, chest, middle, head, falsetto, and whistle registers, although not everyone agrees that all categories exist. In speaking voices we refer to the modal register, the voice quality used generally by healthy speakers, as opposed to a low, gravelly vocal fry or a high falsetto. Vibrato is a rhythmic variation in frequency and intensity. A wobble occurs when the variations from the central frequency become too wide (Sataloff 16).

Attempts to describe subjective voice qualities is the most contentious area of voice instruction. Different registers sound differently. The acoustic impression of the voice is derived from changes in the way the vocal source signal is molded by the vocal tract as well as from differences in the vocal source signal itself. Hollien (in Baken 31-32) suggests that the vocal source signal can be classified into the following laryngeal registers.

1. **Modal register:** this consists of laryngeal function in the range of fundamental frequencies (FF) used commonly by untrained speakers: 75-450 Hz in men, 130-520 Hz in women. It is the most common register, and a speaker's optimum pitch will generally fall into this register.

2. **Pulse register:** this register occurs at the low end of the FF scale: 25-80Hz for males and 20-45Hz for females. Laryngeal output is pulsatile in nature, like vocal fry or glottal fry, or a creaky, harsh or rough voice quality. Folds are freed of all tension (increased mass and reduced stretch) in this low register, which accounts for low pitches in this register. It is quite common at the ends of sentences where both pitch and volume tend to drop in some speakers.

3. **Loft register** is the upper end of the vocal continuum, 275-620 Hz in males and about 490-1130 Hz in females. This register is often referred to as falsetto or upper reaches among singers. Falsetto at the extreme upper portion of the pitch range is also a peculiar vocal quality that is a consequence of the manner and not just the rate of vocal fold vibration. Very high levels of fold tension occur at this register, and the folds are thinned so they look like a shelf. In fact, contact between folds may be minimal or not at all. Faster vibrations and shorter cycles in the loft register results in a reduction in the maximum glottic size which means weaker intensity.

In addition to characterizing the voice by pitch ranges and registers, the manner in which the folds vibrate can also contribute to perceptions about voice quality. For instance, the tension of the vocal folds and their mass per unit length will influence the rate of vibration. The folds act as pairs and tension and mass must be the same for both. If one fold is slightly heavier than the other, it will vibrate at a lower rate and the perceptual consequence will be a rough-sounding voice. Longitudinal tension, mass per unit length, medial compression, subglottal pressure, and physical symmetry all have an important bearing on the quality of the voice (Zemlin 168-69).

Good vocal quality is a delicate balance and many things can influence it,

including acute or chronic disease, swelling due to allergic reaction or acute vocal abuse. The use of tobacco, drugs or alcohol, as well as yelling or shouting will modify the physical characteristics of the vocal folds and can cause damage to the vocal tract. The voice is a surprisingly good index of the general state of health of an individual and that includes mental health. It is possible, to some degree, to control the environment the vocal folds are subjected to ensure the health of the voice and thus the quality of the voice.

In addition to the condition and vibratory action of the folds, other factors can influence vocal quality. These aspects of voice quality are inherent in the glottal wave itself, although some are a product of the action on the source signal in the vocal tract (e.g., resonance).

First, turbulence caused by leaking air in the glottis can affect the perceived sound. A little noise produces a sensation of fuzzy softness to the sound which is perceived as a "velvety" quality. More turbulence produces breathiness or perhaps huskiness. Lots of turbulence contributes to the perception of hoarseness.

Vibrational irregularity or frequency and amplitude perturbation makes the harmonics less easy to distinguish. Normal perturbation is not lessened by vocal training or attempts to control the voice. It reflects the inherent instabilities and irregularities in the contractions of the muscles that control the vocal structures. Some amount of jitter (variation in period) and shimmer (variation in amplitude) are normal, however, voices with less jitter or shimmer tend to sound "better" (they are more periodic) than others (Baken 38-39).

The problem with talking about vocal quality is a lack of consistent terminology to describe it (Stern 14). "A voice classification system should be based on the specifiable parameters of the voice, and that presupposes that the facts will support our images, which are often steeped in tradition (Zemlin 169)." Fairbanks

characterizes vocal qualities caused by laryngeal variation as hoarse, harsh, and breathy (170-171). Illness, abuse, allergy, edema, or neoplasms may also produce hoarse or rough voices.

Breathiness (mentioned earlier), or noisy voice, is an inefficient form of phonation, resulting in very limited intensity range. Because of inadequate medial compression of the folds, subglottal pressure will not have to build up to very high values before the resistance offered by the vocal folds is overcome. Low pressure means low intensity. Leaking air produces noisy voice. Breathiness may be the result of poor vocal habits or it may be organic, (i.e., structural peculiarities in the larynx which may result from chronic vocal abuse). Nodules on the vocal folds can result from vocal abuse and causes the voice to be very noisy, using about four times more air than normal.

Whispering is nonvocal sound production, with an air stream creating turbulence in a v-shape chink in the glottis, generating frictional sounds. The vocal folds may move or remain still during a whisper. Monoson's (1976) research suggests that whispering is not abusive and persons on vocal rest can whisper without injuring the folds.

III

Methods

Most vocal instructional systems deal with both voice and speech. Voice typically refers to the production of vocal sound or tone, while speech refers to what happens to the laryngeal tone as it is resonated and shaped by the articulators in the upper vocal tract. So in examining how vocal instructional systems teach about

phonation, we are examining, for the most part, the production of "voice." Voice and speech are very closely related functions, because speech cannot occur without voice. But in training the voice, much is made of the difference and often they are taught separately and often in a particular sequence so as to achieve a certain result. For example, Skinner assumes that the student will come to the work with an "adequately trained voice" and does not mention it further but launches directly into speech instruction. Turner, on the other hand, deals with development of the resonance portion of speech ("tone") prior to work on the voice or "note." Work on the "word" or articulation of the tone and note follows. Lessac differs from both of these stating that the order of study is of no importance as long as the interrelationship of all of the parts of voice and speech are maintained in a balance.

Morgan attempted to identify what college and professional voice instructors were emphasizing in their voice courses in his 1980 survey of U.S. Colleges and Universities. His results reveal that about 42% of instructors in non-professional programs and 29% in professional programs analyze students' voices early in the course and identify areas that need personal improvement. In other words, they make perceptual analyses of their student vocal quality. However, only 31% of nonprofessional programs and 17% of professional programs include anatomy and theory of speech production early in the course. This would suggest that some teachers may be making assessments about students' phonatory behavior without explaining laryngeal structure or function. Only a third of the nonprofessional programs and only a quarter of the professional programs surveyed considered information about both vocal quality and laryngeal function preliminary and foundational. The remainder of the programs address anatomy and physiology much later in the course of study for their voice students, or do not include it at all (Morgan 10-11).

Most instructors (three-fifths) indicate that one and a half to two octaves is an appropriate pitch range (15). One-third of all instructors indicated that 75% or more of their students employ a reasonable modal pitch habitually. Teachers in professional programs believe fewer students are using efficient modal pitches than teachers in non-professional programs (16). Only about half of the teachers assess habitual pitch for each student (16-17). Three fifths of all instructors assess pitch usage by their "sensitive, experienced ear" alone. One fourth use some sort of a "standard test" in combination with their "experienced ear."

The most frequently used method for encouraging wider pitch intervals in speaking is the drawing of intonation lines or "pitch contours (17)." More than half of all teachers use this method. Almost half advocated practicing appropriate emotional material as a means to increasing pitch variety.

More than one-third of all instructors consider voice registers to be primarily the consequence of phonation. Another third believes that registers are the result of phonation and resonance combined. The other third believe registers are accounted for by resonance alone or are not concerned about registers in their instruction (18). One-third to one-half of all teachers surveyed attempt to develop higher "head" registers and lower "chest" registers in their instruction. There was a lot of confusion about what registers were. Some respondents indicated that registers meant wider pitch ranges, while others used registers to mean different resonating cavities or the focus of tone within a specific cavity (19). Morgan's results indicate a great deal of inconsistency in how phonation is taught in both college and professional voice courses. This is borne out by the widely varying treatment of phonatory information included in the vocal systems examined here.

In the various vocal instructional systems examined a wide variety of topics relating to phonation are included. Some are directly related to laryngeal structure

and function while others are included with no mention about how they are produced. Nearly every system mentions the presence of the larynx and vocal folds, although not all of them discuss their role in the production of vocal tone. Because most of the authors included indicate that very little or none of the phonatory process is under the direct control of the speaker, phonation is often poorly described, characterized in metaphorical terms, glossed over as unimportant, or omitted entirely. Speech functions which occur on the laryngeal level, including variation of frequency (perceived as pitch) and intensity (perceived as loudness) are often dealt with extensively in most systems, but almost never in physiological terms. Vocal quality is often considered, and various names are assigned to each of the qualities. How these perceived qualities are produced on the laryngeal level is almost never included, however, in most of the texts examined. Only a few systems believe registers are salient points to be studied.

Detailed description of laryngeal structure and function is almost never included in even the most detailed works, and the effects of vocal abuse, illness, medicine, and environmental conditions on the larynx which directly impacts the health of the voice (as well as the quality of the voice) are seldom mentioned as well.

Thus, in analyzing how the various systems communicate about phonation, I will note specifically that information related to (1) pitch, (2) intensity or projection, (3) vocal quality, (4) vocal health of the larynx, in addition to (5) a brief overview about how laryngeal structure and function is included or excluded from the particular method.

Edith Skinner, *Speak With Distinction* (1942, 1966, rev. 1990)

Skinner ignores phonation for the most part because the focus of her work is articulation. A brief description of "the vibrator" or vocal folds in the introduction to

her work states that the vocal folds

produce sound waves or sound vibrations when breath travels across them; this action is an involuntary one that relies on concentration and mental images. For this reason, it is essential that the breath and the vocal folds function with relaxation, so that the speaker can achieve a smooth initiation of tone and avoid tightening of the throat, which result in what is known as glottal attacks of vowel and diphthong sounds (Skinner 3).

Because the process of phonation cannot be directly controlled by the speaker, according to Skinner, nothing more is mentioned about the vocal cords or the source signal. What speakers can control is their degree of relaxation in the region of the throat, so this is focused on. Because relaxation may influence the ability to avoid glottal attack, it is mentioned, only in passing.

A detailed description of vocal anatomy above the larynx is predictably included in the beginning of Skinner's work, but nothing more is mentioned about the larynx (called the voice box in her drawing) or the vocal folds and glottis. One exception is the peculiar designation of the "throat or glottis" as one of the four immovable articulators (along with the teeth, gum ridge and hard palate) (Skinner 4).

Skinner does not mention vocal quality except nasality, and only mentions the glottal attack as a sudden convulsive stop and release of the breath in the glottis or throat. She characterizes it as a stop plosive, which she believes is undesirable in Spoken English. It is further characterized as a tense, throaty attack on words that begin with a vowel or diphthong sound, or as a hiccupping replacement for a consonant sound in a word or phrase (388). Thus, it is seen as an articulatory feature rather than a laryngeal one, and thus is controllable. Skinner does not address projection or intensity, pitch or range, or vocal health.

Evangeline Machlin, *Speech for the Stage* (1966, 1980)

Machlin begins her examination with an analysis of the student's voice to

identity "speech faults" including characteristics such as nasal twang, hoarseness, or mispronunciations. Because perceptions about vocal quality are a natural part of this assessment, analysis of the phonatory signal would be suggested. Machlin mischaracterizes strident, hoarse, and breathy vocal tone as features of resonance rather than phonation (16), a point Stern has taken her to task on in the past (Stern 15). Analysis of pitch has more to do with emphasis and variety rather than noting habitual pitch or accounting for the size of the pitch range in Machlin's text.

Most astonishing is Machlin's suggestion that projection or natural loudness is easily achieved by simply opening the mouth wider (17). She explains that opening and closing the mouth appropriately to project speech is a principle based on both the nature of sound and the acoustics of theatres.

Speech sounds, like all sounds, are pressure disturbances. The motive power for the disturbance is the upcoming stream of air from the lungs. The source of the disturbance is the vibration of the vocal cords, opening and closing as the air forces its way between them. In so doing, they start sound waves, pulses of alternating rarefaction and condensation of air molecules, that move out into all the open spaces to which they are admitted. They act somewhat like water pouring from an opening under pressure. If the opening is a main hydrant rather than a faucet, much more water will pour out. It is so with the sound waves coming out of your mouth. Barely open your lips, and you will cut down the volume of the escaping sound wave very much. Open them wide, and much more of it will emerge (20-21).

While it is not disputable that an open mouth and relaxed jaw contribute to both resonance and projection, Machlin's analogy misses the point. It is the pressure from the hydrant that permits the flow which can then be allowed to flow either restricted by the faucet or unrestricted on the curb. Thus with mouth opening, it is the pressure of the breath stream, modified by glottal impedance that permits the flow which can be restricted or not by the aperture of the mouth. While increasing the size of the resonating cavity can no doubt augment tone, the role of subglottal pressure and medial compression of the vocal folds in producing intensity in the voice is absent

from the discussion.

In "A Reply to David Stern" Machlin attempts a defense against the charge that there is more to intensity than opening the mouth widely. She quotes Boone's *Voice and Voice Therapy*, who also notes that a larger oral cavity aids amplification of the voice. She fails to acknowledge, however, the role of subglottal pressure or laryngeal adjustment. This is understandable, from her perspective, because her method does not rely on an understanding of vocal function to improve the voice. In fact, she takes Stern to task for using "big words" and sounding pompous, instead of acknowledging that Stern's descriptions were functional rather than metaphorical.

Stern argues that "a functional approach [to phonation] will reduce confusion about the distinct contributions of air speech, fold valving, and fold shaping to the loudness and pitch characteristics of the voice (15)." Machlin differs on this point. She might argue that such knowledge is of little use because we exercise no control over the phonatory structures. Stern argues that it is only through our ability to control these structures that we are able to exercise such precision in control of both pitch and loudness and significantly improve vocal quality, including the elimination of the "faults" of hoarseness, breathiness, and harshness.

Another problem arises when phonatory functions are mistakenly assigned to other parts of the vocal tract. Stern charges that Machlin "thoroughly confuses the independent, functional elements of resonance and phonation" by calling the vocal qualities of stridency, hoarseness, nasality, and breathiness faults of resonance. He acknowledges that nasality is a resonance problem, but argues that the other three are actually dysfunctions of the vocal folds. In her reply (Machlin, *Theatre News*, 28) Machlin concedes that "hoarseness and breathiness are, from the clinician's point of view, problems of phonation. But they are perceived by the student and the teacher as problems of resonance (28)," and from her perspective perception is more truthful

than structure and function.

Thus, it is clear from the arguments of Stern and Machlin that significant differences in understanding of the process occurring during phonation significantly impact both what is taught and how it is taught. Specifically, Stern and Machlin do not place the same importance on information about laryngeal structure and function. While this may not influence the efficacy of their instruction, it can confuse or mislead students about what is critical in the study of voice.

Finally, Machlin does not address vocal health in any substantive way, except to note that abuse is the result of tension in the vocal tract and the reduction of tension will both improve vocal technique as well as reduce vocal abuse. No mention is made of external factors which can cause injury to the voice, or techniques which can be employed to protect the voice from harm.

J. Clifford Turner, *Voice and Speech in the Theatre*, (1950, 1956, 1977)

Turner differentiates between the "tone" (resonated sound) of the voice and the "note" or source signal. While the natural progression of topics, based on a physiological model, would be to examine breath, note, tone, then word, Turner inverts the middle two vocal characteristics. Discussion of the "note" or laryngeal sound comes after discussing resonance in Turner's training regimen in order to "tune the instrument before playing upon it," using his metaphor.

By examining and developing the resonator on its own merits by means of the whispered voice, we have prepared the way for the introduction of the element of note, so that this may be reinforced and amplified to the full by the open, expanded resonator (44).

While this may or may not be sound pedagogy, at least Turner makes it clear to the student that the order in which things are learned has a logic to it that has precedents in related fields.

"For practical purposes a detailed knowledge of the structure of the larynx is entirely unnecessary, as it would be of no assistance in developing the action of the cords which can be influenced only by indirect means (44)." With this Turner all but dismisses laryngeal anatomy and physiology, remarking that even the term "vocal cord" is unfortunate as a clearer picture of this structure can be gained by imagining a tube, closed at one end by a flexible covering which is slit along its diameter. He does, however, provide a very basic description of the action of the vocal folds.

It is the rhythmical opening and shutting of the slit which has the effect of cutting the breath stream up into a series of minute puffs which give rise to a musical note. The rapidity of the movement of the cords determines the pitch of the note; the interval of an octave, for example, is obtained by doubling, or halving, the number of times the cords part in a second of time (45).

The length and mass of the cords determine the voice type, according to Turner. Thus, lower voices will have longer, thicker cords. Higher voices will have shorter and thinner cords.

Two characteristics of laryngeal function are addressed in Turner's discussion of the "note." First, the way in which the tone is set up or "attacked," its continuity, and the way in which it is terminated affects the quality of the note. Secondly, the compass or range of notes which may be demanded of the voice must be able to respond to character and situation. While voice quality is discussed as a characteristic of resonance earlier in Turner's work, he returns to it here to address a slightly different aspect of quality, particularly those associated with the onset of phonation.

Correct attack, he writes, is the result of perfect timing between the breathing muscles and those responsible for approximating the vocal cords. Imperfect coordination of these two groups of muscles will result in a glottal stop or hard glottal attack resembling a clicking sound. This problem is solved, according to Turner, by

beginning all vocalizations with the "H" sound. Eventually this can be discontinued after the faulty hard attack is eliminated. Abrupt termination of a vowel sound can also occur by a tightening of the throat, causing a sharp clicking sound heard to end the note. It may be avoided by breathing in when the note is to cease.

Breathiness is accounted for more by incorrect breathing than by incomplete glottal closure, according to Turner. He points to shallow breathing as the culprit which causes breathiness. The problem is "difficult to eradicate" and is done by singing the "M" sound at the beginning of each vowel (47). Clearly his understanding of breathiness on the laryngeal level is incomplete, and his proposed technique to eliminate breathiness is unclear.

Finally, with respect to pitch, Turner states that "the ear is responsible for the pitch of the note," and that ear training is the only means by which to achieve both increase in range and flexibility in variation of pitch within phrases. "To reproduce a note of a given pitch, all that is necessary is that it should be correctly heard (47)." Only ear training can reinforce a clear sense of pitch by concentrating on a clear mental "picture" of the note in the mind at the instant it is to be reproduced (47).

Perfection of voice demands not only perfection of resonance but also perfection in the way in which the note is attacked and sustained. Tremolo or pitch fluctuation on sustained vowels gives a perception of unsteadiness. Firm and constant breath pressure will alleviate this problem as well as mentally imagining the note as a straight line (48).

Turner refers to the "centre note" or optimum pitch as the one that should be used in the first place for all vocalization exercises. It lies toward the middle of the speaker's compass, or a note roughly an octave above the lowest note that can be clearly sung. A well-trained voice should be able to encompass about two octaves, but Turner insists this should not be pushed because vocal strain could result.

Of all the systems examined, Turner's appears to be the most sensitive to vocal injury and abuse as part of the training method and he cautions students to take care so as not to produce damage while training or working. This is laudable. Had he gone on to explain why certain behaviors result in damage on the laryngeal level, he would have provided his students with the tools they need to understand how to avoid damage and to recognize what damage is possible and how it occurs. This allows the students to apply that knowledge to all situations and not just those specific to the training.

Arthur Lessac, *The Use and Training of the Human Voice* (1967)

Lessac describes his system as a gestalt -- where the principles and exercises are part of a total system which must be taken together and remain in balance (1). No particular order is necessary in studying his system or in learning the various parts, so long as all parts are learned and used together. From the beginning, Lessac's system is confusing. While he argues it is based upon a detailed understanding of vocal anatomy and physiology, he freely creates his own vocabulary to describe function in sensory terms rather than structural ones. One is led to believe that a system based on "natural function" will describe such function, but that is not the case with this system.

This is a perceptual and metaphoric system, based on sensations, without any clear way of assuring that the student will feel the same sensation as the teacher. It is the most difficult of all the systems examined so far to learn and to master and it is highly unlikely that mastery can occur without the specialized attention of a skilled instructor trained in precisely this technique. Because it is so radically different from other techniques and denies both phonetics and ear training, it would be very hard to use this system with other systems.

With an emphasis on voice training "by feel," Lessac has little need to describe the aural characteristics of vocal tone. Apart from a brief observation that phonation takes place when sufficient pressure builds below the folds to "puff through, setting the membranes into vibration (10)," his book contains no discussion of the functions of the vocal folds. Indeed, he goes so far as to claim that "once the vocal membranes have begun to vibrate, nothing else of importance takes place in the larynx (11)." The real voice box, according to Lessac, is not the larynx at all, but the resonating cavities of the mouth, nose and sinuses. Further, he contends that

when the larynx is removed because of throat malignancy most patients are able to develop a fairly strong speaking voice by substituting the esophagus, which has no equivalent of the vocal membranes. Medical case histories even record claims that some of these laryngectomized patients have developed fairly strong singing voices as well -- without mechanical or electronic devices (9).

I can find no documentation to support such a contention. So it appears, as long as you have good resonating cavities and bones in your head you can dispense with the diaphragm and larynx altogether. For a system purportedly based on "voice science" this is an inappropriate and baseless claim.

Lessac refers to beautiful voice quality as a voice that is "nonthroaty, nonnasal, nonpharyngeal, . . . produced and resonated effortlessly; it [has] stentorian resonant qualities and projection, pitch-range, variety of color, and nuance and body of tone (xiii)." It is hard to know exactly what this description means because he uses many of these terms in different contexts throughout his work, and in different ways than other voice systems would employ them. Because the throat and the pharynx are essentially the same structure and the pharyngeal and nasal cavities play a role in voice production, it is not clear how to produce a "nonpharyngeal" sound. While his description may be attempting to describe voice "quality" characteristics, it is not clear exactly what these characteristics are.

Lessac concentrates on those parts of the vocal tract above the larynx stating that "some of the actions that produce vocal sounds are clearly not controlled by the performer: he cannot consciously feel or control the passage of the breath stream from the larynx; he cannot move the vocal cords; he cannot determine what parts of the cords to vibrate (xiv)." Instead, argues Lessac, the actor can learn to control any action or position that he could learn to sense, including all the parts of the head above the larynx. These areas are actually the most crucial in the control of vocal activity, according to Lessac.

This vocal training system attempts to create control over laryngeal function indirectly by memorizing the sensations caused in the face and head associated with acceptable or appropriately formed sound. It attempts to create an intermediary locus of control over an area that cannot, according to Lessac, otherwise be directly controlled. It assumes a one-to-one relationship between the sensations of the face and head and the appropriate (though unidentified) actions of the larynx and respiratory apparatus. This can be problematic, from a functional perspective, however, because these actions can vary dramatically from individual to individual and most phonatory functions are the product of more than one muscular action. Thus, a given physical sensation may or may not relate to a specific phonatory phenomenon, as Lessac would predict it should. Indeed, he would discount any individual variety in either structure or function (xviii), despite the evidence that such diversity is the rule rather than the exception. "Anatomically, our vocal mechanisms are all alike, even though they vary in dimensions, and they respond to training as other parts of the body do (4)." Lessac's system is a novel and clever approach, but difficult to learn, artificial (although Lessac argues it produces the best voice by natural means), and imposes a working method difficult for anyone who has employed ear training in the past as a gauge of phonatory behavior.

Lessac defines "voice" as the phonation of the vocal cords which produces vocal sound waves that become amplified and resonated in other parts of the body. Voice, then, is related primarily to the vowels. "Speech" refers to articulate sounds, principally consonants (voiced and unvoiced), along with vocal expression, intonation, inflection, accent emphasis, and nuance. Voice also incorporates range in both pitch, volume, tempo, and color. Pitch, of course, corresponds to frequency (although he doesn't identify what that range should encompass) and volume to intensity both clear phonatory functions. He is dealing with the perceptual aspects of frequency and intensity, and not the structural or functional aspects of them. Tempo may refer to pacing (an articulatory function) and color may relate to vocal quality, many aspects of which are determined on the phonatory level (i.e., breathiness, hoarseness, stridency, and glottal attack).

According to Lessac the entire process of originating vocal sound in the larynx is performed without voluntary control. He bases this claim on the fact that there is no sensation of breath or pressure until vocalization begins. Thus, he argues, if we cannot feel it we cannot control it. The diaphragm, breath stream, and vocal membranes "cannot be manipulated because they produce no controllable physical sensation in the trachea and larynx. Only controllable actions are responsive to training (13)." If this were true, we would not be able to produce sound on demand at a specified pitch or at varying intensities. While we may lack a mechanism to sense these minute adjustments and movements of these structures, the fact that we can predictably control the result of their action is indisputable.

Lessac concedes that there are some areas of vocal production over which we exercise partial or indirect control. These "semi-voluntary" actions include "supplementary breathing and the memory experience and brain signals that help in approximating pitch (14)."

In Lessac's system, three major "actions" contribute to the vocalization process. *Structural Action* refers to the position and associated sensations present in the face and head when the correct facial posture, referred to as the inverted-megaphone shape, is achieved. *Tonal Action* occurs when the student learns to experience the sensations of vocal vibrations in the hard palate, the bone of the nose and nasal sinuses, and the forehead. Control and command of tonal action rests on learning to feel this buzz or call instead of listening for a vocal tone. Finally, in *Consonant Action* the consonants make up the words of speech conveying the intelligibility of the word, supplying the rhythm, tonal color, and melody to speech, and furnishing contrasts and variations through percussive, melodic, and sound effect qualities (17-20). The first two of these actions relate, at least in part, to laryngeal function.

The inverted-megaphone stretch of the structural action, according to Lessac, not only results in improved vocal qualities, but allows for maximum expansion of the oral cavity, lip rounding and greater tongue flexibility. Less clear is the claim that it also results in "a new approach to phonetics, and a newly discovered reflex action that relaxes the jaw, lowers the larynx, relaxes the vocal membranes, and even contributes to dental health (18)."

The new approach to phonetics is not phonetic at all because it is based on a vocabulary of sensations associated with each of the vowels instead of with vowel sounds. They are no longer so much vowel sounds as they are vowel senses, which are reproduced through sense memory rather than through ear training. Lessac claims that even deaf children can produce perfect vowels automatically "by feeling the sound they cannot hear (61)." In addition, instead of using IPA transcriptions, he creates a numerical system creating and dismissing sound designations at his convenience. Amazingly he admits that distortions in

pronunciation will sound perfect if they are properly experienced (69).

The "newly discovered" reflex action is "the reflex jaw relaxation" where the jaw floats downward and slightly inward as a result of maintaining the inverted-megaphone stretch. As a result, "the larynx, too, relaxes into a lower position—sometimes as much as half an inch lower—and there the vocal cords occlude and vibrate more freely and more efficiently (59)." In addition, Lessac states that the structural action will also regulate both the speed and pitch of speech (62). No evidence is given to suppose that any of these assertions are true, and even perceptual evidence is omitted. Such extraordinary unsupported claims weaken the credibility of Lessac's already shaky technique.

Tonal action, the second of Lessac's three energies, relates to the sensing of vibrations, but not of the vocal cords. Instead, the air stream which has been energized by vocal cord vibration is sensed in the bony structures of the head. When the "correct" sensation is felt then students know they have "formed the sound" correctly. Again Lessac contends that tone-deaf students can be taught to sing perfect chromatic scales by feeling the tones and ignoring what they hear (80).

Because Lessac argues that tonal action develops the full pitch, range, power, and projection of the voice as well as eliminates nasality, throatiness, and breathiness, it is performing phonatory functions. What is missing in each of these illustrations is the fact that his system is functioning on a metaphoric level while attempting to induce the student to believe it is operating on the "natural" level. While vibrations may be sensed in the bony tissues of the head and face, such vibrations originate elsewhere (in the larynx) and the contribution of the vocal folds in the frequency and intensity of vocal tone (as well as vocal quality) is dismissed out of hand. While his imagery may well achieve the desired results he claims for his system, he does his students no service by masking the metaphorical nature of the

system under the guise of "science."

Finally, Lessac argues that, once his system is learned, actors can experiment with their voices to create all kinds of sounds with impunity. He infers that the voice, thus trained, is damage proof and the actor can "explore the many abnormal and ordinarily harmful uses of his voice without fear of damage to the vocal mechanism (xvii-xviii)." This is an extraordinary statement which is difficult to accept without extreme caution and could seriously mislead students into thinking their voices may actually be protected from damage.

Curiously, Lessac says little about protecting the voice from harm beyond a very generalized statement of keeping the body in good physical condition through regular exercise and a sensible diet. He admonishes the actor to "smoke or drink lightly . . . or not at all," avoid chocolates, nutty, syrupy or sweet foods, or heavy meals before a performance, and to eat half an apple to soothe and clean the throat (237). Gargling with warm salt water (with bicarbonate of soda and an aspirin) is offered as a remedy for a sore throat when unable to see a doctor. Nothing else is mentioned about the care of the larynx apart from reducing tension and stress.

Lessac's book concludes with a chapter on treating voice disorders. The purpose of this, I believe, is to demonstrate that his training method has application in voice therapy as well as in voice training. Lessac makes a strong case that voice therapy is best treated by a team of specialists whose combined knowledge and cooperation is essential to effect voice correction. Further, he argues, that every member of the team should not only be thoroughly trained in his own discipline but should have a working knowledge of every other discipline represented on the team. The weakest link on the team, according to Lessac, is often the specialist in speech who knows little or nothing about voice training, or a voice expert who knows little or nothing about speech (255). The ideally trained voice and speech therapist, in

Lessac's opinion, should be a combination of speech teacher, singing master, voice specialist, speech therapist, and experimental phonetician with a working knowledge of otolaryngology, neurology, anatomy, and psychology. He emphasizes the need to be proficient in understanding both speech and voice to be considered 'ideally trained.' "A smattering of articulatory techniques and vocal exercises is as dangerous in the hands of the physician as a smattering of anatomy and psychology is in the hands of the voice and speech teacher (256)." Having said this, Lessac then proposes "therapeutic application of the Lessac system" for the conditions of cleft palate speech, stuttering, and the dysphonic voice disorders associated with hoarseness and fatigue, nodes and contact ulcers, dysfunction of the abductor muscles, and hysterical, habitual, or functional aphonia (257-64). According to him, "the principles and concepts of voice and speech discussed in this book are fundamentally valid under any circumstances and therapeutically applicable to a wide variety of voice and speech disorders (263)," except perhaps for those with mental retardation or brain damage. To use this system in therapy, however, one "must have a thorough understanding of the principles of bio-dynamics given here and must personally have mastered the physical techniques (264)."

One of the daunting characteristics of Lessac's approach is that it is a type of "all or nothing" system that does not lend itself to flexibility or adaptation with other systems. According to Bonnie Raphael, advocates of Lessac's system cite its ability to heal and strengthen voices that have suffered from hyperfunction and strain, and its ability to reproduce speech sounds that are clear, communicative, and beautiful in actors who do not respond well to traditional training methods (108). Barton and Dal Vera note that Lessac-trained actors often have powerful voices. His "call focus" and "y-buzz" exercises make use of the natural acoustical properties of the voice to produce a large boost in loudness without strain (287).

Critics, however, find Lessac's untraditional terminology confusing, and until students fully understand and internalize their training, they may look and sound forced or uncomfortable when they speak or speak in a manner that appears self-conscious or even pretentious (Raphael 107-8), theatrical or "actory" (Barton & Dal Vera 287). He is also faulted for having developed an obtuse and awkward system for noting vowel sounds, where standard phonetics (IPA) has wider use and is more applicable to dialect study (287).

Cicely Berry, *Voice and the Actor*, (1973)

Berry has very little to say about laryngeal structure and function beyond a few passing references. She dismisses the need for accurate description because her method is psychological rather than physical.

The vocal cords, . . . are not under your direct control, so you can do little about them. In fact, you are only aware of them when you misuse them by tension in the larynx, by forcing the sound out before the breath is ready, by being out of time, as it were, constantly using a pitch which is outside your range (Berry 19-20).

Body cavities, including the chest, function as resonators to amplify the primary note. "The bones themselves can be part of this amplification, and you can even feel vibration down to the base of the spine and in the stomach (20)." Berry tends to confuse phonation and resonance, treating both as though they were one integrated and inseparable action. Consequently, explanations of vocal characteristics which originate in the phonatory and resonance systems are often confused.

In addition, Berry erroneously claims that several phonatory behaviors are controlled by the speed of exhalation. Too much breath, she claims, causes breathiness, while too little breath leads to glottal attack (19). Additionally she states that breathiness is "caused by a lack of muscular firmness in the ribs and diaphragm

(40)." In his critique of Berry's discussion of phonation, David Stern charges that she ignores fold valving (as it contributes to the breathy vocal quality) and disputes her statement that we have no control over the vocal folds. He claims that both breathiness and glottal attack are produced by "fold valving" and are, contrary to Berry and others, under voluntary control (Stern 14).

One other laryngeal function Berry mentions has to do with the 'size' of the voice. By this she means the emotional size of the voice which only partly has to do with volume. It is partly an attitude – reaching out to the audience – and partly the "firmness of sound, its solidity (18)." Pushing to increase the size of the voice creates tension, according to Berry, and this can cause the voice to rise in pitch. In addition, she states that the tension in the neck restricts the throat and cuts out the lower tones of the voice, the chest notes, and the listener becomes more aware of the sound than the word (18-19).

Size of feeling and size of character have more to do with time and weight than volume . . . What is required is a voice which is big enough to share in whatever area you have to share it. This has to do with your own reaching out as a person, in particular with allowing time, for the sound has to travel further (38-9).

Berry contends that volume alone does not mean that you will be heard. Thus, she places far more emphasis on clarity of expression and the desire to communicate than in attempting to produce a loud voice. There is no mention of how intensity or volume is produced physically, only a brief mention of how tension interferes in the process. For Berry, size of expression is a function of the text and the word rather than the desire to speak loudly. "Never forget that the text itself contains the size, the breadth of what you are saying coming largely from the energy contained in your text (39)." Exercises designed to increase loudness are primarily aimed at keeping pitch from rising as volume increases and to eliminate breathiness (39-42, 130-31).

Finally, it is fair to say that laryngeal structure and function have no relevance

in Berry's work. She does not work on the physical, functional level, but rather on the psychological and linguistic level, where the text functions as the "impulse to communicate," and provides all the clues needed to motivate appropriate "size," pitch, inflection, power, resonance, and vocal quality. Vocal health is never raised as an issue.

Kristin Linklater, *Freeing the Natural Voice* (1976)

Kristin Linklater's work is based on two basic assumptions. The first of these is that everyone possesses an expressive voice in a two-to-four octave natural pitch range. Secondly, tensions acquired through living diminish the efficiency of the natural voice to the point of distorted communication. Thus, if the blocks that inhibit the natural voice can be removed, the voice will naturally do all that is demanded from it (1). According to Linklater, this natural voice would possess a "wide pitch range, intricate harmonics and kaleidoscopic textural qualities which can be articulated into clear speech in response to clear thinking and the desire to communicate (1-2)."

Because the sound of the voice is generated by physical processes, according to Linklater, the inner muscles of the body must be free to receive the sensitive impulses from the brain that create speech. Tension blocks this process from occurring, as well as emotional, intellectual, aural and spiritual blocks. All of these psycho-physical obstacles can be removed permitting the full voice to express whatever it will (2). Physical awareness and relaxation lead to emphasis on mind-body unity. Breath and sound are always connected to thought and feeling to activate and release inner impulses and to dissolve physical blocks.

Linklater acknowledges that her book is a poor substitute for a teacher and that real progress can only come with the help of someone who can assist the student one-on-one, employing extensive side-coaching, and physically touching the

students to feel the tension in their muscles, and helping them move their body to identify and eventually break habitual movements. Her system (as outlined in her text) requires "dealing with causes rather than effects, in re-thinking usage rather than in re-doing sounds (4-5)."

Like Lessac's system, Linklater's is not only a different approach to training that fundamentally changes the way an actor will think about their voice, but also is a complete package or system, which taken together, will accomplish a result over time. The student must place his trust in the teacher/trainer/method, hopeful that strict adherence (despite a lack of progress markers) will result in the desired outcome. While Lessac's system is more product-oriented and Linklater's is more process-oriented, they both share this reliance upon the student's faith in the method to achieve their results. Students are, in effect, asked to be disciples of the method if they hope to truly see results and use the system's methods effectively and effortlessly. Finally, neither of these systems rely upon accurate descriptions of laryngeal structure and function in their methods. Both create a metaphorical world in which the voice operates within their systems, relying upon imagery and relaxation to induce the necessary impulse to trigger proper functioning of the vocal apparatus.

Linklater provides a brief description of the phonatory process at the beginning of her book but quickly alerts readers that she will not be using scientific terminology in the rest of her text, choosing instead to describe the voice "metaphorically, analogically and by its perceivable features (7)."

According to Linklater, the larynx partially closes the vocal folds at the beginning of exhalation to impede the upward air stream. The pliable vocal folds are set into quasi-synchronous vibration as the air passes between them. These vibrations break up the outgoing breath stream into puffs of air that are released into the vocal tract above. These puffs of air excite the air in the resonating cavities of

the pharyngeal, oral and nasal passages and produce sound in the upper vocal tract (7). This description of fold function is a bit confusing. Vocal sound is produced at the larynx and modified by the upper vocal track. It is not produced there. Later she suggests that students should picture the "source of sound" deep within the diaphragm, de-emphasizing further the role of the larynx in sound production (35-40).

Linklater describes vocal quality as one form of resonance used to shape or color the voice generated at the larynx regardless of the speech sound intended. It is always present for the speaker (7). Impulses (aroused by the need to communicate) arouse the reflex musculature of speech that controls their expression. The impulse triggers the breath response, which then plays upon the vocal folds.

The same impulse that stimulates the breathing musculature activates the laryngeal musculature to stretch the vocal folds so that they offer enough resistance to the breath to oscillate on impact. A gentle pressure of breath meeting relatively relaxed folds creates slower oscillations and the resultant vibrations of sound are of a low frequency. A strong pressure of air finds greater resistance from folds pulled tighter, and a higher frequency results in a higher pitch (8).

The respiratory and laryngeal actions are for the most part simultaneous, as Linklater suggests, but they are triggered by different impulses because similar amounts of respiratory pressure can produce different vocal responses such as a whisper, or voiced or unvoiced sounds, all of which require different laryngeal adjustments but similar respiratory pressures. Her oversimplified explanation of pressure and laryngeal action is both confusing and misleading. According to David Stern, Linklater (and Cicely Berry) erroneously attributes pitch levels to the strength of the breath stream. Stern argues that if this statement by Linklater were true, then "no speaker or singer could produce a soft sound at a high pitch or a loud sound at a low pitch (14)." Stern also charges that Linklater and Berry both fail to discuss the role of intrinsic laryngeal tension on phonation, dealing only with tension as it inhibits resonance.

Perhaps more confusing is Linklater's statement that the folds themselves are not muscles, but membranes, and are not brought into play by the breath but rather by cartilages to which they are attached (Linklater 8). This fails to mention that muscles are needed to move the cartilages, and that the vocalis muscle in the vocal folds is an essential element in laryngeal tone production. It also contradicts her previous statement which related breath pressure to pitch, and then changing from breath action to cartilage action as the source of oscillation. While Linklater may not intend such a contradiction, it has the potential to confuse her reader.

Another confusing passage relates to the relationship between pitch and resonance. Earlier, Linklater stated that the basic pitch of the voice is determined by the rate at which the vocal folds vibrate. At another point, however, she states that "different degrees of tension in the muscle tissue lining . . . tunes a resonating area to a given pitch (9)." While muscles do change the size, shape, and openings of various resonating cavities, pitch is controlled primarily by the frequency of vocal fold vibration and not by 'tuning' the resonating cavities. It is unclear exactly what she infers about the relationship of pitch and resonance.

Tension in any part of the vocal tract affects every other part of the tract, argues Linklater, and because all of the parts directly communicate with all the other parts, the entire tract must be relaxed and freed from tension. This assumption is based on her assertion that "the tongue is attached to the larynx (by the hyoid bone), and the larynx communicates directly with the diaphragm through the trachea (14)." Thus, any lack of freedom in the breathing, according to her, shifts too much responsibility for sound making to the delicate laryngeal muscles. These muscles are not equipped to deal with it, and consequently they tighten and destroy the free play of the vocal folds (15). This is perhaps an overstatement of the relationship between respiration and phonation. There is no "direct connection" between the diaphragm

and the larynx as she suggests. In addition, the laryngeal muscles are some of the strongest muscles in the body and are designed to "tighten" as part of their function. It is not clear to what the "free play of the vocal folds" refers.

Another aspect of Linklater's training process is to imagine the source of sound as a location deep within the body in the region of the diaphragm. Many exercises are directed at the effort of diverting attention from vibrations in the throat and head to sensing them in the torso. Like Lessac's system, Linklater encourages students to "shift the job of judging sound from the aural to the tactile sense (35)," and developing what she refers to as 'the touch of sound' emanating from the diaphragm.

While attempting to create this metaphoric image of sound production, Linklater intersperses occasional "scientific facts" about the voice, but then curiously dismisses them as unimportant. For example, in attempting to get the student to locate the "touch of sound" in the area of the diaphragm, she cautions students that they cannot feel the diaphragm, although its downward contractions and upward expansion are subsequently explained. "This is one of the scientific facts that only serves to confuse the lay practitioner and is best ignored (37)." Indeed, the imaginary source of sound can be confused with the functioning of the diaphragm, and the functions of respiration and phonation could be easily confused. Despite her discussion of respiratory and laryngeal function offered at the beginning of her text and snippets offered throughout the actual training process, disclaimers of this type cajoling the reader to "ignore it" serve to undermine the integrity of accurate knowledge and confuse the student. In addition, if Linklater does not see it as helpful, why is it not omitted entirely from her text and working method? It does little to reassure her reader that her method is based on a sound understanding of the voice, and raises doubts as to how the system works and what results can be anticipated.

In talking about Linklater's system, it is hard to separate the discussions of sound production (phonation) and sound shaping (resonance and articulation) because she treats them as part of the same impulse, driven by the same organic function. Vocal quality is dealt with as a resonance issue rather than a phonatory one and will be examined more in the next chapter.

Little about intensity or projection is mentioned because projection, according to Linklater, is nothing more than a function of the degree of sincerity and truth actors bring to the expression of their emotional impulses rather than a physiological increase in amplitude in vocal fold vibration. Lack of projection is addressed psychologically rather than physically in her system by working with actors to share their emotions more generously. If emotions are free, the thoughts clear, and the breath flows easily the actor will be heard anywhere in the theatre. If actors strain their voices to "project" they can become unintelligible (195). Indeed, Linklater goes so far as to call "projection" dangerous, because concentration on throwing the voice forward takes energy away from the emotional and mental content and transfers it to the voice.

Finally, Linklater mentions only briefly a few points relative to the health of the voice. Actors lose their voices most often due to fear, strain, or misuse. She does not explain what she means by misuse. Hoarseness can result from such misuse and can be corrected by training. Indeed, even when actors have colds they can still use their voices effectively. Most voice disorders, she claims, are the result of psychological blocks rather than physical affliction in most cases. "It is relatively rare for the vocal folds themselves to be affected [by a cold or sore throat], so that physiologically there is nothing to prevent continued free production of sound (196)." While the pain and discomfort of such conditions draw attention to the throat, and muscular energy in the respiratory system may be reduced, actors can avoid losing

their voices when they are ill if they double the attention paid to breathing and extend vocal warm ups rather than reducing them, according to Linklater (196-97).

Linklater scorns actors who go to "a throat doctor's office" because they are "the very people who should know how to look after their throats (197)." This is an amazing statement given the dearth of information on vocal health provided by her text. Her assumption is that "reconditioning usage" is the solution to vocal ills, and those seeking medical attention who lack discipline are looking for a quick fix. "There are very few voices that cannot be repaired if damaged. . . . If you strain your voice . . . or are tired and start pushing for energy you don't have, always do a repair job then and there (197)." This "repair job" consists of a half-hour of consciously relaxing and gently going through the humming exercises, along with the tongue and resonance exercises. In this way the student will "massage [his or her] voice back into good condition after heavy use (197)."

Michael McCallion, *The Voice Book* (1988)

McCallion's system of vocal training, like Lessac's system, pays close attention to body position and body movement as a significant variable in producing good voice. He is concerned with the mechanical and physical process of voice production and assisting actors in acquiring the skill necessary to get the voice to do what they wish it to do.

Like Linklater, McCallion assumes that everyone has a strong, capable voice, and that problems are more the result of misuse of the voice rather than organic dysfunction. Unlike any of the previous practitioners, however, McCallion's method is based on a clear understanding of vocal health, and training is designed to identify and modify patterns of use that don't work into patterns of use that do work.

McCallion's work goes through a very specific and calculated progression

beginning with Alexander-based body work which identifies postural behaviors which can contribute to poor alignment of the back, neck, and head. Next the actor addresses breathing. Like Linklater, McCallion says that breathing must be set free or liberated to function properly. Tuning is the next stage of the process, and this includes a close examination of both phonation and resonance. Speech is the fourth stage in his progressive method and this looks at articulation and vocal quality. The final stage is applied work specifically addressing the demands of using the voice in the theatre.

Tuning, according to McCallion, is a complex process involving both phonation and resonance. Unlike most of the other system examined so far which place resonance and articulation together, this system sees resonance more as an extension of phonation and provides considerable detail in explaining both phonation and resonance. McCallion correctly identifies both pitch and volume as phonatory processes. He qualifies resonance as only partly phonatory.

Resonance (or timbre) is determined partly by the action of the vocal chords [sic] and also by what happens to the phonated airstream after it passes the vocal cords and enters the resonators, chiefly those of the throat (or pharynx), the mouth and the nose. So the tuning of the voice is the outcome of how we use these three qualities of pitch, volume and resonance (61).

He stresses the need to understand basic anatomy and physiology "in order to understand how we produce and control the tuning of the voice (63)." By far the most thorough and accurate of all the systems in describing vocal structure and function, McCallion addresses an entire chapter to phonation, using relatively detailed and clear illustrations of the skeletal, muscular, and cartilaginous systems associated with the voice. A series of well-labeled drawings of the side view and section view of the larynx and a cross section of the glottis accompanies a very brief explanation of laryngeal function.

In the larynx, and largely responsible for its action as a valve, are the vocal cords. . . They are not really cords at all . . . they are made of muscle and ligament extruding from the inside walls of the larynx. They stretch horizontally and from front to back: in the front they attach to the [thyroid cartilage] and at the back to the two moveable cartilages called the arytenoid cartilages. When the arytenoids move and rotate, the cords move as well, being helped in this by their own muscle fibers. The action of the cords in moving together and apart can be very rapid, and during phonation, this action converts the airstream into a series of puffs which can be heard as sound. This sound wave, duly resonated, is the voice (66).

According to McCallion, vocal technique is needed to be able to control pitch and volume independently, because we tend to raise pitch and loudness when we have to "speak up." "Speaking up" can strain the voice, so the technique is aimed at allowing the speaker to use ordinary conversational pitch while reaching the whole audience and using lower pitched voice and still be audible. It also allows for the use of a higher-pitched voice than normal without sounding over-loud or hysterical (67).

"The pitch of the voice is determined by the number of puffs of air that pass through the glottis in a given time. The more puffs per second the higher the pitch of the note (68)." Though simplistic, this explanation of how pitch is created is accurate. McCallion's explanation of intensity or volume is less clear and fails to attribute intensity to respiratory pressure and vocalis tension.

The volume of the sound is directly controlled first by the wish to speak louder or quieter, which produces the appropriate action of the cords, and then by the adjustment of breath pressure. As the sound becomes louder, the vocal cords present more of a barrier to the breath by staying closed longer between each puff of air (although the puffs are still allowed through at the same number per second for any given note regardless of increase or decrease in breath pressure) (68).

McCallion argues that pitch and volume are closely related and an increase in volume is usually associated with an increase in pitch. He explains this phenomenon this way:

As the note gets higher, the cords open and close faster, . . . and the space between them becomes shorter and narrower. This makes more of a barrier to the air-flow, and consequently, the higher we speak, the more we tend to increase the breath pressure; the consequence is that we speak more loudly (68).

He suggests that training the laryngeal muscles in other patterns of behavior will result in more independent control of pitch and volume.

According to McCallion resonance occurs because the basic note needs to be harmonically enriched. The throat and mouth are the most important resonating cavities because they are the largest and most flexible. They can change their size, shape, and acoustic properties by moving the larynx, the tongue, the soft palate, the jaw, the lips, and the cheeks. Also, the elastic properties of the walls of the pharynx permit limited changes in shape (70). McCallion discusses possible theories about the contribution of the sinuses to resonance, noting there is much dispute about their function in voice production. He believes that ultimately they play little if any part in resonating the voice and no part at all in determining pitch (71).

Physical sensations can guide students in learning to use the laryngeal and resonating structures more effectively. However, sensations in and around the area of the larynx should not be felt. "If we feel pinching sensations, strain or roughness at the laryngeal level it is a warning that we are doing something wrong or overworking (72-3)." McCallion argues that the feelings that accompany changes in voice usage are psychological in nature, subjective, and personal, and not easily measurable, although they are the result of the use of the muscles.

The physical feelings we experience when we use our voices are more easily described, according to McCallion, and are likely to be similar for most voice users (74). They are, however, specific, and McCallion describes them throughout the exercises included in his Tuning chapter. "The Murrur" and "The Body Buzz" are two of his primary exercises designed to acquaint students with the kinds of physical

sensations they should be experiencing, based on proper physical alignment, adequate breathing, and unstrained phonation.

Problems which occur in this sensation-seeking practice are of three major types: breathing, converting the breath into voice, and directing the placing of the sound (80). The first of these problems relates to the breathy voice. It is characterized by escaping breath, leaving the actor with insufficient breath to complete a vocal task without gasping. It has been described as having a grainy quality, a huskiness, lacking intensity and endurance.

If you have breathy voice production . . . you could find yourself in trouble and suffering from voice loss when you come to make more volume. As you pump more and more air through the throat to support the rise in volume you begin to gasp, and heave in the upper chest in order to get enough breath to last the phrase out. And as all this unvoiced breath, at great pressure, passes between the cords it has an abrasive effect upon them and you begin to get a sore throat. Then everything gets worse and you have to force to tune the higher notes and your effective range becomes smaller and smaller (81).

McCallion asserts two possible causes of the breathy voice. The first relates to poor breath management and the second relates to misuse of the vocal folds over time, which now find "great difficulty in tuning the breath-stream (81)." The latter of these causes also produces a rougher quality to the sound and greater difficulty producing high notes. He advises students with persistent breathiness of this sort to see a laryngologist. Oddly, he describes the cause of breathiness much more clearly later in an exercise designed to correct it. Here he states it is caused by, or results in, an inadequate closure of the glottis during phonation. The elaborate exercise which follows called "glottic popping" actually has the student working specifically on glottal closure through a series of calculated and specific steps directed at the structures themselves. Unlike many of the works described so far, McCallion is willing to suggest that an understanding of how to control the breath-to-resonance process can help the student achieve greater control. He admits that not everyone will benefit

from this understanding immediately, but over time and with practice, the theoretical and the practical will work together to achieve results.

The glottic shock or glottic attack is another laryngeal problem McCallion addresses, and while he uses a form of it called the glottic pop to help alleviate breathiness, when it is used consistently in an exaggerated and audible form is problematic. He attributes this primarily to tension in the breathing muscles and the larynx. Careful self-monitoring is necessary to gain conscious control (86).

Additional problems he addresses are excessive nasal resonance and the lack of nasal resonance, but he focuses a considerable amount of attention on problems related to pitch (far more than any of the other systems examined). Specifically he looks at use of the whole range of pitches (as opposed to favoring high or low notes), determining optimum pitch and effective range. He is the only practitioner to deal with registers and offers considerable attention to pitch-breaks or transitions between registers in the speaking voice. Indeed, he refers the reader to the works of Husson, Vennard, Husler and Rodd-Marling for additional detailed information on the neurological and muscular processes in producing the various registers (92).

McCallion describes what he calls 'head voice' and 'chest voice' as the two primary registers into which most male and female adult voices fall. Pitch breaks generally occur toward the top of the speaking range in men and toward the bottom of the range for women. "It happens when moving from one register to another – but only when the laryngeal muscles are in a poor state of use – or not sufficiently developed (93)." Pitch-breaks can be used as a vocal effect, but can lead to vocal ill health, according to McCallion. Habitual misuse of pitch-breaks can "bring about a decay in the working relationship of the laryngeal muscles together with a progressive deterioration in the control of the voice (93)." McCallion addresses

registers also to increase pitch range.

McCallion cautions the student about pushing the volume of the voice. Trying to project the voice to reach the audience can strain the voice, raise pitch unduly, and disturb the head/neck alignment.

There is a way round this problem which leaves our intention to communicate with the audience functioning properly as the directing force behind what we are doing, and which easily and naturally encourages the voice to operate fully at whatever volume is necessary but without our apparently having to "speak up" or strain to be heard (103).

Filling the space is more than just increasing the volume of the voice. It depends upon your intention and, as with advice given by Berry and Rodenburg, the desire or impulse to communicate (in this case psychological) triggers the appropriate response. McCallion bravely admits he is asking the actor to draw upon imagination in this instance, an approach that "is not scientific but suggestive (104)."

Volume control should be easy if the speaker has taken care to "tune the voice efficiently for note and resonance (108)." However, because the relationship between breath pressure and the vocal cords governs volume, exercises to achieve volume control are for the most part exercises in breath control.

McCallion's instructional method includes a brief but accurate description of laryngeal structure and function, with many exercises designed to increase actors' sensitivity to the functioning of the structures involved, along with the feel and the sound of the tone produced. He uses the International Phonetic Alphabet (IPA) throughout. While McCallion is clearly coming from the British tradition of theatre and vocal instruction, there is much to commend about this method to American actors.

Patsy Rodenburg, *The Right To Speak* (1992)

Patsy Rodenburg ardently embraces the "technique" of working on the voice

from the outside in: "working from the purely physical and systematic aspects of ourselves (the outside) toward the emotional and intellectual life (the inside) (113)." However, it takes her more than 100 pages of extolling the emotional and psychological basis for voice usage and habits before making this claim. She does provide a brief description of the structure and function of the larynx, but eschews any illustrations admitting "that I hate looking at unsightly diagrams of the sort most books on the voice resort to using as illustrations (115)." Her descriptions are, however, brief, vague and somewhat imprecise.

The larynx, that knotty chain of bone and cartilage situated midway down the neck, contains the vocal cords or folds. As the breath passes over and between these folds they act in two ways: as a kind of valve that regulates air and as a vibrating mechanism that creates the actual sound we make. It is a bit like a set of wind chimes. . . . You will feel the sensation of the air passing up from the lungs as the rib cage, accordion-like, squeezes the held air and then opens wide once more for another try. Notice too that the stomach . . . aids in the pumping like a helpful power substation (115).

Rodenburg makes a passing reference to how the voice produces varying pitch. She explains that the varying thicknesses of individual vocal folds produce different notes, but does not say which type of thickness produces the higher or lower notes. Notes thus produced are then resonated ("reinforced and sustained") by the resonating cavities in the chest, throat, face, nose and head.

Several laryngeal-produced conditions are described in Rodenburg's extensive chapter "An Owner's Manual of the Voice." Physical alignment and proper breath support are the primary prerequisites of any vocal remediation, and much of the chapter is spent dealing with these. Once these are mastered, then freeing and placing the voice can be attempted. A 'free voice' is an effortless and efficient one, and 'to place the voice' means to allow it to move up into the mouth and out of the body (159). If any neck, shoulder, or breath tension is present, the voice becomes "trapped in the throat" and the voice can become impaired. The impairments she

describes are all problems associated with the larynx, although all of them are described in metaphorical and psychological terms rather than structural or functional ones. While she does address the most common problems associated with laryngeal function, she creates original terms, in some cases, to describe them and fails to explain why and how these conditions exist on a physical level. This is curious only because she emphatically states that "a priority of any responsible voice teacher is to safeguard any student against vocal harm or damage (160)," – a task requiring physical, structural, and functional knowledge.

The first of these adverse vocal conditions which Rodenburg describes is called "The Push." According to her, the pushed sound can be harsh and ragged, inflexible, overly insistent, and distorted (161). She says this occurs when the speaker feels inadequate, unprepared, or out of control. The tension in the throat makes it impossible for the voice to achieve any range. The push is experienced physically by a speaker as not having adequate breath or support to power the voice. "Everything from the upper chest down is cut off . . . [and the actor] begins to push for power only from the throat and strains the vocal cords in the process (162)." The result is usually a sore throat or loss of voice.

The second condition she describes is "The Clamp." According to her, the larynx should bob up and down freely (164). If it is held tightly in position and not permitted to freely move it becomes "clamped." She states that the voice is not easily damaged in the clamped position but it does tire quickly and sounds monotonous. The clamp occurs when forcing the voice into higher or lower ranges to create a fashionable effect. She asserts that 95% of male students effect this clamp. It appears as though she is trying to combine two phenomenon which may or may not be related. The first is the ability of the larynx to rise and fall in the throat, and the second is the ability of the larynx to extend pitch range (perhaps into other registers,

or beyond the range of the speaker's optimum pitch). Because the movement of the larynx downward can extend the length of the pharynx to improve resonance, it is really not clear if this "clamp" is related more to phonation or to resonance. Either way, she does not explain further. She does, however, provide a remedy. "The clamp can be released by 'thinking' the voice into the face and then out. Aim your voice at a point above the eyeline and hum towards that target (165)."

"The Glottal Attack" is caused by potentially dangerous vocal tension.

"Instead of the breath starting to vibrate the vocal cords gently and smoothly, the glottal attack or shock bashes the cords together before the sound begins. . . . Air pressure has built up behind the cords just before the speaker vocalizes (166)." A click in the throat may be heard. The cause is usually some nervousness or a tightening in the throat which needs relief, according to Rodenburg. She contends it is not problematic in average conversation but is worrisome when speaking loudly, shouting or using a lot of vocal power and force. Combined with "the push" it can be bruising on the vocal cords. The glottal attack cuts down on the speaker's ability to move easily through his or her range. The remedy for the attack is to stop the closure of the cords before the speaker vocalizes (167). This can be done by speaking on a yawn, or speaking a silent 'h' at the start of typical attack words, such as those which begin with vowels. Gently chanting problem words and phrases will also help, states Rodenburg.

"Devoicing" occurs when the voice continually falls to a whisper, especially at the ends of sentences. The sound is fuzzy and inaudible. While it does no real damage to the voice, it tires the speaker and frustrates the listener. It is sometimes described as "breathy." In the devoiced position "the vocal cord is not vibrating fully. It is only quivering and not fully engaged (168)." Intoning, chanting, or gently speaking is the technique she employs to eliminate devoicing.

The final condition Rodenburg describes is "The Pull Back." This is described as "swallowing our words" or "spasmodic speech." "Ascending breath is cut off at a crucial juncture just as something said is being completed. So the larynx is sandwiched between two opposing forces of going out and coming back in. . . . The result can be vocal turbulence and friction (170)." This is not specifically a function of the larynx, but it is unclear exactly what it is functionally.

In Rodenburg's "Voice Workout" chapter she identifies several other vocal characteristics which relate to laryngeal function, although she does not identify them as such. These include a discussion of range, related to pitch, optimum pitch, resonance or vocal tone, and volume control. Specific exercises are provided to assist the student in identifying and extending range (two and a half to three octaves should be possible); identifying the center of the range; balancing the tone being resonated in the chest, throat, and head; and gaining control over the volume and level of sound, while adapting it to the acoustical characteristics of a given performance space. Specific techniques are suggested for screaming, laughing, and singing as well.

Rodenburg combines much of the psychological approach of Berry and Linklater with some of the technical precision of Machlin, Turner, and McCallion. She harkens back to pre-1960's traditional vocal training when the "beautiful voice" was sought after, admonishing later teachers for dispensing with what she considers to be valuable and necessary technique while also freeing the voice.

It is clear that there is great disparity between systems with respect to information about laryngeal structure and function. Each system utilizes some type of metaphor to engage listeners' imaginations in an attempt to sensitize them to a complex and often indescribable process of sound production. In this area, more so

than in the areas of respiration or articulation, there is more conflicting, obscure, vague, inaccurate and misleading information provided. Whether through acquisition of gross technique or elimination of all technique, instruction about the larynx and sound production stands as a central feature in all vocal instructional systems.

CHAPTER 4

Resonance and Articulation

The vocal tract is generally viewed as a mechanical acoustical filter which modifies the sound produced at the larynx. The size and shape of the vocal tract tube determines the nature of the filtering properties . . . The sound one hears depends on the acoustic properties of the filter that are excited by the source, the vocal tract acting as filter. Dimensions of the tube are altered by movements of the articulators, any changes in shape affecting the resonance of the tract; accompanying changes in filter function vary the sound perceived (Miller 55).

I

History and Background

The third part of the human voice organ is the cavity system, consisting of the pharynx (throat) and mouth cavities, referred to as the vocal tract through which the modulated sound stream must pass on its way to becoming speech. These cavities act as resonators or filters which shape the sound generated by the vocal folds. The nasal cavity is also used as a supplemental resonator by lowering the velum which allows the sound stream to enter the nasal cavity. The vocal tract resonators acoustically shape the vocal source sound based upon their configuration.

Articulation describes the changes made in the shape of the vocal tract to form specific sounds. The structures which modify the shape of the vocal tract are called articulators, and these include the tongue, teeth, lips, hard and soft palates, and to some extent, the jaw.

The laryngeal tone is acoustically rich, being composed of many partials that are harmonically related integral multiples of the fundamental frequency (vibratory rate of the vocal folds). Depending on its configuration, the vocal tract resonates or

reinforces some of the partials of the glottal tone and not others. Those which are reinforced determine the sound being produced. The vocal tract has four or five prominent resonances called formants or resonant frequencies, and their frequencies are determined by the shape and length of the vocal tract (Sundberg 50-51, Zemlin 193).

These formants are of paramount importance to the voice sound. They totally determine vowel quality, and they give major contributions to the personal voice timbre. In the vocal tract, there are four or five of interest. The two lowest formants determine most of the vowel color, while the third, fourth, and fifth are of greater significance to personal voice timbre (Sundberg 51).

Humans are able to skillfully tune their formant frequencies by changing the shape of the vocal tract, primarily by moving the articulators. The jaw can be raised and lowered, the tongue can constrict the vocal tract at many different positions, the lip opening can be widened and narrowed, and the larynx itself can be raised or lowered. Even the sidewalls of the pharynx are muscular and somewhat flexible and can be moved slightly to modify the shape of the pharynx.

The articulators may also generate speech sounds. When the air stream is constricted by the articulators, a hissing sound, known as a fricative, is produced. In addition, other articulators can block or stop air flow, releasing an audible puff of air known as a stop. Stops and fricatives can be produced without vocal fold vibration (unvoiced) or with it (voiced). For example, the [z] is a voiced fricative, while the [s] is unvoiced. Both consonants are formed in the exact same manner, except that the vocal folds vibrate during the production of [z].

The tuning of the resonating cavities to produce vowel sounds and the manipulation of the articulators to form consonants is the final area of voice production to be examined in each of the instructional systems identified thus far. Each system treats these elements slightly differently, placing slightly more emphasis

in areas which coincide with the specific instructional philosophy and technique of the author and their process. For example, some place more emphasis on resonance and tuning of the cavities, while others emphasize formation of precise vowel and consonant sounds. Some (like Lessac) approach articulation structurally, insisting that a specific physical configuration must be achieved, and then a natural sound will be produced. Others (like Skinner) approach articulation from an acoustical perspective where a certain sound, pronunciation, and quality must be achieved through imitation of perfect models, and the means to achieve it is less important than the end product.

Some of the approaches to articulation include several practices in effect since the early part of the nineteenth century (Rasmus 257). Indeed, it is the study of articulation which most closely resembles the instruction of the elocutionists from the past. Because nearly all aspects of articulation and most of the aspects of cavity resonance are under the direct control of the speaker, teachers throughout the ages have concentrated their efforts on the relatively immediate changes which can be effected in the voice by paying attention to precision in articulation.

Records do not disclose any specific articulation drills until elocution came into prominence, although there are several references from antiquity which called for placing small marbles or pebbles in the mouth to help improve precise articulator placement and improve voice clarity. Traditional procedures during the 1800's involved some form of phonetic analysis together with drills on the formation of individual vowels and consonants and practice on prepared word lists and on sentences (F. T. Russell 25; Fulton and Trueblood 40-41). Many teachers using arbitrary standards of pronunciation, followed this general procedure as late as the first two decades of the twentieth century (and some continue to employ them). In many cases, however, these drills became difficult both to administer and to follow

because of ineffective ways of representing speech sounds and the use of obscure directions for sound formation (Rasmus 257).

Around the time of World War I, phonetic science had progressed to the extent that it clarified, not only symbolic representation by application of the International Phonetic Alphabet (IPA) and descriptive analyses of sounds, but also standards of pronunciation for each symbol. The arbitrary selection of pronunciation patterns also began to decline in practice as elocution faded in status. Toward the end of the first two decades of the twentieth century, the trend toward "accepted usage" in the different American dialect areas as a guide to pronunciation began to supplant authoritarian precepts (Kenyon vii-viii).

Present day voice and diction courses look remarkably like those of the past. Even present day acting classes employ many of the techniques developed out of the "voice and diction" tradition, including drills to improve both pronunciation and speech sound formation within the framework of descriptive phonetics.

Standards, however, for pronunciation and sound formation have undergone dramatic changes, even while basic drills have remained unchanged. Rigid standards for "correct" speech sounds have given way to more flexible standards, especially since the 1960's. As will be seen in the analysis of the systems which follow, some teachers do not believe there is a single "correct" formation of a sound, and they use ear training as a means of establishing better discrimination and, hence, better enunciation. If the acoustic effect of the student's sound production corresponds to an acceptable standard, the specific manner in which the sound is formed becomes relatively unimportant.

Other systems do not seek aural standards but aim instead for structural and placement standards. In these cases, if the student has formed the sound correctly the desired aural effect will naturally occur. In addition, current practices include

phonetic analyses, drill on the formation of vowels and consonants, and the pronunciation of word lists and sentences within a framework of description rather than prescription.

Barton and Dal Vera, however, believe that articulation has little to do with how you pronounce a word, but rather how precisely, carefully, and crisply you speak each sound within the word (18). Articulation, from their perspective, has to do with what organs you use to make the sound (often called placement), how long you use it (extent), how much force you put behind it (pressure), and whether or not your vocal folds are engaged (vibration). A student may totally mispronounce a word and yet articulate beautifully. Articulation concerns mumbling, slurring, and stumbling or sluggish speech versus precise forming of sounds.

Articulation also relates to how easily precision is accomplished, according to Barton and Dal Vera. They believe that one way to achieve this precision is to repeat scales, like a musician, repeating exercises to improve speed, clarity, definition, and control. In addition, they (along with Machlin and others) believe that projection is often a matter of articulation rather than volume alone. Articulation, they argue, has to do with consonants, and if they are clean, it is often not necessary to push the sound behind them. Articulation has an enormous effect on clarity (18), and as a consequence, most of the systems that have been examined link both clarity as well as intensity to articulation.

II

The Parts of the Vocal Tract

The nasal, oral, and pharyngeal cavities are not only part of the breathing

mechanism, they are also essential organs of articulation and resonance. Along with the larynx they are part of the vocal tract. In their function as part of the breathing mechanism, they filter, moisten, and warm the air prior to its entering the lower respiratory tract by way of the larynx (Zemlin 35).

The tongue, lips, palate, pharynx, nasal cavity, and possibly the sinuses shape the sound quality produced at the level of the vocal cords by acting as resonators. Minor alterations in the configuration of these structures may produce substantial changes in voice quality. In addition, while the rate at which the column of air in the lungs is driven into vibration determines the pitch of the voice, the frequency or frequencies at which the air column resonates determine the quality of the tone. This is the reason that the speech mechanism is capable of producing a certain vowel sound over a large part of the pitch range while a static vocal tract configuration is maintained (292).

The cavities of the vocal tract reinforce some overtones of the source signal more than others. Those frequencies whose wavelengths can be contained within the vocal tract will be reinforced, along with multiples of those frequencies. These resulting "resonant frequencies" or formants directly influence the intelligibility of speech. Thus, changes in the configuration of the vocal tract modify the resonant characteristics of the voice and influence the quality of the voice. While much of the quality of the voice is determined on the laryngeal level (hoarseness, breathiness, and harshness), additional aspects (like nasality) are the product of resonance.

The vocal tract resonance, called formants, are of paramount significance to voice and vowel quality. The two lowest formants decide what the vowel quality is going to be. The higher formants determine much of the personal voice characteristics, including voice classification. . . . There are other factors of major importance, too. Thus, the voice source, reflecting the chopped airstream through the vibrating glottis, is as decisive to voice quality as are the formants (Zemlin 67).

While vocal tract resonance accounts for much of the quality of articulated speech, resonance in the face and skull is also a factor in many of the instructional systems considered here. There is much controversy, however, about the role of these other resonators. Zemlin states that there is no doubt that the voice sets up forceful vibrations in the structures surrounding the larynx, including the chest wall, the throat, the face, and the skull. However, these vibrations are much too feeble, he argues, to compete with the sound radiation from the open mouth. In other words, such vibrations do not contribute acoustically to the formation of vowel sounds. This is not to say that they cannot be used as a sign of a properly used voice organ (67). This may account for the position taken by Lessac that vibratory sensations in the head and skull can provide markers for correct tone production.

The vocal tract itself may be subdivided into five cavities: the buccal (cheek), oral, pharyngeal, and paired nasal cavities. Each of these cavities play a variable role in resonance and articulation.

The buccal cavity is the small space between the teeth and the cheek. It is a highly variable space depending upon the status of the lips and the cheeks. The oral or mouth cavity is the space bounded by the tongue below and the hard palate above and on the sides by the teeth. The pharyngeal cavity or throat is an oval tube extending from the base of the skull to the level of the sixth cervical vertebra. It connects the mouth to the larynx, but it also communicates with the tympanic, oral, laryngeal, and nasal cavities, as well as the esophagus. The two nasal cavities permit air to be inspired through the nostrils, warmed, moistened, and cleaned of impurities on its way to the lungs through the pharynx.

More than just passageways, the vocal tract cavities also house the structures which are responsible for the formation of the specific sounds which constitute speech. It is the variable relationship between the articulatory structures,

specifically the lips, teeth, tongue, hard and soft palates, and the velum, along with movement of the lower jaw, which dominate most of the discussion about articulation in the instructional systems examined.

These structures, located for the most part in the mouth, modify the resonant characteristics of the vocal tract and form the specific sounds we perceive as speech. The tongue, jaw, lips and soft palate are highly mobile structures. Each of these structures contributes to the formation of vowel and consonant sounds. Indeed, most consonant sounds are classified by the articulators which form them or impede them.

The lips are particularly important in the formation of consonant sounds. Bilabial consonants such as [p], [b], and [m] are formed when the two lips are compressed and released. Labial consonants [hw] and [w] are formed when the lips constrict but do not stop the flow of air out of the mouth. Labiodentals [f] and [v] are formed by touching the lower lip to the upper teeth. The production of the vowel sounds depends upon lip retraction, rounding and protruding to form the various vowels.

The teeth also play an important role in the formation of both consonant and vowel sounds. In addition to the labiodentals, the linguadental sound TH (voiced and voiceless) is formed by contact between the tongue tip and the upper teeth. Indeed, the teeth contribute to the acoustical characteristics of almost all the sounds we emit.

The tongue is probably the most important and the most active of the articulators. It plays an essential role in resonance by altering the shape of the oral cavity. The tongue also acts as a valve to either inhibit or stop the flow of air and, in conjunction with the teeth, alveolar processes, and palate, may act as a noise generator. At times, it functions both as a noise generator and a modifier of the laryngeal tone as in the production of voiced consonants (Zemlin 248). It is also the

quickest articulator in the mouth capable of rapid, dexterous, and subtle changes which permit a wide variety of sounds as well as quick shifts between sounds. The tongue is capable of a large repertory of positions due to both the lingual musculature and the movements of the lower jaw.

The positioning of the tongue is critical for both consonants and vowels. Horizontally, the tongue body can move forward and backward to produce the low back vowels like [ɔ], and the tongue tip can move forward and back for retroflex articulations. Vertically, the tongue body can move upward and downward to produce the central vowels and palatal consonants, while the tongue tip moves downward to produce the vowel [i] and upward to produce the consonants [t], [n], and [s]. In addition the tongue can spread out from side to side when producing [t]; it can form an inverted groove, as in the case of [s]; and the surface of the tongue can spread out or form a tapered configuration as in [t], [s], [ɪ], [i], and [e].

Vowels are the least complex sounds to form in terms of tongue movements, while consonants, particularly alveolar stops and some fricatives, are the most complex. It is easy to see why sloppy articulation is not only possible but common, given the high degree of complexity and dexterity required to form some consonant sounds crisply and distinctly.

The jaw also contributes to speech production by modifying the shape as well as the resonant characteristics of the vocal tract. This is because lower lip and tongue postures are dependent, somewhat, upon jaw movement (Zemlin 255). While the jaw is capable of opening 50 mm or more, typically during speech, vertical movement seldom exceeds 7-18 mm. The jaw is quite mobile and can make exceedingly fast articulatory adjustments, second only to the tongue tip in speed. Inadequate, inappropriate, or sluggish movements of the jaw may contribute to articulatory defects, while an open-mouth position can increase vocal intensity 4-5

decibels (256). It is clear then, that crisp articulation and an open mouth and throat position can contribute substantially to the perception of vocal loudness in some speakers.

The palate or roof of the mouth is composed of three parts which include the alveolar arch, the bony hard palate, and the muscular soft palate. The palate "modifies the degree of coupling between the nasopharynx and the remainder of the vocal tract (Zemlin 261)." The height of the alveolar arch has a direct bearing on the acoustic properties of the oral cavity and may well contribute to individual voice characteristics (262). The soft palate or velum may be elevated by tensing or lowered by relaxing the associated muscles. As it is raised or lowered, it modifies the general configuration of the vocal tract and changes its resonant characteristics. Normally the soft palate is elevated for the production of vowel sounds but it lowers to produce various nasal sounds, and remains lowered during normal breathing to permit nasal inhalation and exhalation.

The pharynx or throat is about 12 cm long and about 4 cm wide at its widest part. It is a muscular tube which connects the oral and nasal cavities to the larynx. The role of the pharynx in speech production is not completely understood, but it is certain that one of its functions is resonance and that "it contributes significantly to the acoustic properties of the vocal tract and to modification of the energy distribution in the source material generated at the level of the larynx (270)." The pharynx itself actually is modified very little during speech production, but it contributes to modification of the vocal tract made by the tongue and soft palate and by the elevations and depressions of the larynx.

The nasopharynx is the upper portion of the pharynx above the level of the soft palate. It connects the pharynx directly with the nasal cavities. The nasopharynx works in conjunction with the velum to vary the degree of acoustic

coupling between the oral and nasal cavities.

Velopharyngeal closure is a very important articulatory gesture, since inadequate closure may result in nasalized speech or the inability to impound air pressure within the oral cavity for production of consonants. Unvoiced consonants may become voiced, plosives become snorts, and vowels exhibit an unmistakable nasal quality or twang. Inappropriate or excessive velopharyngeal closure can result in the familiar "stuffy nose" quality (Zemlin 275).

Adequate closure is achieved by elevating and retracting the soft palate and constricting the walls of the nasopharynx at the same time.

In addition to the nasal cavities, other cavities in the head may contribute to speech production. There is, however, disagreement about what the function of the cranial sinuses is with regard to speech production. Zemlin states that they have no real significance except for "minimal contributions to the resonant characteristics of the skull bones, and there is little support for that contention (220)." They may, however, have some affect on the voice, because an infection of the sinuses can affect voice quality by changing the relative size and shape of the cavity due to swollen tissue.

The sounds produced through the articulation and resonance of the source signal have been classified into vowels and consonants based on how they are produced. A set of "cardinal vowels" have been identified as a set of standard reference sounds whose quality is defined independently of any specific language (296). Each of these eight cardinal vowels is defined by both tongue position (relative to the palate) involved in their production as well as the phoneme or sound produced by that articulatory position. They are generally depicted on a chart indicating the position of the tongue (1) relative to the hard palate and (2) relative to the front and back of the mouth. For example, [i] is a close front vowel while [u] is a close back vowel. [æ] is an open front vowel while [ɔ] is an open back vowel.

Lip rounding and the degree of muscle tension are also used to classify

vowels. For example, [o] and [u] are both produced with a strong degree of lip rounding while [i] and [ɪ] are not. [i] is considered a tense vowel while [ɪ] is considered a lax vowel. Tense vowels tend to be longer in duration and more powerful acoustically than their lax partners (298).

Diphthongs are blends of two or three vowels spoken within the same syllable. The [aɪ] sound is an example of a diphthong.

Consonants are the product of airway resistance and constrictions that can occur at various locations in the vocal tract. They are the result of movements of the tongue, lips and jaw primarily. They are classified by the type and location of the constriction which occurs during their production and whether they are voiced or unvoiced. Most classification systems for consonants, including the International Phonetic Alphabet, identify distinct consonant sounds based upon their place and manner of articulation.

Consonants can be formed by the lips (labial or bilabial), the teeth (dental), the gum ridge (alveolar), the tongue (lingual), the hard palate (palatal), the soft palate (velar), the uvula (uvular), and the pharynx (pharyngeal), as well as a combination of these. The degree of constriction describes the manner of articulation. These include stops, fricatives, affricates, nasals, glides, and liquids or laterals.

This classification system forms the vocabulary used in most instructional systems for discussing both placement, production, and pronunciation of speech sounds. Additional symbols indicate the relative duration of a given sound or relative stress on a given syllable making phonetic transcription of speech possible. Such transcriptions are often a central feature of those instructional systems which rely on ear training. Auditory feedback is a principal way in which we monitor our speech production. Other systems which do not depend upon auditory feedback to monitor speech production, dispense with phonetic transcription entirely or create their own

system of classifying vowel and consonant sounds. Lessac's system, for example, does not use phonetic transcription at all and employs kinesthetic feedback rather than auditory feedback to monitor speech production.

As can be seen from this very brief description of resonance and articulation, there is a great deal of information to impart to students and a vast array of techniques, exercises and drills to assist speakers in improving their resonance and articulation. Most instructional systems do not address resonance physiologically but prefer to discuss it metaphorically or psychologically. Generally, articulation is dealt with functionally in those systems which employ ear training and use IPA for phonetic transcription. That is not the case with all systems, however, as will be noted in the descriptions of the specific systems which follows.

III

Methods

Edith Skinner: Speak With Distinction

It is in the area of articulation that Skinner's contribution to American speech training is most valuable. As one of the most important speech trainers in the American theatre in the last 50 years, Skinner has taught thousands of actors and teachers how to achieve "good American speech" through a carefully defined and prescribed series of rules for pronunciation. Using the International Phonetic Alphabet and phonetic transcription, ear training is the cornerstone of her technique. Her training manual lays out a program of intensive articulation drills to apply these desired standards of pronunciation to a wide variety of materials in performance. Students are instructed to practice and perfect these exercises until new standards for

pronunciation and articulation become habitual.

Skinner's work produces speakers with beautifully precise speech and excellent ears. Her training is used in a large number of highly regarded theatre programs throughout this country, and according to Raphael, it provides an effective elevated American sound for actors performing in classical plays (Raphael 106).

Skinner's classic work, *Speak with Distinction*, details how to speak two forms or dialects of Spoken English, which she refers to as "General American" and "Good Speech." "Spoken English will ensure that an actor is easily heard and immediately understood in any theater, and will allow the actor to work with accuracy and confidence no matter what accent, dialect or variety of English a script calls for (ix)." General American is a dialect of North American English typical of the ordinary speech often heard in the western United States. It is generally free of regionalisms and is referred to as "Western Standard." Good Speech, according to Monich and Mansell (editors of the most recent edition of Skinner's text), is a dialect of North American English that is free from regional characteristics, suitable for classic texts, effortlessly articulated and easily projected. It is sometimes known as "Eastern Standard" or "Theatre Standard."

Skinner's system, then, is both a speech and a dialect course, advocating very specific pronunciations to achieve a specific "sound." Indeed, the goal of this instructional system is to retrain the way the actor hears in order to acquire the best possible speech habits. This is achieved through a detailed study of phonetics and an analysis of the sounds of Spoken English, followed by application of Spoken English in classical passages.

Skinner begins with a very brief description of resonance and articulation. A good voice, she states, issues from a relaxed throat and resonates freely through the pharynx, mouth and nasal passages, producing an appropriate balance of resonance

(3). According to her, only the excitor (respiratory muscles) and the articulators can be directly controlled by the speaker. Most of her attention, however, is directed toward the precise control over the articulators.

The better part of her text consists of meticulous descriptions of every vowel and consonant in Spoken English, transcribed in IPA, with extensive drills, exercises, word lists, and sentences designed to hone pronunciation and sound formation. Indeed, she addresses every consonant in every conceivable position and combination with guidelines for standard pronunciation in each context.

Skinner divides the articulators into two groups, four which are moveable (tongue, lips, lower jaw, and soft palate) and four which are immovable (teeth, gum ridge, hard palate, and throat or glottis). It is not clear why she considers the glottis the same as the throat or why it is considered an immovable articulator. As an articulator it is limited to the formation of glottal stops or pops and the voiceless [h] sound.

Skinner classifies the sounds in Spoken English into groups of vowels, diphthongs, triphthongs, consonants, and affricates. Vowels, she explains, are made with an open, uninterrupted flow of air through the mouth, consisting of a single sound involving no movement or change of the shape or position of the articulators during the creation of the sound. Thus, she argues, vowels are pure sounds, and all English vowels are voiced. According to Skinner there are fifteen pure vowels in Spoken English; and they are produced with the tip of the tongue resting behind and touching the back of the lower front teeth, while the tongue blade arches to various heights and the lower jaw is relaxed. All of the pure vowels in Spoken English are produced with the velum raised to close off the nasal cavities.

Skinner identifies ten diphthongs or vowel blends which are made by movement of the articulators. Diphthongs are generally perceived as a single sound,

but they consist of two pure vowels blended together into a single phonetic unit. A blending of three vowels to form one sound is called a triphthong and is considered a single syllable. They are [ei] as in *pay*, [ai] as in *my*, [ɔi] as in *boy*, [oʊ] as in *go*, [aʊ] as in *now*, [ɪə] as in *here's*, [ɛə] as in *their*, [ʊə] as in *poor*, [ɔə] as in *ore*, and [ɑə] as in *car*. Only two triphthongs are common in Spoken English. They are [aɪə] as in *hire*, and [aʊə] as in *flower* (Skinner 11).

Consonants are made by stopping, impeding, or interrupting the breath through the mouth or through the nose, according to Skinner. They may be voiced or unvoiced and can be formed by stationary or moving articulators. Twenty-six consonant sounds are in well-spoken English. Affricates are a special kind of consonant composed of a stop-plosive and a fricative consonant blended together. The only two affricates in Spoken English are [tʃ] as in "chease" and [dʒ] as in "judge."

Once each vowel and consonant sound is identified, Skinner provides the student with detailed IPA charts. A separate chapter with accompanying exercises is created for every sound and sound combination.

According to Raphael, advocates of Skinner's method say that her standards of pronunciation can help people sound more "cultured" or "educated," and that several of the sounds acquired through this training carry more easily in large halls and are more clearly understood by diverse listeners (105). The particular dialect advocated by Skinner has proven to be very successful in Shakespearean and other classical plays, and acts as a fairly standard and relatively neutral base for effective stage dialects.

Critics charge that "good American speech" is not neutral American but rather a somewhat affected sound, based on a Southern British model. It is based on a single cultural standard, White Euro-American. They feel it undervalues the great

diversity of speech patterns characteristic of different areas and cultures within this country and is more relevant to an older generation of American stage and film actors (105-6).

Despite these objections, Skinner provides the most thorough and exhaustive reference work on articulatory precision of any of the systems examined. Her instructional manual begins with a thorough discussion of the International Phonetic Alphabet and detailed rules for phonetic transcription. Her discussion of vocal anatomy and physiology is sketchy and brief, in sharp contrast to the exhaustive detail given to every nuance of pronunciation and articulation. Resonance is defined in the glossary at the back of the text and only mentioned in passing in the introductory pages. She does, however, list the chest, throat, mouth and nose as resonating cavities, even though she later questions whether the chest actually acts as a resonator or not. In addition, "the production of tone is dependent on internal and external physical conditions, as well as on mental attitude and emotional response (3)." These conditions are never enumerated and no further discussion of the relationship between the intention or idea and the word occurs in her text.

Skinner's text works from the assumption that a student can guide his or her own study of voice and offers students instruction about how to proceed on their own. She advocates a daily 45-minute practice session which should include some stretching, relaxation, easy-breathing, and vocalization exercises, followed by some articulation warm-ups and specific speech exercises that address the particular needs of the individual. Selecting these speech exercises, however, may need to be done by an instructor, Skinner admits, but the careful student can work without one. Even the subtle work of ear training can be done individually, although it requires patience, judgment, taste and sensitivity, according to Skinner, and must proceed slowly and methodically.

To assist the student, Skinner has prepared an audio cassette tape to accompany her text which provides accurate examples of the sounds of "well-spoken English" in isolation, in comparison and in connected utterance. Few others have provided this service. Barton and Dal Vera include a practice cassette with their new (Voice: Onstage and Off) text, and David Stern has produced an extensive series of voice and diction tapes covering most of the aspects of his vocal training technique; but all the other training systems assume that a good teacher is the best model, and do not have tapes. Machlin includes numerous references to recordings of famous actors reciting classic plays as models for students, but it is highly unlikely that students could ever lay hands on such LP and 78 RPM recordings as those listed.

Four or five months of study are needed before students are likely to have a good sense of which sounds need attention the most, according to Skinner. Ear training and "imitative ability" should be sufficiently advanced by that time to produce "a fair approximation of the correct sounds (28)." The student should also begin to practice using works of literature at this stage.

The goal of Skinner's exercises is to achieve relaxation and opening of the lower jaw, activation of the lips, forward placement of tone on vowel and diphthong sounds, and clean, efficient articulation of consonant sounds. Maximum clarity with minimum tension is the ultimate goal of her method, and few systems could equal this one in scope, detail, or depth.

While she claims her system to be comprehensive, it really addresses only speech and not voice. It is dogmatically prescriptive and demands minute attention to correct placement of the articulators and perfection in the crisp and agile uttering of every phoneme. Skinner's work is the true bridge between the old voice and diction (and elocution) models of the early twentieth century and the modern theatre voice

training programs which evolved after the 1960's.

Evangeline Machlin, Speech for the Stage

Evangeline Machlin's approach to vocal instruction always begins with students listening to excellent models of professional actors reciting classic plays and poetry, and then listening to themselves to assess their current ability or disability with respect to articulation. This traditional approach based on imitation of good models is self-directed through the use of various kinds of recordings. Macklin's text provides basic explanations, while students begin their own investigations and experimentations into their own voice.

Her treatment of resonance and articulation is no different. Machlin has compiled a comprehensive workbook full of specific detailed techniques and numerous exercises designed to help acting students discover the power of resonance and the crisp precision of clear diction.

Machlin treats resonance and articulation as separate but related functions, providing a separate chapter in her text and set of exercises for each function in her text. She begins with a relatively detailed and functional description of resonance and is the only author among those whose work has been examined here that goes into the physics of resonance and the acoustical properties of open-end tubes. While she does not name formants, as such, she does describe them in a simple and easy to understand way using a vase filled with water as a metaphor.

The empty part of the vase is an open-end tube of the right length to amplify one frequency among the many in the mixed tone that we call middle C. The wavelength of this frequency fits into that particular space, so that all the air in the space begins to resound with the same frequency (Machlin 70).

She continues to explain that the production of different vowels is possible because the oral resonator can vary its shape to amplify different frequencies. In vowels like

ee, high frequencies dominate. "High pitches need smaller, narrower spaces for their wavelengths." Vowels like ah, which are dominated by lower frequencies need "larger chambers to resonate in, because their important frequencies are lower and their wavelengths longer (71)." Thus, the oral track is "tuned" to resonate vowel sounds by adjusting itself to a size which will acoustically reinforce the sound. Each vowel, as a consequence, has its own mouth shape.

The nose is the only resonating cavity which cannot change its shape, however, it is critical in the resonance of the nasal consonant sounds N, M, and NG. According to Machlin, lip shaping tends to influence resonance, and specific instructions are provided for each vowel and consonant sound to insure the "greatest resonance possible" by using the lips to extend the resonating cavities. In addition, she suggests that other parts of the body sense vocal resonance and may even contribute to it.

The creation of resonance is a matter of holding vowel sounds for a longer time in more precisely shaped mouth openings. It is assisted to by strong inhalations . . . , and by flexible jaw-opening movements. . . . The recognition of resonance is a matter for your ear, but your sense of feel may assist in the process. Big resonance can be felt even when it is not heard. . . . It is very possible that every bone in the body resonates some part or other of the sounds of strong speech, helping to give them power and beauty (72-73).

Up to this point Machlin has been accurate and clear in her description of resonance and cautious about attributing resonance to parts of the body other than the vocal tract. But when she discusses what she refers to as "resonance faults," she mistakenly attributes to resonance problems which typically occur on the phonatory level. Of the four faults of resonance she identifies -- stridency, hoarseness, nasality, and breathiness (73) -- only nasality is a resonance problem. The rest are the result of laryngeal misuse. Each of these faults must be corrected, she argues, before substantive work on the voice can continue. To do this she

supplies numerous exercises.

The problem of stridency is described as a loud, shrill, harsh vocal quality that "lacks the warm ring of resonant speech (74)." Because Machlin attributes loudness and projection to the size of the mouth opening rather than to subglottal pressure and medial compression of the vocal folds, it is logical, from her perspective, to attribute stridency to resonance rather than phonation. Thus, an error is perpetuated on several levels.

It is unclear why Machlin characterizes hoarseness and breathiness as faults of resonance because, in her explanation of each vocal quality, she clearly attributes them to phonation. She states that hoarseness is "due to a sore throat and slight inflammation of the larynx (74)," and breathiness "is the sound of air escaping between the vocal cords when they have not been pulled together for phonation (77)." The remedies she prescribes for these situations are not acoustical, but medical and physical. Exercises which work to achieve deep relaxation, along with the gentle production of a soft, clear tone, are advocated to eliminate hoarseness and breathiness, along with behavioral changes.

When criticized for making this mistake by Stern, Machlin replied, "I grant that hoarseness and breathiness are, from the clinician's point of view, problems of phonation. But they are perceived by the student and teacher as problems of resonance (Machlin, Theatre News, 28)." How that perception relates to resonance, however, is never clearly explained, despite her usually clear explanations of structure and function. This uncharacteristic imprecision is defended in her reply to David Stern, despite her claim that her "preference is for the precise word, rather than the figurative (28)."

Machlin's resonance exercises are primarily humming and singing exercises because she believes that singing not only develops resonance, but that it helps all

speech tone faults (77). She moves from singing phrases and words to reading passages of poetry in order to transfer the resonance developed into shorter duration tone production.

Once full resonance development is achieved the actor can then begin to work on clarity which depends upon "accurate, vigorous articulation (77)." Despite the relatively small movements associated with articulatory precision, they must be executed deftly, rapidly, and easily. They must be both agile and accurate. The tongue, lips, jaw, and soft palate are named as the primary articulators.

Most articulatory faults evolved, Machlin states, due to the common practice of making articulation easier by decreasing the amount of distance traveled between sounds by the articulators. "Ease of utterance," or co-articulation then accounts for most of the sloppy and imprecise diction we may hear. This must be corrected, she states, by attention to each sound and continuous practice.

Machlin's system advocates the use of the International Phonetic Alphabet as an essential tool that students can use to diagnose their own articulatory faults. Students can analyze their own speech by recording difficult words and phrases and identifying the exact sounds that compose them (92). Traditional IPA charts are included which contain the sound, the phonetic symbol, the points of contact of the articulators, and the action by which sound is released. "The precise movements of the articulators and an understanding of the sounds they make thereby are your key to both standard pronunciation and clarity in your stage speech (94)."

Machlin classifies consonants (voiced and voiceless) into plosives, fricatives, blends, nasals, and glides. Vowels are designated as front vowels, back vowels, mid vowels, and diphthongs. This is the same classification which Skinner uses and is characteristic of the manner in which phonetics is frequently taught in voice and diction and linguistics courses. Many of the other systems examined here present

this traditional IPA format. Like Skinner, Machlin pays particular attention to learning the skills of phonetic transcription or "spelling by sounds."

In addition to careful ear training and phonetic transcription, Machlin advocates the use of Standard American pronunciation, "the speech of the educated American, free from marked regionalisms (110-11)." She advocates elimination of regional accents in favor of the national standard dialect employed by newscasters and professional actors of the past. She does not, however, advocate the use of "stage diction" as Skinner does, which she dismisses as an imitation of British usage.

Despite her insistence that actors use standard pronunciation, she later argues that regionalisms are in danger of being lost due to the influence of nationwide media which depicts an oral standard. Moments after she argues that regional variations should be preserved, she dismisses them again. "Regionalisms and dialects are with us, and will be for a long time to. Your business in the interests of clarity is to divest yourself of the former and assume the latter when needed for a role (113)." This kind of contradiction can make Machlin's method confusing.

Once phonetic transcription is mastered, the student is led through a series of exercises to identify the kind of changes which occur in words in connected speech. Fluent speech, Machlin states, follows the "law of economy of effort" which permits a certain amount of assimilation or blending of sounds, especially in difficult combinations. A vast array of articulation "faults" are listed along with the "correction" for that particular fault. Unlike Skinner and others who work one phoneme at a time, Machlin goes right from the correction of faults to articulation agility exercises without any detailed instruction about forming the consonants and vowels. It appears that she places more emphasis on the discernment of speech, phonetically, than on the pronunciation of speech orally.

While there is much to commend in Machlin's text and method, she lacks the

thoroughness of Skinner and the connection to the text and the psychological impulses addressed in Berry's and Linklater's systems. Her system is a midpoint between Skinner's and Lessac's, the only other prominent American methods. Like theirs, the strong roots of voice and diction (and its predecessor elocution) can be seen in Machlin's technique, content and method. Because there is so much accurate information about structure and function in Machlin's text, the occasional errors and contradictions really stand out in an otherwise credible system.

J. Clifford Turner, Voice and Speech in the Theatre

Turner devotes a good deal more attention to resonance than Skinner does. In fact, Turner states that both "tone" and "word" are characteristics of resonance.

"The resonator . . . has a musical function in producing tone, and a linguistic function in assuming the shapes for the vowels and carrying out the movements necessary to form the consonants (Turner 94)." The resonators produce the "tone" or the unique voice quality which differentiates one speaker from another. The size and shape of the resonating cavities (pharynx, mouth, nose) determine this unique tone quality.

In Turner's methodology, the students are trained to produce and recognize good tone (resonance) before information about phonation is provided. This order of instruction is purposeful, as the ear training necessary to identify appropriately formed notes can only be done through developing and controlling the resonated tone which we can hear. We cannot hear the unresonated note (laryngeal source signal) and so the student must develop and control the resonators to "make its influence on the note as perfect as possible (24)."

A well-resonated voice possesses a tone that is "generous and full." Tone is the first of the three main objectives toward which students work to achieve perfect utterance, according to Turner. Tone is at its best when each section of the

resonator contributes more or less equally to produce the sum total effect.

"Excessive use of the mouth and too little use of the pharynx will result in thin, reedy tone. Excessive use of the pharynx results in heavy, dull tone. Excessive use of the nose results in an overdose of nasality." Good tone is achieved when we control the "quota of resonance that each cavity contributes to make up the over-all impression (27)." The difficulty here is to know how much each resonator is contributing to the tone. Apparently the only way to know is based on the resulting tone. Consequently, ear training is critical in both listening for correct sound and balancing resonance. This relatively arbitrary approach to ear training could be very tricky for a beginning voice student and would require careful monitoring by a skilled instructor.

Turner states that the more expanded the resonating cavities are the better the tone. Thus, the size of the cavities is critical to tone quality. In addition, it is the ability to alter the shape of the mouth (including the tongue, lips and jaw) which enables us to impress the character of the vowels on the tone (27). The resonators determine the character of the vowel by reason of the shape of the vocal tract through which the tone is molded. Thus, in training the resonator the aim is (1) expansion of the cavities in order to impart full sonority to the note; (2) the achievement of balanced resonance, so that no one cavity predominates to the detriment of the total effect; and (3) perfection of the shapes (articulatory positions) which mold the tone and give it particular character in the form of words.

Opening the jaw and enlarging the space at the junction of the mouth and throat are the two areas addressed in expanding the size of the resonators in Turner's system. According to his text, the "AH" sound represents the optimal open position of both jaw and throat. It is easy to open the jaw for this sound, but hard to maintain this degree of openness with other vowels. It is not easy to open the throat, yet it is essential "if the bugbear of throaty tone is to be avoided (29)." It is not clear,

however, how this openness can be maintained in vowels other than "AH," and Turner provides no explanation as to how it is to be done.

Another means of expanding the pharynx is through the use of rib-reserve breathing. According to Turner, rib-reserve breathing draws down the larynx from below, thus bringing about an increase in the length of the pharynx (29). The enlargement of the pharynx can only be brought about indirectly by means of correct poise, controlled breathing, and an absence of tension throughout the resonator. We cannot consciously bring about this enlargement. Turner states that it is not important that we know why rib-reserve breathing lowers the larynx, only that it does. The curious student would be left without an explanation, as is so often the case in Turner's system. Again we ask voice students to believe a technique will work without providing any explanation or rationale.

Turner is clear, however, about what we can and cannot control. In terms of resonator expansion, he writes that we can see and feel the open jaw and feel the tongue; we can only observe the open throat with a mirror and feel it only in a very minor degree. He states that speakers need to develop and train their sense of hearing so that by its acuity and awareness they may bring about the right degree of openness in this area. According to Turner, we can neither see nor feel the extent to which the pharynx is expanded and must rely entirely on the evidence of our ears.

Touch and hearing are the controlling factors in tone production in Turner's system. The former tells us that the jaw is open, the tongue is forward, and the lips are doing what it required of them. Tactile observations about the movements of the respiratory organs, breathing, and rib expansion signal to the speaker that they are accomplishing pharyngeal expansion. It is unclear, however, what sensations the actor should be looking for, and unlike Lessac who clearly spells out the nature and location of the desired sensation, Turner does not describe them in any detail.

A technique Turner employs to bring about resonator enlargement and openness is whispering, a technique in use since the eighteenth century. He argues that this eliminates the tendency to constrict the passages. The conditions which will provide good tone need to be created prior to actually beginning work on the actual note. This "trains" the passages to be configured optimally before producing the actual sound of the voice (30).

The speech process, as Turner describes it, begins with the resonators shaping the vowels. The resonators are then partially or completely closed to create the consonants. Clear articulation is achieved by means of several important techniques in Turner's system. He explains that consonant movements are to be felt far forward in the front of the mouth. Clarity depends upon the precision and forwardness of the movements involved (95). Apparently this lifts the chin slightly and thrusts the head forward, enlarging and partially straightening the pharynx for improved resonance. This suggests a comparison with Lessac's forward stretch – structural action – and his sensory monitoring system. While the forward stretch probably refers to roughly the same facial posturing in both systems, the use of tactile feedback is a bit different. Lessac uses sensed vibrations and buzzes to negate the need for aural feedback, while Turner employs touch as a means of exploring articulatory positions which are reinforced by aural feedback.

Turner does review the traditional consonant and vowel sounds using the IPA to identify and describe them. He prefers to employ dramatic passages for practice rather than word lists or drills. He specifically employs passages from romantic plays in verse "because the highest demands on the voice are made by such plays (99)." Working with a dramatic text during practice reinforces the desired technique in an appropriate setting. Like Berry, he uses the text to make the connection between the technical application of training theory and the practical application of vocal skill in

dramatic work. This emphasis on text during practice could make it easier to integrate the training more quickly into rehearsal work, where more abstract training may be more difficult to apply.

Turner places emphasis on vowels where Lessac places emphasis on consonants. Indeed, Turner is not concerned with the correctness or incorrectness of sound formation but with the selection of the correct sound, particularly the correct vowel for a given word. He advocates using "that vowel which calls least attention to itself, because it is used by the majority of educated and cultured speakers (101)." Thus, like Skinner, he is advocating pronunciation standards for words as well as articulatory standards for sounds.

Descriptions for pronouncing vowels are given in general terms. Suggestions for correctly forming vowel sounds are not given using a vowel location chart or positions descriptions. Instead, he relies upon sample words and unclear instructions. For instance, to achieve the correct position for the [u] sound the actor is urged to "whistle a low note." This is confusing and does not provide accurate lip positioning as a low note can be whistled from many different positions by the deft whistler. In addition, because he is British, his sample words are transcribed phonetically in standard British rather than in Standard American, a practice which could easily be confusing for American students who may be unfamiliar with dialect subtleties. Although Turner is not prescriptive in pronunciation, he does argue that actors must know "standard" pronunciation. In addition, they must be capable of reproducing those differences in pronunciation which are indicative of the regional differences and the social background of the characters created by the dramatist (101-2).

Despite potentially confusing descriptions of vowel sound formation, Turner is clear that it is the vowels that must be perfected because they are responsible for

maintaining the vocal tone.

Where vocal tone is concerned, consonants are to be regarded as a necessary evil. Necessary, because they are the means whereby the tone is articulated into speech, and evil because, unless correctly managed, they interfere unduly with the free, open production of tone, and not infrequently ruin it (73).

To overcome this problem, he employs a sequential training process, designed to reinforce the openness of the consonants. "The consonants which should first be brought into association with the resonator are those which cause no cessation of the note and at the same time require the least degree of closure (73)." In other words, consonant sounds are taught in the order in which they most resemble vowels. Consonants which require a large degree of closure, like the voiceless consonants and the plosives would be studied last, and then are practiced in association with open vowels like AH.

Much of Turner's chapter on "the word" is an exploration of these consonants in the order he prescribes for maintaining maximum opening. The continuants M, N, and L are the first sounds to be studied, followed by TH, V, Z. Additional consonants are added, but only in association with open vowels to secure quick, crisp articulation of consonants while maintaining the best possible resonance characteristics of the vowels (74-83).

While pronunciation of various vowel and consonant sounds are provided in isolated phonemic drills and poetic passages, Turner is just as concerned with pronunciation problems associated with connected speech. When combinations of consonants and vowel sounds create a word that is difficult to pronounce the tendency has been to simplify the speech movements. "Speakers fail to achieve the necessary delicacy of the minute movements of the speech organs, and a fresh, simplified pronunciation is gradually evolved (116)." Turner argues that if these simplifications have become customary then they are acceptable, but "those which

have not passed into current usage are inadmissible (116)." Dropping some consonant sounds have become common, like the "d" in grandmother. In these cases, he advocates adhering to local pronunciation models, or in the case of actors, the standards of pronunciation appropriate to the characters they are portraying.

Turner differentiates between customary pronunciations and careless speech, the latter of which gives rise to all the innumerable omissions which are inadmissible (117). To clarify what is acceptable, He provides descriptions of each consonant sound, target words, drills to achieve precision in formation of the sound, and passages to practice the sound in connected speech.

This precision is achieved both through descriptions of where the articulators are and how they should move, but just as importantly by sound targets which must be achieved. The ear is a critical tool in Turner's system for determining if targets have been reached.

Finally, Turner is really more concerned with the effect of articulation than the mechanics of it. Relying on imagery, metaphor, poetic description and dramatic sense more than anatomy, physiology, structure and function, Turner hopes to create a "feeling" for how voice should be produced and how it should sound rather than an understanding of how it works.

Arthur Lessac, The Use and Training of the Human Voice

Lessac's highly technical system is almost entirely concerned with resonance and articulation of the "sound stream," or the molecular wave action responsible for what we hear as voice and interpret through speech. By "voice" Lessac refers primarily to the phonated tone produced at the larynx, while "speech" refers to articulate sounds, principally consonants (voiced and unvoiced), along with vocal expression, intonation, inflection, accent emphasis, and nuance (xv).

Lessac's system deals extensively with resonance and the shaping of the sound stream within the cavities and the bony structures of the head and chest. He states that the primary resonating structures are the teeth, the hard palate, the bone of the nose and the maxillary, forehead and frontal sinuses. Each of these surfaces transmits the vibratory sensations which are the central feature of Lessac's instructional system. While other systems focus more on the acoustical properties of the hollow cavities, Lessac is more interested in the bony areas adjacent to those cavities as transmitters of the vibrations associated with open cavity resonance.

Sympathetic resonance occurs when the vocal sound waves travel through the air from the vibrating membranes and make contact with the other hard surfaces setting them into vibration. Sound waves also are reflected within each of the cavities (he does not mention the effect of damping) bouncing around from top to bottom and from wall to wall.

This action creates tone color and body, which vary with the size and shape of the cavity. A well-formed large cavity darkens the tone and gives it fuller body, while a smaller cavity produces a lighter and thinner tone (Lessac 11).

Lessac goes so far as to say that the human voice box is really not the larynx, but the cavity where the tone is strengthened, amplified, and beautified by resonance and wave reflection. The true voice box, states Lessac, is the oral cavity and the nose and sinus cavities. Thus, most of his system is concerned with achieving precise configurations of the oral cavity, monitored by kinesthetic feedback rather than aural feedback.

Proper formation of the oral cavity, where wave reflection takes place, produces a full-bodied, mature, authoritative, warm, expressive tone; coordinating this action with proper use of the resonating areas adds brilliant, ringing, penetrating, stentorian qualities. . . . Vocal resonance, without proper form of the oral cavity, becomes tinny, shrill, and strident; while even the best-formed cavity cannot make the voice more than a dull and lifeless instrument without good resonance (11).

Lessac proposes that much of the process of respiration and phonation are beyond the direct control of the speaker and thus cannot be manipulated because they do not produce controllable physical sensations in the trachea and the larynx. He argues that only controllable actions, which produce controllable physical sensations, are responsive to training. According to him we have complete conscious or voluntary control over postural actions that aid respiration, over articulatory actions that form and control the spatial relationships within the oral cavity, over the sensations of vocal sound waves vibrating against the bones in the head, and over the habit pattern of overriding the auditory mechanism (13).

Lessac contends that we hear ourselves through bone conduction rather than air conduction; "the ear must be considered a nonessential agent in the process – and a nonobjective one if we try to judge the sound by it (15)." Thus, he dismisses ear training as unreliable. The actor or speaker must be trained to feel the sound rather than hear it, to ensure that it is properly formed.

The other critical element in Lessac's system is the Three Energies or actions that are employed to achieve the correct formation of the oral cavity. The structural action, tonal action, and consonant actions are postures which both "tune" the resonating cavities to optimally reinforce the sound stream as well as form precise vowels and consonants. The inverted megaphone stretch is the primary structural action designed to achieve maximum expansion of the oral cavity. Like Turner's forward stretch, this structural action attempts to enlarge the oral cavity by relaxing the jaw, slightly rounding the lips, separating the teeth and lowering the larynx.

The tonal action sensitizes the student to the sensations of vocal vibrations in the hard palate, the bone of the nose and nasal sinuses, and the forehead and frontal sinuses. Lessac believes that sound waves also continue through the sinuses, cranium, spine and ribs, producing chest resonance. "The more tonal action felt in

these structures, the greater the chest resonance (19)." The tonal action is particularly important in the formation of vowels, because the vibrations produced during the production of these voiced tones are the keys to proper vowel formation. "Control and command of tonal action rests on learning to feel this buzz or call instead of listening for a vocal tone (19)."

According to Lessac, tonal action develops the full pitch, range, power, and projection of the voice and improves quality by eliminating nasality, muffled tone, throatiness, and breathiness. While tonal action is primarily a technique for sensitizing the speaker to the vibrations associated with the resonance and articulation of vowel sounds, Lessac assigns to tonal action many of the functions that are actually performed by the larynx. While nasality is a function of resonance, pitch, vocal quality, and projection to a great extent are phonatory behaviors. While the imagery created by Lessac may function to achieve the kinesthetic sensitivity necessary to work with his system, it is none-the-less confusing and inaccurate physiologically.

The third Energy in Lessac's system is consonant action. It is associated with the sensory images and vibratory patterns responsible for the proper formation of consonant sounds. Likened to the instruments in an orchestra, each consonant action is designed to create both a mental image and a rhythmic sensation. "The correct sound for each of the consonant instruments can be repeated precisely if the proper physical sensation is memorized – not mentally or by listening, but through a physical sense memory (21)." Lessac asserts that this method eliminates the need for "complicated, hard-to-coordinate, and impractical" articulatory drills.

Consonant action supports and contains tonal and structural action. The three must be used in unison to produce the proper alignment of the oral cavity while sensing and repeating the vibratory patterns of each vowel and consonant. The

consonants especially must be formed meticulously, as clear diction depends far more upon them than on vowels. Good sound is produced only when each consonant is a complete action-sensation and is not assimilated into the vowel or consonants which follow it.

Lessac does not use the IPA because he does not employ ear training in his method. Instead he creates a complete shorthand of his own for describing and recording vowel and consonant sensations. He calls this "Phonetics by Feeling" which is a series of specific stretch positions associated with a specific vowel. "When you recall and reproduce a position you will produce a particular vowel, automatically and perfectly, guided by the way it feels rather than the way it sounds (61)."

Each vowel is given a target and a shorthand, like OO as in *ooze* or AW as in *all*, along with a number from one to six that correspond with lip openings. OO (as in *ooze* and *you*) is a "1" which represents the smallest lip opening, while AW (as in *all* and *laud*) is a "3" or the keystone position. "5" is the largest lip opening (AH as in *father* or *alms*), "4" is a large oval opening made by the O as in *bond* or *odd*. "6" is a large lip opening that is slightly widened to produce the A as in *add* or *back*. Diphthongs are designated by two symbols, such as "21" as in *ode*, *no* or *foam* (106).

Lessac argues that his phonetic system is simpler and more general than traditional phonetic designations (IPA) and that it is easier to use. He focuses attention on the nature of the stretch and associated physical sensations rather than on the nuances of sound which are difficult to detect in all but the most highly trained ear. In addition, he permits great leeway in the production of vowels which are more targets than precise positions and sensations like the consonants. "Specific vowel pronunciation is not essential to communication of meaning (69)." Speech will sound perfect, Lessac argues, if the consonants are properly experienced.

Consonant production requires the absence of tension in the muscles, a balanced action and position of the muscles, and the most efficient use of muscles. His notation system for consonants differs from that used for vowels, because he characterizes consonants as the "instruments that provide musical accompaniment to speech" based upon "the feeling and the taste of speech (129)." He explains,

I found that when consonants were felt as vibratory and tactile combinations of action and sensation associated with orchestral instruments, muscle and vibration memory were developed, and the ear was de-emphasized as a controlling guide—the student learned to feel the sounds instead of listening for them (xv).

Consonants, therefore, are responsible for the intelligibility of speech as well as the "multiplicity of musical values and instrumental qualities, built-in tempo and speed controls, and a wide variety of contrasts and variations (130)."

Each consonant, then is classified as an instrument of the orchestra in one of three categories, melodic, percussive, or sound effect. For example the N is a violin, the M is the viola, and cello is represented by the V. The percussive B, D, and G are three tympanies, while their unvoiced cognates P, T, and K are the bass drum, the snare drum, and the tom-tom. The cymbals are the CH and DG sounds. The whistles and wind machines are the S, F, SH and H and the unvoiced TH. The woodwinds consist of ZH as the bassoon, NG as the oboe, W as the flute, L as the saxophone, and the voiced TH as the clarinet. Finally, the R is thought of as the trombone, and the Y (as in *yonder*) is the French Horn (131-35).

The student must learn the action of each simulated musical instrument and the sensation of that action which is then applied to voice and speech. By employing the orchestra metaphor Lessac is able to employ an extended and detailed comparison of playing upon the voice by means of consonant actions like playing upon musical instruments. His descriptions, explanations, and terminology are all designed to heighten the musical value of the consonants and the manner in which

the students look upon them and ultimately manipulate them.

Finally, Lessac addresses the need to link sounds together in connected speech and to preserve the integrity of each sound while linking, connecting and phrasing as if a phrase or a sentence were one long word. He cautions students about dropping consonants which he deems undesirable. Instead, the final consonant of one word should be linked to the initial consonant of the next word, except before a pause. He believes this is the key to natural, smooth speech (174). Intelligibility in speech is lost when final consonants and those that precede other consonants are dropped.

The objective standards Lessac uses to judge speech are enunciation, articulation, and voice usage based on standards of euphony and natural function. For example, when the word "ran" is pronounced "reyan" the essential fault is not wrong pronunciation or peculiar intonation, but that the sound is too nasal (xvi). Natural function and euphony are further explained using the "R" sound in hard, fir, mother, board, fierce, and firm. According to Lessac, the choice of pronunciation should not be based on regional variation but upon the knowledge that

an "R" that follows a vowel and precedes a consonant, or when it is the final sound in a word before a pause, is a backward, restrictive, throaty influence that tends to produce poor tone, a tight jaw, and loss of clarity. But if the facial stretch is forward enough to increase the mouth cavity and relax the tongue and jaw, and the tonal sensation is strong enough to direct the vibration forward into the bony area, one can use as much or as little R as one pleases and offend no one (xvi-xvii).

Thus, criticism is aimed not at the pronunciation of a word but at the way in which the vocal mechanism is used to produce the word. Voice and speech training need never be considered to mitigate against regional accents. Lessac further states,

through muscular sensation of the facial posture, the tonal sensation of the vocal action, and the orchestral accompaniment of the consonants, objectionable regional influences are eliminated while the flavor of regional individuality is retained to give variety to an excellent

common culture of voice and speech (xvii).

This sounds as though Lessac is advocating standard pronunciations and articulatory positioning in order to create an American standard of pronunciation, a tacit effort designed to divest the speaker of that regional individuality at the same time that he is advocating for that diversity. This type of contradiction is repeated again when Lessac states that he does not believe that individual differences make a difference and states that everyone can have a good speaking and singing voice if his technique is used. Indeed, he argues that his approach will lead to a "superior American speech standard, elegant and beautiful . . . which can be used in artistic as well as practical speech (xviii)."

While Lessac's technique is unorthodox and perhaps confusing, it does have the advantage of being consistent throughout, based on the musical metaphor of the orchestra and the acquisition of a physical technique which can be learned under the guidance of a skillful instructor. It may be easier, then, to "gain" a new technique – a clear objective – than to lose old habits without a clear understanding of what they are being replaced by, as is the case in the next system.

Kristin Linklater, *Freeing the Natural Voice*

Linklater's method is fundamentally psychological, encouraging a freeing of the natural voice that already exists within each person but is stifled by "insidious tension and habitual inhibition." It is in no sense a technique, but rather a freeing of the voice from all boundaries without prescribing any particular form, style, or sound. It is a process-oriented technique, not focusing on proper style of pronunciation or a correct way to speak. Exercises do not specifically address articulation, but instead deal with

allowing the free passage of breath . . . with freeing up the vocal

channel through tension reduction and relaxation of the shoulders, neck, jaw, tongue, and lips; with developing greater vocal range through contact with and exploration of a series of resonators, and with immersing oneself in the intricacies, subtleties, implications, and layers of the language itself, of the text being spoken (Raphael 106)."

Linklater describes the articulation process only briefly. According to Linklater, the shape, volume and opening of the resonators determine the overtone structure of the sound, while the basic pitch is determined by the rate at which the vocal folds vibrate. Resonation can be thought of as two types: the first type is used to shape or color the voice generated at the larynx regardless of the speech sound intended. The second type is that which modifies the larynx-generated sound for a specific speech sound. The first type of sound (resonance) is always present for the speaker and the second type (articulation) depends on what the speaker wants to say (7).

According to Linklater, the initial vibrations of sound produce a wave which resounds off the nearest sounding boards which are the cartilages of the larynx. The vibrations are then amplified by the resonators or hollows and empty tunnels in the architecture of the body, including the pharynx, the mouth, and the nose. But Linklater also includes the "bony structure of the chest, the cheekbones, the jawbone, the acoustically powerful sinus hollows, the skull, the cartilages of the larynx and the vertebrae of the spine (9)" among the structures contributing to resonance. No evidence is provided to support the contention that these structures actually do contribute to resonance, or that they conduct meaningful vibrations which can be sensed. It may be that Linklater is attempting to create a mental image rather than describe actual function. If that is the case, it should be made clearer for the student who is likely to be misled by such claims.

In addition, Linklater proposes that the pattern of resonating response changes in response to pitch.

For instance, low sounds get resonance from the chest and lower throat; [the] lower middle part of the range is amplified from the back wall of the throat through the soft palate, the teeth, the jawbone and the hard palate . . . middle voice resonance comes in from the mid-sinuses, the cheekbones, the nose . . . the upper-middle and high voice resonate in the upper sinuses above the nose, and in the skull. All the pitches and resonances spill into each other's precincts, creating harmonics and overtones (9).

Again, there is no evidence that different frequencies resonate in different parts of the body or in any area other than in the throat, mouth, and nose. In addition, harmonics and overtones are the result of producing a complex tone at the level of the larynx, with some resonant frequencies being reinforced while others are damped to produce formants. While sympathetic vibrations may be felt in the bony and cartilaginous structures identified by Linklater, their role in resonance is dubious.

Linklater links the emotional impulse that the actor is feeling directly with the amount of breath needed to produce an oral response to the impulse. It is also linked to the degree of tension of the folds and the type of tone produced as well as the location in the body where it is resonated. For example, when the speaker feels warm and comfortable

if there is an impulse to transmit this state through words, it generates just enough extra energy to send breath gently onto the vocal folds which, remaining relatively relaxed, produces a low sound which is resonated through the chest and lower pharynx. A change in the mood . . . will increase the causal energy which will dispatch the breath with greater vigor onto tighter folds, producing a higher pitch which will ring into the middle resonators of the face. The muscle tissue lining the corridors and caverns of the throat, mouth and mask respond simultaneously to the mood change, and their stretch helps tune the resonators to the pitch generated by the increased energy (9).

Linklater's "pattern of emotional energy and resonating response" theory postulates that as the emotional excitement increases the breath pressure, fold tension, and cavity muscular tension, all increase and the locations where resonance takes place moves continually higher in the head. A scream, thus, generates pressure on the

folds and their responsive tension will send a scream into the head, which is a "superb acoustic dome . . . capable of dealing with the pressure of such a sound(10)." This time Linklater associates resonance location with the level of emotional excitement. While it is undeniable that breath pressure and fold tension respond to the need to communicate with greater intensity, there are no data to support the contention that resonance shifts from place to place in the body in response to that same need as Linklater claims.

With cavity resonance aside Linklater dismisses articulation with a brief, perfunctory litany of what she refers to as the eight general areas of articulation in the mouth: two lips, the front of the tongue, the upper gum ridge, the middle of the tongue, the roof of the mouth, the back of the tongue and the back of the hard palate (10). A description of consonant and vowel formation in the mouth is just as brief.

Consonants are formed when two articulating surfaces meet and interrupt the flow of breath or sound. Vowels are formed as the lips and tongue move to mold the flow of vibrations into different shapes. In the economy with which words are formed lies the accuracy with which they realize thought. The muscles of the body can never respond finely enough to reflect the agility of thought, but the articulating muscles should crave that ability in the interest of accurate revelation of the mind (10).

Several elements of this explanation are troubling. Linklater states that vowels are formed as the lips and tongue move to mold the flow of vibrations. Typically, however, vowels are formed by holding the articulators stationary – albeit only for a moment in connected speech. During sound formation the articulators move between vowels and during the formation of diphthongs and consonants. In addition, she states that economy of movement is responsible for the accuracy with which words represent thoughts. Assuming sounds represent thoughts accurately when they are formed precisely, then economy could imply shortcutting precise articulation rather than preserving it. Her choice to avoid functional descriptions in favor of the

figurative ones creates a degree of confusion about her meaning.

Little else is said about articulation, because this system is more interested in tuning the instrument than in playing upon it. The theme of Linklater's training is the freeing of the breath stream which provides the force and power of the voice. This breath stream is directly related to the emotions, and the impulse to speak draws upon this force to initiate phonation. A speaker who has not attained this freedom is subject to a wide variety of voice disorders and irregularities. According to Linklater, "the interferences that restrict range and resonance must be removed (13)."

While she claims not to deal with faults in the voice, Linklater describes the three most obvious distorted resonating reactions that can occur when the voice is not free. The first is throat tension which constricts the channel through which sound travels. "This constriction prevents the vibrations from traveling freely down into the lower resonating chambers of the pharynx and chest, restricting amplification to the middle and upper resonators. This can result in a light, high or strident tone (13)." In addition, throat tension along with the desire to deepen the voice can lower the larynx so sound only resonates in the lower cavities making the voice monotonous. Tension in the back of the tongue and soft palate can "drive the voice up into the nose" rather than allowing it free passage out of the mouth. This produces excessive nasal resonance.

It appears that the appropriate freedom and relaxation also frees the ear from its roles in the speaking and listening process. Much as Lessac refutes ear training, Linklater acknowledges that inflections can be manipulated by the ear and conscious muscular control but, as the manipulative skill increases, so does the distance from the truth. Consequently, the truthful voice is not manipulated by the ear but responds to the free emotional impulse of thought. In fact, Linklater states that one of the major maxims upon which her work rests is "muddy thinking is the fundamental obstacle to

clear articulation (16)."

Tension also negatively affects the articulators as well as the resonators. Linklater argues that the lips and tongue cannot perform their natural functions when there is any tension in the tongue, the larynx, or the diaphragm which she states directly communicates with the larynx. If there is tension in any of these three areas the "tongue will articulate with more effort than necessary, thereby diminishing its sensitivity of response to motor impulses from the speech cortex (14)." While tension can result in diminished control over laryngeal function, contrary to Linklater's statement, the diaphragm and larynx do not "directly communicate with each other."

Advocates of her instructional method point out the unusual sense of liberty in their work which is expressive and open and capable of surprisingly subtle colors in the voice. Actors have a connection between themselves and their work, their text, and they cite the simplicity and honesty of their work (Barton 290, Raphael 106).

Critics of Linklater's work point out its slowness, taking years before results are noticeable, as well as its lack of technique and lack of identifiable signposts to measure progress. Some feel it is too psychologically oriented and that it short changes both attention to clear articulation and development of actors' ability to characterize vocally outside of their own personae, limiting their range as actors (Raphael 106). In addition, "actors trained in this method often don't have supported or well-placed voices. It is not uncommon for a student within this system to lose his voice (Barton & Dal Vera 290)."

Linklater's system clearly deals more with resonance than articulation and is not concerned with attaining crisp sound production but in allowing the actors natural sound -- whatever it may be -- to emerge once blocks and barriers have been removed. This is, consequently, a highly personalized system, one perhaps more like therapy than voice lessons. While the resulting freedom may result in a resonant,

clear voice, there is no assurance that will occur and no benchmarks against which to gauge the extent of any improvements over time.

Cicely Berry, Voice and the Actor

Cicely Berry's method of instruction centers first and foremost on the text as the source from which all work on the voice springs. Her system, if it can be called that, is the least dogmatic of all of the methods identified thus far and allows that there are many right ways of speaking, depending upon the context.

Berry's focus on resonance and articulation is not concerned with physical functioning or identification of structural members. Indeed, she never even identifies the resonating cavities of the vocal tract. Her work reflects a much more psychological connection with the text. "She asks not merely for an intellectual understanding of what is meant by the lines, but a feel for the rhythms of the words, their organic structure, and dynamic need to be expressed (Barton & Dal Vera 288)."

Despite this she is adamant about technical vocal work. "You can only respond to the extent that you are capable of making sound (Berry 76)."

Consequently there are many exercises, from typical speech drills to extensive text explorations, designed to focus attention on resonance and articulation. "Her technical work is still approached with the understanding that if you sloppily, passively, or blindly motivate that work, it will probably be useless (Barton & Dal Vera 288)."

Berry's approach briefly discusses body placement, posture and resonance, but goes into much more detail about muscular flexibility of the articulators and extensive articulation drills. The essential core of her work, however, lies more in her relationships to text and language and the psychological connection between the desire or need to communicate and the manner in which that intention finds

expression in a free and flexible vocal instrument.

According to Barton and Dal Vera, Berry's work is sometimes criticized for failing to be comprehensive and having vague standards. However, that is a true reflection of her values. She eschews both standards of pronunciation as well as the assertion that her ideas constitute a "method." Despite this, her work is highly influential both in England and the United States, and many schools seek teachers schooled in the "Berry method."

Berry states that the initial sound of the voice, created by the interaction of the breath stream and the vocal folds, "is amplified and resonated through the body, and can be formed into words by the movement or articulation of the various organs of speech (Berry 43)." Berry explains resonance simply by stating that "you depend on the resonating spaces for the quality of sound you produce." She then refers the reader to an illustration "to see the possible areas which can vibrate and contribute to the sound (20)." The diagram to which she refers is a simple line drawing of an upper body, apparently cut away to reveal the sinuses, nose, mouth, pharynx and chest, appropriately labeled. Structures, while indicated, are not visible.

You can see that there is enormous potential for resonance, or amplification of your primary note. The bones themselves can be part of this amplification and you can even feel vibration down to the base of the spine and in the stomach. Whether you use this resonance or not depends on the breath and complete freedom, or relaxation – good posture, in fact (20).

Berry's assertion that the student can see the potential for resonance is premature, unless the student already knows what resonance is and how resonating cavities work to reinforce and amplify sound waves. The other assertion that resonance is responsible for vocal quality is only partly true, because some aspects of vocal quality can be determined on the laryngeal level. Those aspects of vocal quality which relate to resonance have to do with the characteristics of the individual voice

and the skill with which an actor is able to tune the resonating cavities to reinforce the vocal source signal. Finally, the illustration to which the student is directed provides no assistance because structures are not detailed much less visible. Even her brief discussion of amplification of the tone is less than complete, and a student with no prior knowledge of acoustics or vocal function would dismiss this brief tidbit as useless information.

While Berry mentions that there is a resonating space in the neck, she doesn't identify it or indicate how it acts as a resonator, although she does indicate some problems that can occur when the resonating cavity in the neck is not properly relaxed. She states that tension in the neck "restricts the throat and cuts out the lower tones of the voice, the chest notes (18)." This leads to "pushing the voice," or forcing the sound out before the breath is ready (20). It is not clear what chest notes are, as this is never explained, and it is confusing to imagine how sound can occur before the breath is ready. While these claims are most likely intended to be metaphorical images rather than functional descriptions, they are not represented as such and thus present a potential for confusion.

There appears to be confusion, as well, between cavity resonance and the feeling of vibrations in the bones and other body tissues. While Berry claims that "the whole frame of the body becomes part of the sound as it contributes to it with resonance (21)," she never explains how cavities function as resonators or how sound vibration is transmitted through the cavities to the skeleton or what role these vibrations play in resonance.

David Stern takes Berry to task for making such statements, along with Machlin, Linklater, and Lessac. He claims that

these authors are not only confused about the nature of vocal resonance, they make many ambiguous and general overstatements about bodily structures other than open resonance tubes which they

claim contribute significantly to the reinforcement of the vocal tone (Stern 16).

Stern argues that voice teachers should have sufficient knowledge of the vocal process to describe voice characteristics functionally. This would eliminate the confusion about which vocal behaviors are the result of phonation, resonance, or articulation. "Functional descriptions," Stern continues, "will emphasize the dominant roles of the three primary open cavities, emphasizing especially how the proper structuring and positioning of the cavities affect both the sound of the voice and the feel of vibrations throughout the head and upper body (16)."

An example of where functional explanations would be of great service would be in Berry's reference to chest and head resonance. She refers frequently to "head resonance" and "chest resonance" but never clearly explains what she means by these or what functionally is occurring in the vocal tract to produce these two type of resonances. It is not clear if she means the head and chest act as actual resonating cavities, or if she refers to the vocal quality of the voice associated with registers, frequently referred to as head voice and chest voice.

Despite the lack of a definition or explanation, Berry argues that head resonance and chest resonance need to be balanced because they contribute equally to quality of the tone.

Overbalance of head resonance is a complicated problem. . . . It happens when there is strong head resonance (that is, sinus tone and resonance in the bones of the head and face) which is not balanced sufficiently by the lower resonances from the chest and neck. Head resonance has its own edge, brilliance and carrying power, and makes the voice seem easy to manoeuver [sic]. However, it will always sound curiously disembodied and a little contrived unless it is balanced by true and warm chest notes. In fact, it means that the voice will not have the reality because you are not really reaching down for it, rooting it or centering it (41).

It may be that she is referring to the vibratory sensations that are the result of bone conduction within the body, much like those that Lessac describes. It is unclear how

to ensure that vibrations will carry to both the head and chest, creating the balance that Berry requires, however. And it may be a case where "you'll know it when it happens." The often obscure and vague terminology that she uses in the passage cited above does little to describe either the vibratory sensation or the mental image she is seeking.

While it is clear that she is speaking metaphorically about vocal production and sound amplification, it is unclear how the student is to make the connection between the "idea" and the functioning vocal tract. Knowing the images and sensations it produces in her, Berry can describe reaching down for the sound within her own center and touching it off like a drum, but there is no indication of how the student is to emulate that same image or sensation. Berry assures the student that "if you practice the breathing exercises sufficiently you will find the effortlessness you require (42)," but how will they know when that has happened?

Berry is a little more sure when talking about articulation or the act of transforming vocal energy into words. To do so the actor must "become familiar with the movement of the jaw, the lips and tongue, and the soft palate, which are the muscles we use to make vowels and consonants (43)." While these structures are not strictly muscles, they have numerous muscular attachments which allow these structures to move, for the most part, with great dexterity. Indeed, Berry suggests that good articulation is the product of well-trained muscles which can easily respond to the text and the actor's intentions at will. Thus, this is perhaps the most straightforward part of Berry's training regimen, because she is concerned primarily with developing the muscularity of the articulators.

But that is not the entire picture. The articulators must be muscular and flexible so they can deal with the four tasks required of them. First, the articulators are responsible for the basic clarity of the individual speech. Next, they must be able

to adapt that clarity to the space the actor is in. Third, the articulators must satisfactorily place and balance the vowels and consonants "which then adds another dimension of resonance to the voice." And finally, the articulators must fulfil the intention of the word (43).

Berry proposes that these four functions can be accomplished by finding the energy in the muscles you use to make vowels and consonants. This energy is discovered by doing a series of exercises that investigate the movements of the muscles that form words "so that they are firm enough to make clear vowels and consonants with exactly the right energy required, and flexible enough to respond to all the demands and nuances of speech (45)."

The energy in the articulatory muscles contributes greatly to the clarity and projection of speech. This clarity and projection is achieved through timing, vocal power, and gauging the amount of consonant needed in a given situation. Much of the inaudibility of speech, Berry argues, comes from bad timing in the making of vowels and consonants rather than from a lack of forming them. This is just the opposite of what other teachers, for example Lessac and Turner, propose. They tend to be more concerned with the manner in which the particular consonant (Lessac) or vowel (Turner) is formed than the timing with which it is deployed.

A consonant, according to Berry, is a sound "in which the passage of air or sound is stopped or partially stopped by either the lips or parts of the tongue (46)." The soft palate and the position of the jaw may also be involved in the formation of consonant sounds. She distinguishes between consonants, which completely stop the air stream (plosives), and those which only partially block it (continuants), as well as those that are voiced and breathed (unvoiced). Because timing is a critical factor in Berry's approach to articulation she divides the formation of consonant sounds into three parts: "the coming together of muscles, the holding and the release (46)."

Berry provides fairly detailed descriptions of the movements of the tongue in the formation of the various consonants, emphasizing muscular activity rather than phonetic precision. Indeed, the long series of exercises that follow are all aimed at increasing the flexibility and responsiveness of the tongue, lips and jaw rather than achieving precise phonetic or structural targets. What matters to Berry is

how much muscular activity you use: how much pressure you use to make the plosives both in their holding and their release, how much air you allow to escape on release, how much friction you allow on the continuant consonants, how much vibration you get on the voiced consonants, and how much time you take on them according to their position in the word. There is infinite variability of pressure, vibration and time (47-8).

A vowel is different in that it always has a free passage of sound through the mouth and is not obstructed like consonants. It is always voiced, unlike some consonants which are unvoiced. The vowels are differentiated by the position of the tongue and lips and to some degree the jaw and soft palate. Pure vowels are made without movement in the articulators while diphthongized vowels are produced by moving articulators.

Berry uses her own form of transliteration to represent vowels and consonants instead of the IPA and provides sample words which illustrate target sounds. She makes a special point of differentiating between long and short vowels, because timing is so critical to her articulatory approach.

Muscular awareness is also important in making the vowels. To achieve this awareness of the relatively minute muscular movements associated with articulation, Berry advocates the use of a bone-prop or similar spacing device held between the teeth to keep the jaw open and spaced properly while performing the exercises. Props should be no less than half an inch in height or no more than seven-eighths of an inch. Held between the teeth, the prop assures sufficient mouth opening, thus improving the effectiveness of the exercises immensely, according to Berry. It

permits the actor to isolate the jaw movements from the movements of the other muscles. In addition, she stresses that this is only a training tool to learn to identify and differentiate muscular movements and has little to do with the actual articulation of words. Lessac, on the other hand, advocates a similar facial posture (structural action, inverted megaphone stretch) be maintained during regular speaking to increase vocal resonance.

Attention must be paid to the exact placement, pressure, and rhythm needed to produce each consonant. "The right action of the muscles not only makes the words clear but the muscles will have their own vibrations, and therefore resonance, and so contribute positively to the whole sound (50-1)." This is a totally unique perspective from any of the other systems examined so far. No other system includes muscle vibration as contributing to resonance, nor is there any evidence in the scientific literature to suggesting that it even exists.

Vowels are more difficult than consonants because they do not happen "through contact between muscles or pressure on the muscles." Thus, "it is more difficult to be aware of the sensation of resonance in their physical movement (51)." Many exercises are provided to build the muscularity Berry expects and to demonstrate the sensations, contact, pressures and timing which are central features of her approach. Each exercise ultimately ends in work on a text, because for Berry, the text is the spring board from which the energy for the word is to be found.

Finally, Berry is quick to point out that technical competence is not the end, but only a means to an end. The exacting regimen of exercises she has devised are not designed to make the actor technically accomplished, but rather they are designed to "free the voice so that it is able to respond to the instinct of the moment (76)." Further, if while doing the exercises actors find they are technically at fault it is most

likely because their own motive is out of balance. In other words, faulty speech is as much a result of psychological disharmony and inadequate self-awareness as it is poor placement or sloppy diction.

The amount of time devoted to the exercises and the kind of progression through them varies with each individual. Berry insists "there is not a method, simply an attitude to voice which comes out of a fuller understanding of its workings (77)," as well as a deep appreciation of the connection between word and thought. Progressing from exercises to dramatic texts is critical so that the voice can exercise the freedom it has achieved, and the emphasis gradually shifts from technical ability into the interpretation of the text.

As is true of all of the systems examined so far, Berry's is very vague and imprecise about resonance and fairly clear and detailed about articulation. Her approach, however, is deeply rooted in an appreciation for language in all of its nuance and rhythms and allows the actor to readily connect with the text, forming an organic relationship between the word and the means whereby it is produced.

Michael McCallion, The Voice Book

Whereas so many of the systems examined here treat resonance as a part of articulation, McCallion treats it as an integral part of phonation. He uses the word "tuning" to indicate both the production of sound on the laryngeal level as well as the reinforcement (harmonic enrichment) of sound by the cavities of the vocal tract.

Our resonators are partially enclosed air-filled spaces in which the original note reverberates, disturbing the air in the frequencies of vibration which are harmonically sympathetic to the original note (McCallion 69).

The mouth and throat are the two primary resonators and their variability allows the speaker to adjust the acoustic properties of the vocal tract by moving the larynx, the

tongue, the soft palate, the jaw, the lips and the cheeks. The walls of the pharynx can also change shape to some extent (70). In addition, the nose acts as a resonator for the nasal consonants and the nasalized vowels that occur in other languages.

McCallion is cautious about the role of the sinuses in the head as resonators. While he acknowledges that some believe the sinuses act as true resonators by changing the flow of air between the sinuses, affecting the tone and pitch of the voice, he remains skeptical. "The generally accepted opinion is that the sinuses play no appreciable part in resonating the voice and no part at all in determining the pitch (71)." While he doesn't dismiss them entirely, he concedes that the sinuses may add some qualities to the resonance of the voice when it is "directed to buzz the head and the mask of the face (71)."

Exercises designed to enhance resonance use humming as a means to project buzzing vibrations to various areas of the body in order to become familiar with the sensations that result from phonated and resonated sounds. In his system, emphasis is on expanding the resonators, relaxing the muscles to reduce tension, and sensitizing the individual to the quality of the sound and the physical sensations associated with focusing sound on the hard palate. The "Murmur" and the "Body Buzz" are the two primary resonance exercises, which are flexible enough to include work on pitch and volume control, as well as "directing the resonance by placing the voice" while employing proper breath support.

These two exercises are employed to develop the "normally produced, fully resonated, free sound – the voice which your body most easily produces when you don't get in the way (105)." McCallion is similar in this point to Linklater, and to some degree Berry as well, in his focus upon the natural functioning of the voice once poor habits are removed. Unlike Berry and Linklater, however, who do not address "faults," McCallion discusses many of the faults which he feels can be corrected in

the voice by a series of exercises. Many of these faults relate to vocal quality (and were addressed in Chapter 3) but a few relate to resonance, especially the lack of or an excess of nasal resonance.

Once the student has learned the basics of resonance – opening up the mouth and throat resonators and improving the quality of nasal resonance – McCallion proposes something unique to his system alone. He provides the actor with suggestions for experimenting with the voice to find out what it can do and what kind of resonance it is capable of. Essentially these exercises direct the placing of the voice to change resonance qualities.

Because McCallion, in a small way like Lessac, relies upon the sensations associated with phonation and resonance as a guide to tone quality (he also advocates ear training, unlike Lessac), he concedes that it is hard always to sense the minute adjustment needed to alter tone. But these adjustments can be provoked by playing with mental images of directing the voice to various locations in the head or body, and noting the change in tone or quality which is the consequence. Many other systems do this as well, but McCallion is the only one to describe both the mental image as well as the physical result.

McCallion makes a marked distinction between resonance (allied in his method with “voice”) and articulation which is allied with “speech.” In speech, he states, we perform both linguistic and mechanical functions; that is, we select words to speak and adjust our articulators to form the sounds contained in those words.

While he claims his work is not a detailed guide to pronunciation, he does advocate the use of Standard English (i.e., British) pronunciation, which he considers to be the least regional of the English dialects. He does provide phonetic examples in both Standard English and Standard American English dialects, but argues that “the purpose here is not so much to explore differences of pronunciation as to see how

the voice may be freed in speech. The exercises help to do that whether given in Standard English or American English pronunciation (116)."

McCallion refers to the articulators as "speech organs" of the mouth, and includes the lips, teeth, tongue and palate. He also mentions that the vocal cords may be considered a speech organ. He proposes that two kinds of change occurs in the vocal tract as a result of the movements of the articulators:

those which merely reshape the resonator, changing thereby the resonance of the voice, but offering no effective barrier to the airstream - these are the vowels; and those which do form barriers, partial or complete as the case may be, and these are the consonants (117).

Like Turner, McCallion places more emphasis on vowels than on consonants which give definition and shape to the voice-stream by imposing separations between consonants. Unlike any of the other systems, however, he focuses on syllables, which he defines as the rhythm and energy units of speech. While he does look at the formation and sound of each of the individual vowels and consonants, he concentrates on the syllable because it is the smallest unit in connected speech, and it is connected speech which must be the focus of study, he argues, rather than isolated phonemes or word lists.

Clear formation of vowels and crisp articulation of consonants is dependent upon maintaining full resonance by means of an open mouth and throat. This is achieved by closing the mouth as little as possible in the formation of consonants, using muscular activity that is light and precise.

McCallion prefaces his discussion of phonetics and ear training, however, by insisting that there must be a psychological connection between the voice energy and the speech energy, because the voice is so closely connected to the emotions. "If the vocal mechanism is well connected through all of its parts as a functioning whole, we

are necessarily in touch with, and motivating the voice from the same source which gives us our emotional being; the two are inextricably linked (130)."

To assist in this effort McCallion has devised a "kneeling" exercise designed to get the voice energy supporting the speech. This exercise works on developing good posture for proper breath support as well as working the jaw and oral tract to achieve maximum expansion, thus improving resonance (130-33). When the voice is full and resonant, articulation can be light and clear, allowing speech to be carried on the supported voice which is responsive to the emotions and impulses within the body.

McCallion employs traditional IPA symbols for vowels and consonants (in the tradition of Skinner and Machlin), word targets and transcription, although he employs both British English and American English pronunciation examples and sample words. He provides a series of exercises for each of the vowels and consonants as a guide to developing a daily routine. It is not as comprehensive as either Skinner's or Machlin's phonetic work, but it does present the mechanics of how each sound is formed in addition to general limbering of the muscles of the face and mouth. Because his system emphasizes syllables rather than phonemes, lists of these are provided for each vowel and consonant to "test for facility of utterance with various conjunctions of sounds in various rhythms (138)." Paragraphs which focus on one or two consonants or vowels are included for practice in connected speech, for development of the sense of the piece, and for articulatory precision. This exercise leads to realizing the communicative intention by connecting sound and thought.

McCallion concludes his discussion of articulation by identifying five kinds of articulatory speech faults and offering remediation. The first of these is malformed sounds that are the result of dysfunction of part or all of the speech mechanism, such as stuttering or lisping. These problems should be referred to a speech

therapist. The second group of faults are among the most typical. In this case sounds are badly produced by making the wrong speech-shapes for a given consonant or vowel. This problem is addressed through habituation of the correct movement or position, an often laborious process best done under the supervision of a good speech teacher.

The third speech fault is the result of poorly supported breath which directly impacts the ability of the articulators to crisply form sound. Much of McCallion's method addresses the relationship between breath, phonation, and articulation, so this is a common theme throughout his work and many kinds of remediation are offered throughout his manuscript.

The fourth fault is the production of sounds which call attention to themselves, even though they may be well-formed. These include accents, unexpected pronunciations, over-precision, or peculiar speech rhythms.

The final fault is referred to as "speech mannerisms," which can include errors in timing or pacing of sounds within words, inappropriate omissions or additions of sounds, unusual inflection patterns, or tics. While it is possible for students to work on and correct all of these faults on their own, He differs from the others in his insistence upon the syllable as the primary working unit in speech as opposed to the phoneme. This insistence allows a greater emphasis on connected speech and allows the actor to relate more quickly to the text.

Patsy Rodenburg, The Right to Speak

Rodenburg claims that most speakers fail to use all the possible resonating spaces available to them in the human body. By failing to do so they diminish the power and the sound of the voice. Because the resonating cavities reinforce the "voice note," the more cavities that are employed the more power the voice has to

carry. "It is a bit like giving the voice a chance to echo rather than pumping it for power (220)."

Rodenburg contends that most people use only chest and throat resonances and neglect resonance in the head, face and nose. Chest and throat resonances create a "laid back" sound which sounds muffled, and the more "piercing resonance in our head" is needed in large performance spaces to "cut through the dullness (220)." Thus, her attention to resonance involves two specific goals: 1) to wake up the under-used resonators and play with them so that actors can familiarize themselves with the sound possibilities, and 2) to learn how to balance and focus these sounds (221).

Again, Rodenburg invokes more traditional training methods and urges the student to discover the "beautiful voice" which had been the goal of vocal training prior to the 1960's. A fully balanced, resonant sound, sometimes called a well-modulated "actor" sound went out of fashion, according to Rodenburg, during the 1960's, with the resulting loss of vocal richness and variety as a result of other forms of training. Restoring technique to create the "voice beautiful" is necessary, in her opinion, to obtain the desired resonance in the voice.

To "wake up" the under-used resonators, she uses a series of humming exercises, asking actors to direct the hum (and later speech) to different parts of the head, face, nose, throat, and chest. Vibration should be felt in the area into which the sound stream is being directed. If "one or more of the resonators feels alien," it is under-used and will "require more attention to activate them (222)." She does not tell the actor what that additional work is, so it may be that this identification of resonator use can only occur under the direction of a trained instructor who can provide the additional exercises.

To balance and equalize the resonators, the breath supply must be fluid and

well supported, and the entire voice and jaw must be opened (222). The speaker must intone text or counting "higher than you normally speak or at the centre of your voice. . . . As you move into speaking you might have the pleasing sensation of your voice dropping into place. As this happens you often experience a fully resonant voice as the result (222)." This sounds like a hit-or-miss technique for achieving maximum expansion of the resonators and may take the young actor considerable experimentation or assistance to achieve this fairly vague and unclear state.

Once full resonance has been "discovered" Rodenburg employs a traditional exercise known as the "figure of eight." She states that "this wonderful old exercise has been balancing actor's voices for ages (225)." The vowel sounds are chanted in a double loop pattern beginning with *ah, ay, ee, ay, ah*, and then *ah, or, oo, or, ah*. The sounds can be opened further and placed more forward by adding an "m" or "h" before each sound ("*mah*" or "*hah*"). The goal of this exercise is not only to open up vocal resonance but to balance all of the resonators for the fullest possible sound. The actor should eventually be able to intone the whole figure eight "loop" three times on one breath. The last part of the exercise is to add speech to insure that the new balanced resonance is available to the normal speaking voice.

Beyond this, Rodenburg has little else to say about resonance, and she assumes that the actor will use it from that point onward. Because she discusses resonance with phonation, rather than with articulation, she assumes that the voice is already full and resonant when she begins talking about "speech and phonetics" in a separate section of her text.

"Speech" is the end result of the vocal chain of events. Rodenburg states that speech is nothing more than "breaking up the voice into recognizably defined units called words (229)." Sound entering the mouth is shaped by the lips, tongue, teeth, hard palate, soft palate and facial muscles into a series of phonetic structures

that we recognize as language.

Vocal sound is more than just recognizable words in her method. Because the voice carries cues about emotions, feeling, intelligence, culture, and the state of the senses along with the sense of the word and the rhythms of the utterance, much more is involved than merely forming precise sounds.

Sounds become words, she says, through the complex muscular actions performed by the lips, tongue, facial muscles, jaw, and soft palate. The goal of articulation must be "to manoeuver [sic] each of these structures with economy, efficiency and effortlessness" in articulation. In other words, "the speech muscles should work so well that the production of the word does not get in the way of its meaning (230)." Regular exercise of the facial muscles is necessary to articulate well, or they could become lazy, flabby and unresponsive.

Facial gymnastics is the essence of Rodenburg's articulatory approach. She provides a series of foundational exercises designed to "lubricate" the facial muscles and then discusses each of the consonants in turn.

Consonants, according to Rodenburg, are speech sounds in which the breath is partly or fully obstructed and which form syllables when combined with vowels (235). She divides the consonants into voiced and unvoiced sounds and uses traditional phonetic descriptions of both placement in the mouth and acoustic targets. Unlike any of the other British instructors, however, she uses Received Pronunciation (the dialect of the British upper class) for both vowel and consonant descriptions. The use of RP pronunciation models could be problematic for American students, although it could be useful for advanced students who wish to learn the RPdialect.

Only minimal exercises are provided for each consonant, mostly just to explore the manner in which the sound is formed and to develop awareness of the articulators involved. Word lists, sentences, or texts are not provided for practice in

precision or connected speech. The student is simply told to start and stop each sound clearly and to keep the jaw free. In this point Rodenburg's system very closely resembles Linklater's. "If you have trouble making a particular sound or word then work at it until it becomes free. . . . Start slowly, learn to coordinate the movements and gradually build up speed. Tongue-twisters, . . . nursery rhymes and clapping sounds can be useful (241)." Despite her desire to recapture the training from an earlier era which valued the "beautiful voice", her system lacks the exercises, instructions, or rigor of those "voice and diction" courses. While her goals may be laudable her method is lacking.

Rodenburg turns next to the vowels or "the "voice" in the words that usually release and express our emotions (242)." They are interrupted by the consonants and must be coordinated with them. Pure vowels are a single sound uncorrupted by another vowel, and diphthongs are a blend of two pure vowel sounds. She categorizes them as "long" or "short" rather than the more typical "front", "mid" and "back" vowel categories seen in most of the other systems examined.

The positions for each vowel are not described and are given only in terms of target words which possess the sound. This likely is due to Rodenburg's assertion that vowel positions are approximate and depend on the individual facial and oral structure and regional and national character of the speaker (243). One should never aim for any sort of "perfect sound," she argues, but concentrate rather on placing the vowels as far forward in the mouth as possible.

While Rodenburg does include a chart of the symbols of the International Phonetic Alphabet, she does not use the symbols in her own discussion of either the vowels or consonants and essentially dismisses it as an unnecessary tool, useful in some circumstances and a hindrance in others. She provides it as a practice tool for further work on vowel and consonants but does not advocate its use.

Speaking phonetically can sound robotic and the artificial results of phonetics training are what I resist the most. I admire it, however, as a tool that guides us in the placing of sounds and checking sounds when they go off-balance, though you can train your voice and speak without knowing a thing about phonetics, just as you can learn to sing without knowing a note of music (245).

While she offers several instances where phonetics is useful as an instructional tool, it is absent from her system. While other systems do not use IPA, every one examined thus far uses some notation system. Only Lessac totally rejects ear training, but he substitutes a sensory vocabulary composed of his own sort of sensory phonetics. It is unclear what kind of feedback system Rodenburg advocates, because she dismisses ear training, and only partly relies on sensation or sensory feedback. Indeed, articulatory precision is not her primary purpose, so it is not surprising that she does not employ a reliable feedback mechanism in her system. Like Linklater, Rodenburg asserts that when the voice is free, when obstacles are removed and when the breath and voice are connected in a single fluid motion with thought, articulation will occur without substantial effort.

While it is understandable that each of the vocal instructional systems examined should vary with respect to their approach to resonance and articulation, it is surprising that there is as much variety as there is. Of all the elements studied so far, articulation appears to be the best understood and resonance the least understood physiological functions associated with voice.

Most instructional methods contain some categorization system for the speech sounds based on both physical positioning and acoustical/sensory models. In addition, they provide exercises to improve muscularity of articulatory precision in the formation of speech sounds and in the adaptation of phonemes in connected speech.

Nearly all systems allow for some type of acoustical or sensory feedback or self-monitoring system to permit some degree of self-instruction, although this varies widely from system to system.

The picture is much less clear with respect to resonance. There is no clear definition of resonance, and many things are referred to as resonance which have little to do with sound reinforcement in the vocal tract. Most systems acknowledge the primary resonating cavities as the mouth and the throat, but agreement ends there as each system includes or excludes other body cavities. Almost no evidence is used to support the inclusion or exclusion of these cavities, and it is not even clear if they are intended to be actual physical resonating cavities or merely mental images of potential resonating sites included to induce a certain sound through the production of a mental image. Only one system includes a discussion of the physics associated with the acoustics of resonance, but even that author indicated that it was not necessary to know or understand how resonance works in order to work with it.

This belief that physiological information is unnecessary is perhaps the most disquieting aspect of the variability between systems. By dismissing the "need to know" with respect to the physiological and structural aspects of vocal tract resonance, authors place themselves in a position to "play god," or to devise an imaginary "physiology" based upon an image, metaphor, or sensation which suits their particular view of voice function. There is no assurance or data to verify that a similar image, metaphor, or sensation will occur in the student who attempts to study voice using their techniques. While decades of successful instruction cannot be dismissed, it does indicate a potential for unreliability that any given system will result in the vocal education it professes to provide.

Ultimately, vocal education is not a matter of picking up a book and reading. It requires the acquisition of new behaviors and skills, often through the elimination of

habitual patterns of behavior. Because the approach to voice training is as much a part of an actor's technique as the results of the training, it should be clear at the outset what students can expect to achieve and how they can expect to achieve it if they devote themselves to an extended period of study with a specific teacher and their individual technique. Particularly because most of these systems require students to undergo psychological changes as well as alterations of physical/habitual behaviors, teachers have the added responsibility and ethical obligation of ensuring both the physical (in this case vocal) and mental health of students as they undergo instruction. The next chapter will draw some conclusions about instructional pedagogy, especially as it applies to the assessment and care of vocal health, and offer some guidelines for selecting a training method.

CHAPTER 5

Discussion and Conclusion

Each of the different approaches sketched here only in the barest outlines is important if we want to understand the full complexity of the human voice. Without a thorough knowledge of the medical and of the acoustical factors, without precise clinical observation, the psychological approach is in danger of drifting into a fog of speculation. Without the inclusion of the impact of psychological forces on the human voice, the specialistic experimental research is in danger of losing itself in details of mechanics or acoustics, in measuring and counting that looks good on paper but is valuable only if done as part of a total approach. What is needed is a holistic approach that treats voice as a gestalt (Brodnitz 283).

I

Pedagogy

All of the theatre voice instructional systems examined in this study employ traditional pedagogical methodology to facilitate permanent behavioral changes. Secondly, and as a means to achieve the desired behavior changes, each system provides varying amounts of information about what the voice is and how it works. Most of the information provided to students in these systems is incidental to the desired behavioral change. In evidence throughout each of the eight systems examined are traditional behavior modification techniques.

Behavior modification can result in relatively permanent behavioral change, by means of repeated conditioned experience, where desired behaviors are reinforced by a skillful instructor (Stewart 1972). To gain the desired skills and behaviors, students attempt, through directed study and through trial and error, to emulate the directed phonatory or sensory behavior. It is repeated in an organized and a

progressive manner until the behavior because automatic or habitual. Typically the desired vocal behavior conforms to a specified aesthetic standard about how the voice should sound, or in some cases, how the body should "feel" when making the correct sound.

In a traditional instructional setting, a skillful teacher would provide both instruction (modeling in some cases) and feedback to the student to select out those behaviors which most closely conform to the desired models or aesthetic standards, reinforcing those behaviors through praise or reward. In the absence of an instructor, instructional texts such as the eight examined here try to provide the same kind of selective reinforcement which would allow students to act as their own teachers, and monitor their own progress. This can be valuable to those students who desire vocal instruction but do not have access to the teachers who can instruct them in those techniques in a traditional instructional setting. With determination, self discipline, and a good ear, a student could make progress in improving their vocal effectiveness.

Clearly some systems lend themselves better to self-study than others, but most vocal instructional texts likely were NOT intended to be self-study manuals. All of the authors in the eight systems examined here are first and foremost teachers of voice. Each developed and to a degree perfected their philosophy of vocal instruction, their approach to theatre voice and the dramatic text, and their instructional methods after years of practical experience in the classroom, the rehearsal hall, and the performance stage. Only after they experienced a degree of success with their instructional system did they then write it down, as a guide for their own instruction with their own students. Those students who studied with these teachers could then continue to work on their skills, beyond the classroom, using the instructions and exercises devised by their teachers, and continue to study

and practice.

Ideally, then, those texts would be distributed only to students who studied with those teachers. In an effort to make the texts marketable to a wider readership, (and hence more profitable), editors persuaded the successful teacher/authors to provide enough philosophy, explanation and methodology in their writing to allow others to employ the text even if they had not studied with that instructor. The predictable result is that the texts have become widely used in theatre voice classes in colleges and professional training programs by many teachers and students who have never studied with the authors and possess only the published text -- often only a mere artifact of the original instructional system-- as a guide for their instruction and for their students' work.

In analyzing these systems, then, the significant limitation that must be acknowledged is that such an analysis only addresses what is written about a given system, and not necessarily what is taught when the system is employed by a skillful instructor. If, however, the text becomes the substitute for a skillful teacher, or if a teacher relies upon the text to provide them with a method in the absence of more formalized teacher preparation, then a careful scrutiny of the text is in order, given the enormous shortage of skillful voice teachers in American higher education and the amount of respect accorded to teachers who boast knowledge or skill in these systems.

To learn a given voice system, then, students are given specific information and exercises in a systematic manner in an attempt to modify behavior, first by means of conscious thought and applied effort, until such behaviors become automatic. This process involves traditional behavior modification techniques articulated by psychologists and philosophers like William James, who proposed that new behavioral skills (such as improved vocal effectiveness) are acquired through

conscious thought (James 1890, McDermott 1967). New skills become automatic or habitual when conscious thought is no longer required to perform them. The desired skills connect a known sound, sensation, movement, touch, or condition with a desired behavioral goal. In the case of vocal training, actors are sensitized to certain sensations, physical configurations, mental images, or sound targets which indicate that the desired behavior has been achieved. In addition, Thorndike's Law of Exercise states that stimulus-response bonds are strengthened by repetition, so that with practice, new behaviors are learned, reinforced, and eventually habituated (Thorndike 1921). With repetition and well-paced periodic practice the new vocal behaviors become automatic and are at the service of the voice user whenever demands are placed upon the actor's voice.

Gestalt and Skinnerian learning theories both suggest that the fewer bits of information an organism needs in order to gain closure, the greater and more rewarding the learning will be (Koehler 1976, Skinner 1938, 1967). In other words, a system should appear relatively simple, and a student should be able to comprehend the system's goals and methods very rapidly if they are to remain motivated to learn. Thus, if an actor can learn to use his or her voice effectively without having to learn a lot of "extra" things about the voice, he is likely to do so quickly. Consequently, it is *easier* to learn to use the voice effectively in a relatively short space of time (as demanded by academic calendars) if the instructional technique focuses on procedural learning (knowing how) rather than on declarative learning (knowing that).

The actor who learns to use his voice effectively to respond to the demands of a character is doing procedural learning, while the actor who learns the physics of open-pipe resonance and can apply it to an understanding of vocal resonance is doing declarative learning. "Knowing that" is not always a prerequisite for "knowing how," as is the case in the vocal instructional systems examined here. These

systems emphasize procedural (experiential) learning, and years of experience with vocal instruction have adequately demonstrated that it is possible to become a skillful voice user without much knowledge of vocal structure or function. There are those who would even go so far as to say that knowledge of structure and function actually hinders voice use, and those who argue that, because of their volatile temperament, actors are incapable of learning more than they "need to know."

Since procedural learning results in the fastest progress (just how fast results occur differs significantly from system to system), educators feel pressured to use methods that can achieve observable results in the limited instructional time frame of the typical academic calendar (typically 10-15 weeks per term). Educators have to work quickly, despite the inadequacy of that time frame and instructional technique.

Those instructional systems which have the time and resources to teach students to do both procedural and declarative learning, provide them with the ability to re-evaluate their learning (critical thinking) and apply it to novel situations (problem solving) as needed. Those without that background may find themselves confounded by new situations for which their training has not prepared them, and lack the understanding of the process which could permit them to adapt behaviors to changing or unexpected conditions. They become dependent upon the single system in which they have been trained and lack the background necessary for growth or adaptation of their skills beyond the limitations of the particular system.

In addition, sometimes "quick" is not "better." In other words, some teachers argue students learn more easily when they have adequate information about laryngeal anatomy, physiology, and when they understand the reason the teachers are using some of the images they employ about the voice. Vaughan explains "the more I think you can explain the logic [to students], the anatomy and the reasoning

behind what you say, the more easily and the more quickly your students will comprehend what you say (Johnson 13)."

The student who has both procedural and declarative learning has the foundation for growth beyond a particular system when problems with their voice occur later in their career. An anecdote by Laura Martin demonstrates this.

I was a product of two very fine teachers of voice who felt that one should not say too much to the student. And while at the time this was fine, later on as I did develop problems, and in other situations, relative to my laryngeal function, I really needed more detailed answers and explanations. I found myself dissatisfied with "That's all right, it's going to be all right dear, just be sure that you take a deep breath." I felt I really had to know something more specific and I was not a professional (Johnson 13).

In addition, those trained procedurally and declaratively possess the background necessary to teach others, a skill which is likely to be lacking in one trained solely in a procedural mode.

Therein lies one of the methodological problems within the discipline of theatre voice. Because there is no standard approach to training voice teachers, little of what we know about learning theory is included in theatre voice curriculum. Most voice teachers are very skillful procedurally, and emphasize vocal improvement – the behavioral skill that they themselves have no doubt mastered. However, most systems examined in this study fail to address vocal health which is more associated with declarative learning. The result is a perpetuation of procedural learning and the relative dismissal of declarative learning. This, in part, accounts for the dearth of information about vocal health, structures and function found in the majority of the instructional programs examined.

Another pedagogical question about voice instruction relates to how one approaches the issue of *control* over vocal function. Human speech, despite the precision and speed with which it works, requires relatively little conscious thought.

The extraordinary flexibility of the voice is made possible by an automatic programming process that is set in motion by the intention to speak. Thoughts are codified into language and the central nervous system automatically sends a set of instructions to each part of the speech mechanism. This process occurs rapidly, just prior to utterance, and can be continued without interruption as long as thoughts continue to be processed. It occurs without further attention from the speaker unless an error occurs. Were the system less automatic, the complexity of speech production would require so much attention that humans would find it difficult to think about anything else.

Isolating the individual components of speech is difficult, and gaining some form of control over an automatic process in order to change it can be a daunting task. Conscious thought is needed to change habitual behaviors, and in a behavior as complex as human speech, much of the training process often includes some form of sensitizing the individual to the various sensations which occur in the body during normal speech.

To make the training process easier, the production of speech can be divided into physiological or structural component areas that can be examined somewhat independently. Respiration, phonation, articulation, and resonance are broad categories which are often identified as workable divisions. Not all systems, however, use these categories. Other divisions include the separation of "voice" -- associated with the production of vocal sound -- from "speech" -- associated with the formation of words. Other systems use image-based categories, relating to physical sensations or mental impressions. Some systems develop unique divisions based on criteria specific to their system.

Any instructor who wishes, then, to devise a working method for training the human voice to meet the demands of theatrical performance must determine how they

will divide up this complex process in order to address each part. They must determine what can be done to build associations between old ideas and new ones to bring conscious thought to a relatively automatic process. This is necessary in order to gain some means of control over the process, and to initiate (and ultimately to habituate) new behaviors.

Each of the systems examined in this study has done this, although each one has its own unique approach. Each author has identified the goals they wish to seek with respect to the voice, and these form the basis of their working method. Because speech is a behavior, and behavior is modified by procedural learning, every system examined employs this mode of learning. Those which also include elements of declarative learning do so only to the extent that they believe the knowledge will enhance their immediate procedural objectives. What is often overlooked, however, is that when techniques or methods are devised to address specific vocal behaviors without a fairly comprehensive understanding about how the behavior is produced structurally and physiologically, there is the possibility that the technique or exercise will have no effect because it does not address the organic cause of the behavior. While it is true that thought (and feelings associated with them) set the speech process into motion, attention should be paid to the organic as well as the psychological motivations for specific vocal behaviors if change is desired.

In addition, vocal instructional systems typically take one of two approaches to training. One approach is essentially external, providing the student with a "tool box" of techniques, which when mastered, can be of service to the actor when needed. These include techniques like rib-reserve breathing, the megaphone-stretch, or the adoption of Stage Speech pronunciation standards. External systems include Skinner's, Machlin's, portions of Lessac's, Turner's, and most of McCallion's, although

it is difficult to categorically define a training system as entirely external because behavioral change is involved. While the student may experience vocal improvement which can be carried over to other parts of their lives using these techniques, and likely will need to maintain a practice regimen to remain in peak performing condition, they are essentially the same people they were before instruction began. In addition, because technique can be learned from examining models, and practicing drills it is particularly suited to self-instruction.

The "internal" approach, however, is far more invasive into the behavior, personality, and daily life of the individual. By emphasizing the psychological basis for the voice and changing both thought and behavior, the process of training is typically much longer, more personal, and touches every aspect of an individual's life. Indeed, programs like Linklater's, Berry's, and Rodenburg's (although she considers her approach external) which emphasize the student's "need to speak" or "desire to communicate" or "right to speak" are working from the position that the voice is a direct extension of the person's psyche and must be therapeutically conditioned. There are some elements of this approach in Machlin's Turner's, McCallion's and Lessac's systems, but to a much less extent than those systems mentioned above.

In the internal-based programs the student is taught to perceive themselves and their world differently, with the promise that the voice will be altered as a result. When obstacles or blocks which have developed through a lifetime of experiences are eliminated the voice becomes free to express its natural impulses without the use of artificial techniques. This is a far more difficult and dangerous process, because it involves a far greater understanding of human vulnerability, human psychology, communication theory, and vocal therapy than the "external" approach demands. Because the "internal" approach suggests a near therapy-like environment over a long period, self-instruction is highly unlikely.

Using this instructional technique, I believe, places a tremendous ethical and professional responsibility on the instructor of such a program. Because voice instructors are not, for the most part, trained psychologists or therapists, those who use an internal approach are at considerable risk for malpractice – in both the legal and ethical sense. Great care should be taken that students understand the changes that will be asked of them and agree to undergo an experience which can have profound psychological and behavioral results. They should also know that such approaches do not work for everyone, they take considerably more time before substantial results are apparent, there are fewer benchmarks against which to measure progress, and that alternative approaches may be better suited to their needs or to their particular learning style.

To evaluate the efficacy of any particular instructional method would require comprehensive assessment of each system. While this may be a laudable goal, there are obstacles in the path of such an evaluation. Any assessment instrument would have to measure progress or improvement against a specific standard, in other words, it would have to assess the extent to which a typical student progressing through the system would achieve the specific (measurable) goals of the method. Because voice instruction tends to move at a highly individualized pace and progress varies from person to person and from system to system this could be difficult. In fact, some systems which take long periods of time to successfully complete would need to employ long-range longitudinal studies to begin to gather the kind of data needed to make any competent assessment. With the lack of any data to-date relating to the efficacy of any of these methods, we have only the anecdotal data provided by students and teachers.

The diversity of the systems and their approaches further complicates this dilemma. Without any discipline standards or benchmarks against which to judge

voice skill attainment, the only common point of departure, system to system, is vocal structure and function. No matter what approach is employed to gain mastery over vocal usage, human anatomy and physiology remains the only fairly well understood constant. While it is possible to measure the extent of an individual's knowledge about voice and speech, this knowledge alone is not an indicator of skill attainment.

It is valuable, then, to identify the degree to which a given system employs accurate information about vocal structure and function. While it will not necessarily tell us if the system is effective or not, it does suggest the possible credibility of the system and the degree to which one could expect the techniques and exercises to actually address the conditions they are designed to address.

II

Vocal Health

For those students who are seeking vocal instruction as part of a comprehensive actor training program, there is the expectation that the vocal skills which are part of the vocational preparation will ready them for a career as a professional performer. There is no question among movement and dance teachers that care of the body, including exercise, flexibility training, appropriate rest and proper nutrition is essential to preserve an actor's working life. There does not appear, however, to be an equivalent emphasis on the preservation of the actor's voice to preserve its working life. It is astonishing, considering the care that singers take of their voices, that actors are not so instructed.

Few of the instructional systems examined substantively address vocal health. There is the implicit assumption that once the voice is properly trained,

whether by learning appropriate techniques or by freeing the voice of obstacles which inhibit its free expression, that voice will function well and will require little else to keep it healthy. While some lifestyle changes are mentioned (such as refraining from the use of tobacco and alcohol) in some systems like Lessac's and Turner's, most do not indicate how food, drugs, hormones, age, illness and stress affect the voice, or which vocal behaviors can help or hurt it.

Regardless of which approach an individual instructor takes, vocal health should be a central feature of the training regimen. Student actors, especially, should learn to develop good vocal habits early in their training which can insure the health of the voice as well as their future career.

Vocal training often concerns itself with the elimination of potentially damaging vocal habits such as harshness, breathiness, hoarseness, glottal shock, and inadequate pitch range or intensity control. With the elimination of the behaviors which cause these characteristics of the voice, should come instruction in *preserving* the health of the voice, and not just fixing it for the moment.

Several important elements should be included in any curriculum addressing vocal health. First, actors should be taught to avoid behavior and substances – both environmental and substantive – which pose a danger to the vocal apparatus. In addition, they should be aware of the effect that certain foods and drugs have on the body as a whole and on the voice in particular. They should learn how to handle stress and the difficult situations which are often associated with rehearsal and performance, and practice the discipline necessary to protect the voice from harm by avoiding situations that pose hazards. While it may be unrealistic to expect actors to eliminate stress in already hectic lives, they should at least be aware of the effects of stress on the vocal apparatus, and learn to function while under stress, when necessary, to keep the voice from being unduly harmed during those stressful

periods.

Next, students should learn to identify the symptoms of illness and voice disorders. They should be familiar with the services which can be provided by an otolaryngologist and a speech therapist. They should know the basic care which can be taken to ease the severity of sore throats and laryngitis, and to avoid the behaviors which can cause them to lose their voice.

Finally, I would argue that while knowledge of vocal structure and function may not make someone's voice sound better, it is a great asset in the assessment and maintenance of the health of the vocal tract. When the actor understands how smoking affects the lungs, or how harsh or breathy vocal qualities are produced, or how aperiodic "noise" is an indication of asymmetrical vocal folds, they have the tools they need to protect their voices over their lifetime, rather than just from production to production.

III

Recommendations

In selecting a training method, students or teachers may wish to draw upon various methods depending upon their needs or desires. Any of the systems could be utilized if someone was seeking a comprehensive vocal training program, but if training was desired to fill a particular need or to suit a certain preferred way of learning, then an overview of each system's strengths and working methods would be valuable to both student and teacher.

If one is seeking to improve *articulation* it would be hard to find a more thorough approach than Edith Skinner's. While it seems like a throwback to an older,

pre-1950's style of theatre, plays from that era are still commonly produced. "No other system can take the boy from the "hood" and make him the prince in his palace like hers can (Barton & Dal Vera 285)." Evangeline Machlin's exercises, similar in many ways to Skinner's would be equally good in helping to improve articulation, with the added advantage that she also addresses issues related to voice and speech.

Turner also advocates precision in the formation of vocal tone and clear articulation, and his would also be an appropriate system for articulation training, especially if British plays were in the repertoire. While Rodenburg's treatment of articulation is much less sure than Turner's, her employment of British RP pronunciation standards could prove useful to actors working with classic works from the British repertoire.

Both Skinner and Machlin would appeal to individuals who consider themselves primarily *visual learners*. In other words, if a student feels that they process visual information more readily than auditory or kinesthetic information, they would find the phonetic symbol systems and phonetic transcription exercises presented in these methods as a useful tool. McCallion also uses phonetics, but does not employ phonetic transcription as Skinner and Machlin do.

Students who need to improve resonance and projection would benefit from Lessac's tone exercise and structural action. While Machlin's system addresses both resonance and projection extensively, and offers the only really accurate description of resonance of all of the systems, there are several errors in her explanations of resonance faults which could be confusing. Her exercises, however make this a good recommendation for someone working on resonance. Turner and McCallion offer clear and straightforward work on resonance and would be a good choice for a student doing plays from the British repertoire.

Students who wish to combine voice and body work would do well with

either Lessac's or McCallion's methods. McCallion especially incorporates Alexander technique and extensive body work into his method. This would appeal to actors who intend to perform in highly physical adaptations of classic plays, especially those which employ stage combat or vigorous movement. While most of the systems described here employ some kind of movement in conditioning the parts of the body that support voice and speech, Lessac's and McCallion's methods employ movement as an integral part of both voice and acting instruction. Lessac's other text on movement is an excellent accompaniment to his voice text for the actor who wishes to work on voice and movement together.

If a teacher is concerned about getting their students more connected with their emotions, then Raphael recommends Kristin Linklater's release work (Raphael 110). In addition, if a student wanted an image-based working method, either Linklater's, Berry's, or Rodenburg's systems provide a more psychologically-based approach which integrates emotion, voice and body, and focuses on the intimate connection between language, text, and voice.

Both of Berry's texts (*Voice and the Actor*, *The Actor and His Text*) are particularly well suited for the student who needs to focus on the language in classical plays, and it is especially conducive to self-study. Linklater's first text (*Freeing the Natural Voice*) is not appropriate for self-instruction because side-coaching is such an important feature of the system, and the sure hand of a trained instructor is needed to guide individual discovery and progress. However, her newer text, *Freeing Shakespeare's Voice*, is particularly useful for actors performing in Shakespeare, and is more accessible for self-study, especially for actors who have been introduced to her working method in her introductory work.

If a student is primarily an *auditory learner*, then they tend to process information they hear most effectively than information they see or touch. Those

systems which emphasize ear training -- Skinner, Machlin, McCallion, and Turner -- may be the most accessible to that student. In addition, Linklater's side-coaching method may be easier for an auditory learner, as well. Systems which de-emphasize ear training, like Lessac's, Berry's and Rodenburg's may be more difficult for the auditory learner.

Kinesthetic learners process tactile and sensory information most efficiently, and they may profit by the wholly sensory orientation of Lessac's method, or the muscularity approach to articulation of Berry. Linklater's body-freeing approach may also have a strong appeal to kinesthetic learners who are highly attuned to sensations of tension and relaxation in the body. McCallion also employs a high degree of sensitivity to sensations within the body and vocal tract and would be an appropriate training method as well.

Linklater's and Berry's methods have the advantage of being relatively easy to integrate into acting rehearsal and performance (Barton & Dal Vera 300), because their systems tend to be internalized as part of the working process, and require very little technique or technical expertise once they have been learned. Detailed technique-based systems, like Lessac's, Turner's, Skinner's, McCallion's and Machlin's may be more difficult to transfer from the classroom to the rehearsal hall, at least until the techniques are mastered and habituated.

Those students seeking an approach which emphasizes vocal structure and function, as well as vocal health will have to supplement their studies with works by other authors. While McCallion's system (and to a lesser extent Machlin's) is probably the most thorough and accurate of the systems examined here with respect to vocal anatomy and physiology, the student would do well to also examine the work of Punt (1979), Sataloff (1991), Stern (1979), Zemlin (1988), Boone (1977), Baken (1991), Raphael (1987, 1994), Sundberg (1991), and others to get a more complete picture.

A promising new text which is sure to garner much attention is the eclectic work of Barton and Dal Vera (*Voice: Onstage and Off*) which examines the subject of voice and speech from a variety of perspectives, including a discussion of the work of all of the major training systems now in use. It is a very user-friendly and frank work which easily lends itself to self-study. It employs two unique features -- the *Voice Doc* and the *Voice Shrink* -- which address vocal health and psychological issues associated with vocal training in a very straight-forward manner. Barton and Dal Vera explain that

as your own Voice Physician, you will recognize and diagnose your voice problems, and evolve your own treatment. As your own personal Voice Counselor, you will search out what psychological and emotional blocks underlie any vocal limitations, so you can recognize habits and behaviors you may want to modify (44-45).

Barton and Dal Vera emphasize that the relationship between the physical and the psychological is a critical link in vocal improvement, and that both must be addressed in order to make progress. The resulting method helps the student diagnose symptoms, provides exercises and suggests potential emotional blocks which may hinder progress, always acknowledging the actor's role in determining for themselves what they believe is the best course of action for their own particular needs. It also draws upon many of the best techniques of all of the other vocal systems it is built upon to provide a comprehensive and flexible approach to voice and speech, not seen in any previous training manual.

According to Raphael, "the more familiar the teacher, director, or coach is with several different techniques and strategies, the more efficiently he or she can match a creative solution with any given area of need (110)." This appears to be the course that Barton and Dal Vera have charted and may prove to be a valuable bridge between systems which the discipline of theatre voice can build upon. In her own instruction at the American Repertory Theatre, Bonnie Raphael draws on many

different systems as well. Her students' voice work in the first year of instruction is Linklater-based, while her speech work is highly eclectic, drawing on many different methods. Second-year work is strongly Lessac-based, "permitting the actors to further integrate vocal skills from their first year of training and to begin to apply them to the needs of more demanding roles and more demanding playing spaces (Raphael 111)." In addition they learn the International Phonetic Alphabet and then are exposed to numerous stage dialects.

Very few theatre programs permit such an extensive voice and speech training regimen as the one at the American Repertory Theatre. Most have a far shorter time frame in which to work, typically one or two semesters. Many programs may have to integrate voice work into more traditional acting classes or rely upon voice and diction courses or singing courses to provide the vocal instruction their acting students need. The teacher who can draw upon a variety of methods and is skillful in more than one kind of technique can devise a flexible and challenging curriculum while adapting to the changing needs of their students.

Raphael concludes that "there are as many methods or approaches as there are teachers, so the wise consumer will shop around (111)." Just as teachers profit from exposure to multiple methods, so do students. However, the student may not know what to look for in evaluating a potential teacher or method, or even what kind of training suits them best. Her recent article, a "*Consumer's Guide to Voice and Speech Training* (1994)," is a valuable first step in the direction of providing teachers and students with a clearer understanding of what is available and which technique may be more suited to a specific learning goal.

Barton and Dal Vera provide a similar service in their text, matching student's learning styles to various instructional methods. Taken together these resources begin to create a clearer picture of the discipline of Theatre voice, and set the stage

for a more comprehensive treatment of the topic. While this study attempts to add to that treatment from the narrow perspective of vocal structure and function, other studies are needed to assess the learning strategies and the efficacy of these systems, to examine the impact of VASTA and the work of the Voice Foundation on current instructional practice, and to survey the discipline again to assess the degree of change because Morgan's attempt at a comprehensive survey in 1980. More work is needed in learning theory and pedagogical approaches to vocal instruction, and assessment tools need to be developed to assess the efficacy of instructional systems. Dialogue between voice teachers, therapists, scientists, actors, and others interested in the field of voice must continue, and progress should be made in the standardization of training criteria for voice teachers. These are a few of the possible directions which can be taken in future research in this area, as we begin to scrutinize, evaluate and theorize about the discipline of theatre voice with the same rigor which is rightly applied to other academic and professional disciplines.

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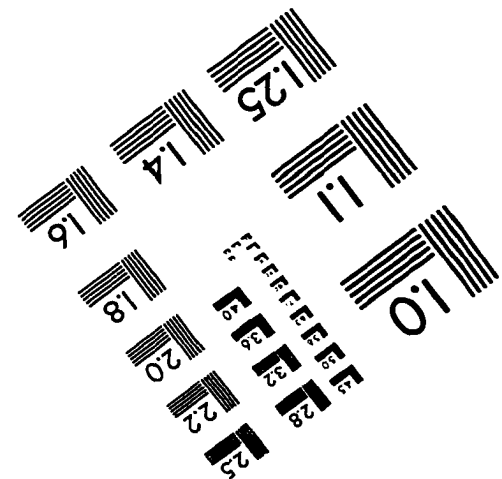
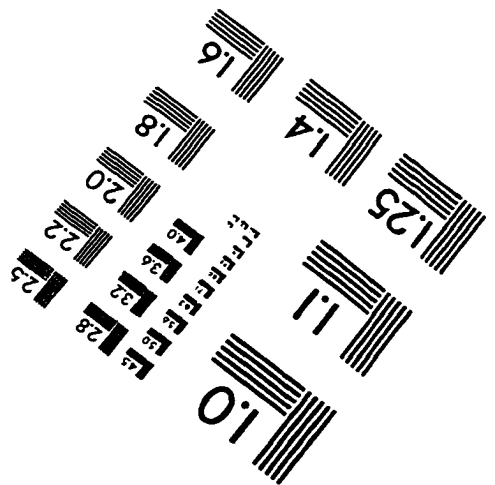
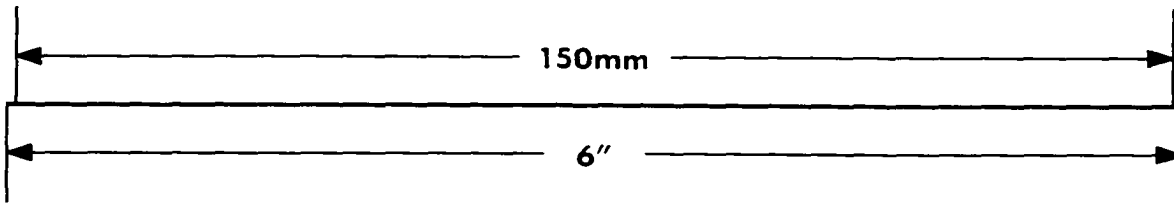
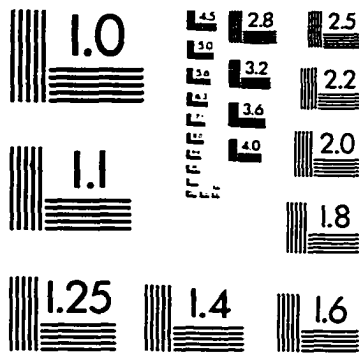
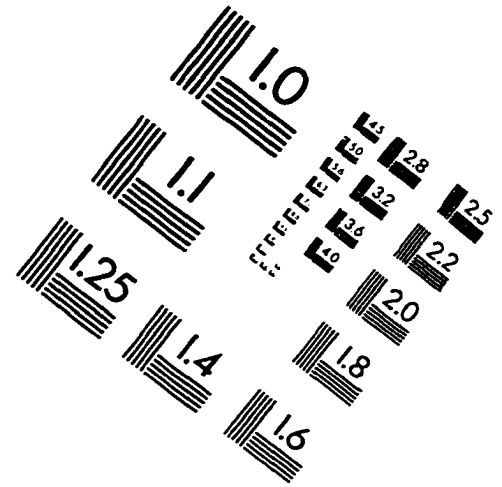
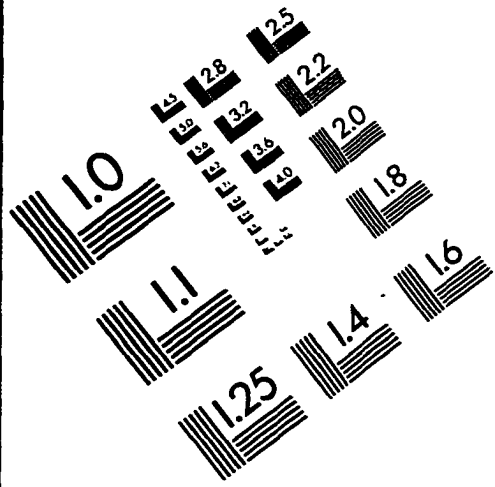
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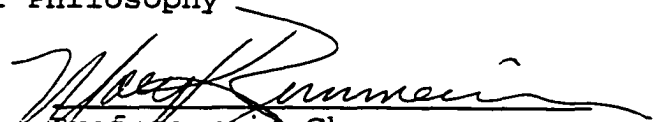
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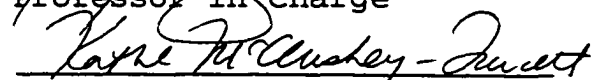
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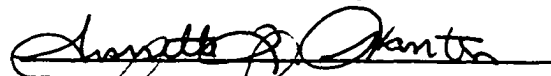
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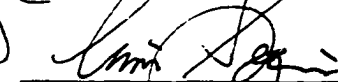
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ABSTRACT

An Investigation of Unintended Pregnancy, Contraceptive Behavior, and Family Planning Services in the United States and Finland

By

Linda Helmig

Unintended pregnancy has been cited as a serious problem in the United States, where almost 60% of all pregnancies are unintended (Brown & Eisenberg, 1995). It is unclear precisely why the U.S. rates of unintended pregnancy are high by international comparison. In order to better understand this problem, a cross-national approach was utilized to assess the contributions of a broad range of individual- and system-level variables. Specifically, the primary purpose of this study was to examine to what extent such variables are influential in predicting reproductive outcomes in the United States compared to Finland, a country that does not share the problem of unintended pregnancy. The present study employed large, nationally representative data sets from both countries and tested the capacity of different health behavior models to predict reproductive outcome. The models were Andersen's (1968) Health Service Utilization Model, Andersen's (1995) Revised Health Model, and the Health Belief Model's "Barriers" component.

A series of multiple regression analyses was conducted to test the predictive ability of the three models. Andersen's (1995) Revised Health Model was the most predictive model in that it was the only one resulting in at least medium-sized

multivariate effects, i.e., in predicting the four outcomes: current birth control, unintended pregnancy, reproductive knowledge, and female sterilization. Overall, the variables that pertain to the individual (e.g., knowledge, demographics) were more consistently predictive of outcomes than the system-level variables (e.g., country of residence). For example, engaging in health-promoting behaviors such as greater utilization of family planning and general preventive medical services, was associated with greater knowledge of birth control, greater reproductive knowledge, and more reliable current birth control use. As a predictor of reproductive outcome, country of residence was less effective than expected. Limitations, including problems related to measurement inherent in the use of secondary data, and directions for future research were discussed.

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An Investigation of Unintended Pregnancy,
Contraceptive Behavior, and Family Planning Services in
the United States and Finland

Unintended pregnancy¹ has been cited as a serious problem in the United States (DeRidder, 1993; Fielding & Williams, 1991), where rates are higher than those in other industrialized nations, particularly the Nordic countries of Denmark, Finland, Iceland, Norway, and Sweden (Jones, Forrest, Henshaw, Silverman, & Torres, 1989; Wallace & Vienonen, 1989). Almost 60% of all U.S. pregnancies are unintended (Brown & Eisenberg, 1995) compared to only 22% in Finland (Myhrman, 1992), for example. Unintended pregnancy is associated with increased risk of fetal exposure to harmful substances such as alcohol and tobacco, less prenatal care, and a number of socioeconomic hardships for the family (Brown & Eisenberg, 1995). In the U.S., unintended pregnancy occurs across all segments of society, although it is often discussed as a problem among women who are young, poor, unmarried, or of minority ethnic status. For example, although researchers in the U.S. have focused on the frequent occurrence of unintended pregnancy and its consequences among teenagers, older women (ages 40-44) have similarly high rates (approximately 80% of

¹Unintended pregnancy is defined as any pregnancy that, according to the woman, occurred sooner than desired (i.e., a wanted but mistimed pregnancy) or was not wanted at all at the time of conception (Jones et al., 1989). The issues of wantedness at the time of birth and contraceptive use (or lack thereof) at conception are not considered in the definition of unintended pregnancy (Brown & Eisenberg, 1995).

pregnancies in each age group) (AGI, 1993a).

It is unclear precisely why the rates of unintended pregnancy in the U.S. are high by international comparison. Although the lack of consistent and careful use of contraception has been posited as an important determinant, unintended pregnancy is believed to be a complex, multicausal problem (Brown & Eisenberg, 1995). The array of factors contributing to unintended pregnancy and ineffective contraceptive use are not clearly understood, although they appear to fall into two categories: those that pertain to the individual and those that exist at a system-level. Researchers have found the following individual variables to be associated with higher rates of unintended pregnancy or less effective contraceptive use: increased religiosity (Mosher & McNally, 1991), positive attitudes toward gender/family roles and childbearing (Plotnick & Butler, 1991; Zabin, Astone, & Emerson, 1993), negative attitudes toward contraception and less knowledge about reproduction (Caldas, 1993; Zabin et al., 1993), and lower self-esteem (McCullough & Scherman, 1991; Plotnick, 1992; Yawn & Yawn, 1993). Interpersonal factors, another category of individual-level variables, include poor quality of relationship and communication with partner or parents (Jaccard & Dittus, 1993; Rogers & Lee, 1992; Scott, 1993; Warren, 1992). System-level or sociological variables associated with unintended pregnancy and/or ineffective contraceptive use include poverty (Donoghue, 1993; Miller, 1992; Sullivan, 1993), lack of educational opportunities (Plotnick, 1993; Stevenssimon, Kelly, Singer, & Cox, 1996), poor access to family planning services (David, Morgall,

Osler, Rasmussen, & Jensen, 1980; Forrest, Gold, & Kennedy, 1989; Jones et al., 1989; Silverman & Torres, 1987), lack of sex education in schools and community public health education (Helmig & Hemminki, 1997), and media exposure to inconsistent messages about sexuality² (Jones et al., 1985).

No one of these systemic or individual-level factors can completely account for unintended pregnancy or ineffective contraceptive behavior. Although researchers have shifted from investigating individual variables in isolation to considering broader, sociological factors, the interrelationships among these two types of variables are not well understood. **The principal purpose of this study is to examine to what extent system- and individual-level factors are influential in predicting contraceptive behavior and reproductive outcome variables.** In order to include and investigate systemic as well as individual variables, a theoretical model that emphasized both factors and a cross-national approach were employed in the present study. The importance of each of these aspects are described below.

Citing international comparisons, many researchers acknowledge the severity of the unintended pregnancy problem in the U.S. (Brown & Eisenberg, 1995; Jones et al., 1989; Wallace & Vienonen, 1989). Surprisingly, few researchers have attempted

²Jones et al. (1985) discuss the U.S. entertainment media's tendency to portray sexual intercourse as romantic and exciting, but without responsible discussion of contraception, or risk of pregnancy or sexually transmitted diseases. In the U.S., values such as monogamy and abstinence before marriage are, in theory, idealized and encouraged/promoted to young people (particularly women). However, the actual behavior of adults in the media is often contradictory.

to understand the problems of reproductive outcome using an international approach, one that could more thoroughly investigate variations in system-level factors. The present study utilized such a cross-national approach by comparing the problems of reproductive outcome in the United States with that of Finland, a Nordic country known for its low rates of unintended pregnancy (as well as low rates of abortion and teenage pregnancy). Employing such an international approach provides a richer understanding of the contribution of systemic factors to reproductive outcome. That is, differences in the health care systems (including family planning services, health education) in the U.S. and Finland can be studied in addition to individual-level factors. In order to provide sufficient context for this cross-national research, relevant background information on Finland and comparisons with the U.S. will be provided later in this section.

Models to Explain Contraceptive Behavior
and Unintended Pregnancy³

³While contraceptive behavior is certainly preventive in nature and has been widely studied and referred to as "preventive behavior," it is qualitatively different than other preventive health behaviors. For example, pregnancy is not an illness or disease state. In addition, use of birth control is not "treatment" for some condition, and one's overall health status may be unrelated to use. Finally, there is a wider range of desirability of pregnancy (which is likely to vary greatly over the course of a woman's reproductive years) compared to disease. Despite these qualitative differences in pregnancy and illness prevention, one important similarity is the medicalization of both types of health behaviors. Because family planning care has been medicalized in most Western countries, including the U.S. and Finland, the application of health behavior models to contraceptive behavior is considered appropriate.

In recent decades a number of theories and models have been developed for the purpose of explaining and predicting individuals' health actions, including contraceptive behavior. For example, the Career Model (Lindemann, 1974), Decision Model or Subjective Expected Utility theory (Fishbein, 1972; Luker, 1975), Kar's Conceptual Model (1978), and Self-Efficacy theory (Bandura, 1977) have been applied to the study of contraceptive behavior and have identified a variety of factors that are associated with contraceptive use. All of these models have the same limitation in that they focus on individual variables (e.g., the woman's, and less frequently her partner's, attitudes, knowledge, perceptions, self-esteem, contraceptive self-efficacy) rather than the broader context in which they occur. Because the primary purpose of the present study aimed to investigate factors beyond the level of the individual, a model that was consistent with the aim of this study, i.e., one that incorporated system-level factors, was essential.

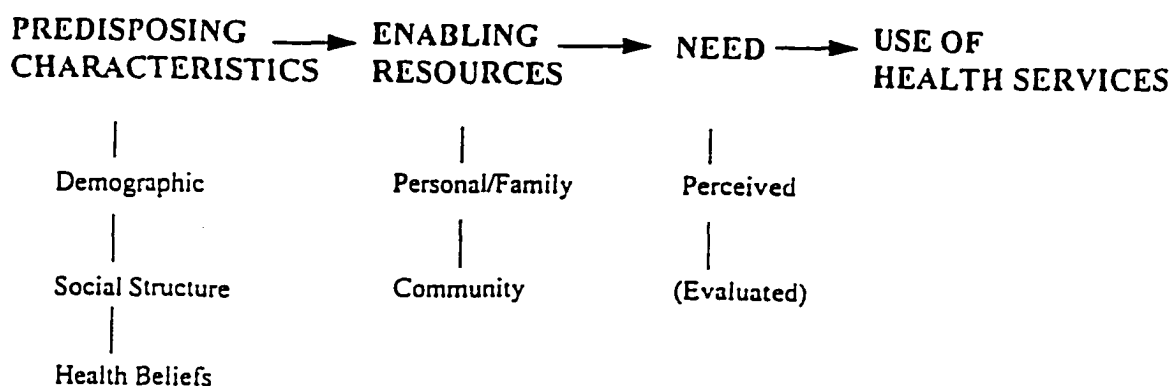
Among the available models, Andersen's (1968) original Health Service Utilization Model (HSUM) and Revised Model (1995) are the most comprehensive in that they include both broader, system-level variables and individual factors. Therefore, both theoretical models were selected for use in the present study. Andersen's original model (1968) attempts to predict health care utilization (i.e., medical visits), and his revised model (1995) also explains health outcomes (e.g., health status, satisfaction). Because of the inclusion of many types of outcome variables, both models are suitable for the study of unintended pregnancy and

contraceptive use. Another strength of Andersen's model is its applicability to either preventive or illness/sick-role behavior. The original model states that health care utilization can be predicted by "predisposing characteristics" (e.g., demographics, health beliefs), "enabling resources" (e.g., personal, family, and community resources), and "need variables" (i.e., perceived or subjective need for health care and evaluated or objective need for health care) (see Figure 1). Andersen's expanded model (1995) adds a wide range of predictors to the three included in the original model. The added predictors are "environmental factors" (i.e., health care system) and "health behavior" (e.g., personal health practices and use of health services). Collectively, the three original predictors are termed "population characteristics" in the expanded model. Andersen's revised model also includes more dependent variables that can be predicted: "health status outcomes" and "consumer satisfaction" (see Figure 2). Both of Andersen's models are employed in this study in order to allow the investigation of a wider range of variables to predict both health care utilization (original model) and reproductive outcome variables (expanded model).

Another frequently used model for understanding health behavior is the Health Belief Model (HBM) (Rosenstock, 1974). The HBM defines four dimensions: perceived susceptibility to and severity of some condition, and perceived benefits and barriers to taking the recommended health action. The HBM's emphasis on *perceived* rather than *actual* barriers, however, narrows the focus and implies that the individual, rather than the system, is a more important determinant of health actions.

Figure 1

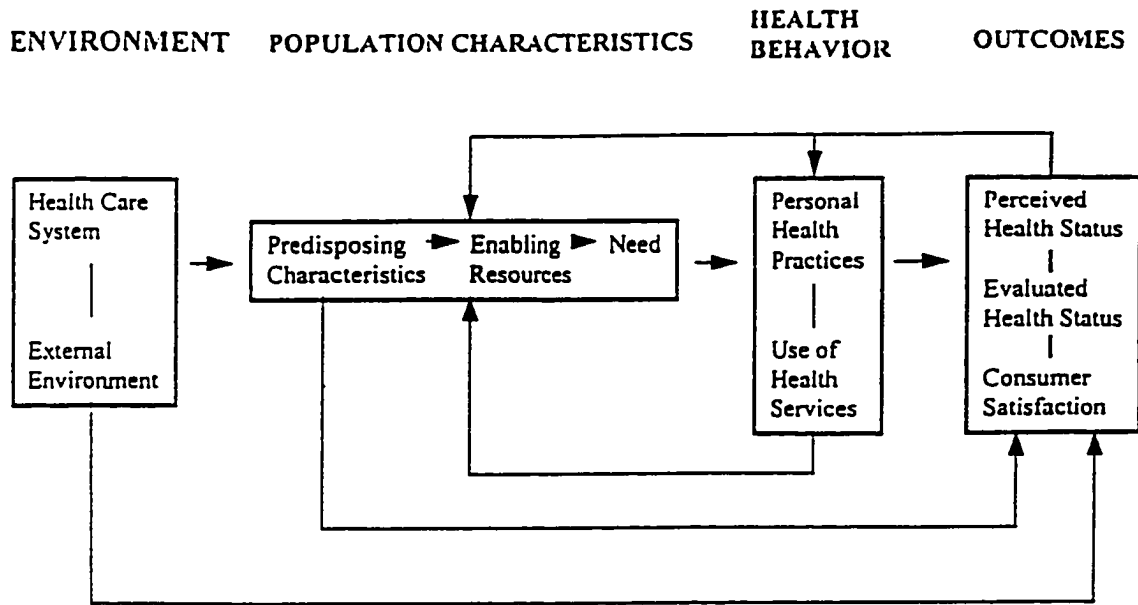
Andersen's (1968) Original Health Service Utilization Model



From "Revisiting the Behavioral Model and Access to Medical Care: Does It Matter?" by R. M. Andersen, 1995, Journal of Health and Social Behavior, 36, p. 2.

Figure 2

Andersen's (1995) Expanded Model



From "Revisiting the Behavioral Model and Access to Medical Care: Does It Matter?" by R. M. Andersen, 1995, Journal of Health and Social Behavior, 36, p. 8.

Only one dimension, perceived barriers, could encompass some system-level factors. Results from a meta-analysis of studies using the HBM demonstrated that perceived barriers was the most powerful single predictor of all HBM dimensions across studies and health behaviors (Janz & Becker, 1984; Rosenstock, 1990). Applications of the HBM have involved the development of educational programs aimed to reduce unintended teenage pregnancy. Specifically, attitudes targeted for intervention have included perceived psychological and interpersonal costs or barriers to abstinence and consistent contraceptive use (Eisen & Zellman, 1992). Such perceived barriers have included lack of support from others for using some method, as well as negative beliefs and/or inaccurate knowledge about particular methods (e.g., inconvenience, side effects, effectiveness) (Condelli, 1986). Results of these individual-level interventions often have been successful at changing beliefs and increasing knowledge about contraception, but ineffective with regard to changing actual contraceptive behavior or reproductive outcome variables such as pregnancy rates (Caron, Davis, Wynn, & Roberts, 1992; Ku, Sonenstein, & Pleck, 1992; Marsh & Wirick, 1991; Vicenzi & Thiel, 1992). For example, following their intervention, Marsh and Wirick (1991) reported increased numbers of women using contraception and increased knowledge of sexuality and contraception; however, the number of repeat pregnancies was unaffected. Several authors have suggested that the concept of "perceived barriers" is important but insufficient in determining contraceptive behavior, and recommend practical interventions to decrease actual, systemic barriers

to effective contraceptive use (e.g., improved access to accurate information and contraceptive services) (Glanz, Lewis, & Rimer, 1990; Gochman, 1988; Lowe & Radius, 1987; Rosenstock, 1990).

Given these findings, it is possible that more valuable information could be obtained by studying barriers to contraceptive behavior - both actual and perceived - in greater depth. The "barriers" dimension of the HBM will be tested in the present study because of (a) the relative lack of research on actual rather than perceived barriers and (b) the fact that actual barriers represent one potential systemic factor that may contribute to reproductive outcome. Specifically, actual systemic barriers (which are not directly accounted for in the HBM) to effective contraceptive use will be investigated.

Background Information on Finland and U.S. Comparisons

General Health Care

Finland is recognized by the World Health Organization for its comprehensive, efficient health care system (Saltman & von Otter, 1992). All Finnish citizens are covered under the national health care system by virtue of being a resident. Finland's health care system differs from that in the U.S. in that it is funded through general taxation. This taxation rate is high by international comparison: Combined municipal and state taxes may total a maximum of 69% of personal income, although the average taxation rate is lower (Hermanson et al., 1994). In Finland, total health expenditures in relation to gross national product are lower than

that of the U.S. (8.3% in Finland and 14.0% in the U.S.) (National Center for Health Statistics [NCHS], 1996; World Health Organization Regional Office for Europe, 1997).

Overall life expectancy and major mortality causes are comparable in the U.S. and Finland,⁴ suggesting similarity in overall health standards and quality of life. Specifically, in 1996 average life expectancy was 75.5 years in Finland and 76.0 in the United States (U.S. Bureau of the Census, 1996), and cardiovascular diseases were the main causes of death in both countries (Ministry of Social Affairs & Health [MSAH], 1990; NCHS, 1993).

Health care in Finland is very different from that in the United States both in terms of its philosophy and structure. Finland's national health care system has emphasized primary care and preventive services (Hermanson et al., 1994), of which family planning is an important aspect. In fact, internationally Finland was the first country to implement the World Health Organization's recommendation that family planning services be integrated with primary health care (Leppo & Launis, 1975 cited in Makkonen, 1994). This tradition has continued, as family planning services have been highly accessible to its users. In contrast, the U.S. philosophy has been that family planning services are considered optional and not an important aspect of primary or preventive care. This philosophy is reflected in the fact that (a) family

⁴Exceptions to the similarities in mortality causes are increased suicides in Finland and increased homicides in the U.S.

planning services typically have been separate from general health care services and (b) costs for services and contraceptive methods have not been covered by the majority (approximately 80%) of U.S. insurance policies (Health Insurance Association of America, 1986).

Accessibility of Health Care

Finland has placed a high value on the provision of health and social services at low cost to all its citizens. Access to quality health care is believed to be the responsibility of the government (MSAH, 1990). As a result, most primary health care in Finland is free of charge or with a minimal co-pay. Receipt of health care is primarily determined by geographical residence rather than by employment or ability to pay for care, as is often the case in the United States. The majority of health care is provided and obtained in Finland's publicly financed and administered health care system, which is very thorough both in terms of regional distribution and range of services provided (Saltman & von Otter, 1992). However, waiting lists often exist for outpatient primary care appointments and some surgical treatments. Although the majority of health care in Finland is provided in the public sector, private medical care also may be obtained. Less than 10% of Finnish people obtain additional medical coverage with private insurance, and out-of-pocket health care expenses for individuals or households accounts for only 13% of health care expenditures (Hermanson et al., 1994). The overall balance between public and private use is opposite of that in the United States: 28% of all outpatient visits in Finland (some of

which are reimbursed through the public social insurance system) are to private physicians (National Board of Health in Finland, 1989, cited from Hermanson et al., 1994), whereas the majority (approximately 75%) of Americans utilize private physicians as their regular provider of medical care (Aday & Anderson, 1984).

National Responses to Public Health Problems

Although both countries are capable of offering health care services of high quality, their different responses to well-known public health problems are worth noting and suggest important differences in public health education and promotion efforts, and availability and accessibility (and thus use) of services. Consider the examples of HIV/AIDS incidence and infant mortality rates. HIV/AIDS rates in Finland are low by international comparison (0.76 per 100,000 in 1995; World Health Organization Regional Office for Europe, 1997), whereas U.S. rates are alarmingly high and escalating rapidly. HIV-related deaths in the U.S. ranked tenth among all causes of mortality in 1990 (NCHS, 1993). The low HIV/AIDS rate in Finland is believed to be due in part to rigorous health education and prevention programs and effective publicity (Loytonen, 1991, cited from Hermanson et al., 1994; MSAH, 1990). HIV/AIDS prevention education has occurred on a national level since the mid-1980s with special efforts aimed at school-aged children and teenagers (Kontula, Rimpela, & Ojanlatva, 1992; Kosunen, 1994). In the U.S., on the other hand, efforts to educate the public and young people are often thwarted by special interest or "pressure" groups and courts of law. For example, recent efforts to launch an

HIV/AIDS prevention program in New York City schools that was to include free condom distribution were met with opposition from parents and struck down by the New York appellate court (American Public Health Association, 1994).

With regard to infant mortality, Finland has one of the lowest rates in the industrialized world while the U.S. has one of the highest (5.9 and 9.2 deaths per 1,000 live births, respectively; Nordic Medico Statistical Committee [NOMESCO], 1993; NCHS, 1993). Finnish prenatal care services are extensive and easily accessible and are believed to be an important reason for the low infant mortality rate. Local governments have been required by law to provide maternal and child health care since the 1940s (Hemminki, McNellis, & Hoffman, 1987; MSAH, 1990). Included have been free visits at specialized maternity centers and an eleven-month paid employment leave (Hermanson et al., 1994), part of which could be taken by the mother or father. Nearly all expectant mothers in Finland (99.9%) participated in prenatal care (National Research and Development Center for Welfare and Health [STAKES], 1993; Rautava & Sillanpaa, 1989). In 1989, an average of 15.1 prenatal visits per woman were made in Finland (Hemminki & Gissler, 1995). It should be noted that rates for early participation in prenatal care in the U.S. and Finland were similar (respectively, 75% and 79% of women initiated visits before the end of the first trimester; AGI, 1993b; Hemminki & Gissler, 1995), although a greater proportion of U.S. compared to Finnish women who gave birth either began care late in pregnancy (fifth month and beyond) or participated in less than half the

recommended number of medical visits (AGI, 1993b; Hemminki & Gissler, 1995). Reasons for poorer utilization of prenatal care in the U.S. compared to Finland include the high cost of services in the U.S. (76% of all prenatal visits occur with private physicians), limited insurance coverage (public or private), as well as some women's lack of knowledge of the necessity of prenatal care (AGI, 1993b).

Family Planning Service Organization and Related Legislation

Fewer organizational barriers to receipt of family planning care have existed in Finland compared with the United States. Finland's family planning system has been characterized by increased availability and decreased costs of both contraceptive methods and services in comparison to the U.S. (Helmig & Hemminki, 1997). In addition, legislation in the U.S. has been more prohibitive to women's receipt of family planning care. For example, some states have restricted women's access to abortion through (a) mandatory waiting periods, (b) barring of abortions in public facilities (National Abortion Federation, 1992 cited in Hafner-Eaton, 1993), and (c) mandatory parental involvement laws that require minors to have parental consent prior to obtaining an abortion (AGI, 1993c). In contrast, legislation in Finland has made contraceptive care more accessible to users of all ages (Helmig & Hemminki, 1997; Hess, 1995). Legally defined as primary care, family planning services in Finland have been available within the general health care system, and have been free for all women regardless of age or socioeconomic status.

Legislation in Finland has also aimed to reduce regional inequalities by

ensuring equal access to family planning services in rural and urban areas.

Nationwide compliance with the law requiring sufficient physicians and abortion providers in all parts of the country has been noted (Ritamies, 1993). In contrast, abortion services in the U.S. have not achieved regional equality. In 1985, 83% of U.S. counties lacked an abortion provider, as the majority of providers (98%) were located in urban settings (AGI, 1993a; Jones et al., 1989). Also illustrative of the difficulty obtaining an abortion in the U.S. is the fact that in 1989 nearly one in ten women seeking an abortion was required to obtain services in a state other than the one in which the woman resided (NCHS, 1993).

Sexual Behavior and Cultural Norms Regarding Sexuality

The Nordic countries, including Finland, are recognized for their liberal, positive attitudes toward sexuality, high priority placed on sex education in schools and the media (legally mandated), and decreased religiosity in comparison to the U.S. (Jones et al., 1985). The lack of these factors in the United States is believed to have interfered with the provision of accurate information about sexuality and contraception (Helmig & Hemminki, 1997). Unlike the U.S., in Finland there has been little or no public opposition to the many ways in which sexual/contraceptive information and methods are distributed, e.g., advertising of contraception in the mass media, sex education in public schools and in the context of religious teachings, and distribution of some birth control methods in school health clinics. Historically, distribution of contraceptive information and methods has never been officially

prohibited in Finland as has been the case in the U.S. (Advisory Committee for Health Education, 1989; McCann, 1994). From 1873 to 1937 it was considered illegal for U.S. medical professionals to provide methods of birth control to women and couples (McCann, 1994).

One myth in the U.S. is that "high" rates of teenage sexual activity contribute to the high rates of unintended pregnancy and abortion among this age group. Data suggest, however, that the sexual behavior of both teenagers and adults (i.e., age of initiation of sexual activity, frequency of intercourse, number of partners) was similar between the U.S. and Finland (AGI, 1993c; Elmer-Dewitt, 1994; Haavio-Mannila & Kontula, 1993; Jones et al., 1985; Kontula, 1991; Kontula, Rimpela, & Ojanlatva, 1992).

Family Formation Patterns

Finnish families have tended to be smaller and started later than American families. In 1992 an average of 1.8 children were born per Finnish woman aged 15-49 (Hemminki & Gissler, 1995), and 2.3 children were expected to be born per U.S. woman aged 18-34 (NCHS, 1993). In the U.S. in 1989, half of all women have had their first birth before age 26 (AGI, 1993b), and in Finland in 1992, before age 27 (STAKES, 1995).

Reproductive Outcome Variables

As previously mentioned, the unintended pregnancy rate among Finnish women has been less than half that among U.S. women. The U.S. has had higher

overall birth rates than Finland. Examined by age, however, birth rates among older women (ages 25-49) have been greater in Finland than the U.S., whereas the U.S. had a higher birth rate among younger women. Rates of abortion and repeat abortion were also higher in the U.S. compared to Finland (NCHS, 1993; NOMESCO, 1993).

The overall relative frequency of contraceptive use was similar among women of childbearing age in Finland and the U.S. (66% and 60%, respectively; Nikander, 1992; NCHS, 1993); however, the actual methods used varied considerably. The most common method of contraception among American women was female sterilizations (28% of women aged 15-44 in 1988; NCHS, 1993). In Finland, significantly fewer women chose this method (8% of women aged 22-51; Nikander, 1992). Frequency of intrauterine device (IUD) use followed the opposite pattern: 20% of Finnish women and only 1.2% of U.S. women used IUDs. Among young women in both countries, birth control pills were the most common method: in Finland, 41% of 18-year-olds and 42% of women aged 22-26 used oral contraceptives (Rimpela, Rimpela, & Kosunen, 1992; Nikander, 1992), compared with 30% of women aged 15-24 in the U.S. (USBC, 1993). Overall oral contraceptive use in Finland has increased in recent years, particularly among younger women (Ritamies, 1993). In the U.S., however, pill use has declined among teenagers during the 1980s (AGI, 1993c). Condom use was greater in Finland than in the U.S., especially among teenagers, although condom use among U.S. teens reflected an increase in the past decade (AGI, 1993c; Kosunen, 1994). Increases in condom use in both countries

have been partially attributed to improvements in public health promotion efforts regarding HIV/AIDS prevention (Hermanson et al., 1994; Jones et al., 1989).

Although HIV/AIDS rates are very low in Finland compared to the U.S., Finland has initiated extensive public health education campaigns for preventive purposes.

Research Questions

In order to better understand the complex problem of unintended pregnancy in the U.S. (which has often been defined as a social problem), a variety of system- and individual-level factors that were hypothesized to contribute to this problem were evaluated. The present study was designed to test the predictive ability (a) Andersen's (1968) Original Health Service Utilization Model, (b) Andersen's (1995) Revised Model, and (c) the Health Belief Model's "barriers" dimension on a number of reproductive outcome variables. Specifically, family planning service utilization and reproductive outcome variables were investigated in the U.S. and Finland, a Nordic country that does not share the problems of unintended pregnancy and its consequences to the same extent. The three broad research questions⁵ that were addressed in this study will be described, followed by an elaboration of the specific

⁵Initially, addressing a fourth research question was planned: Are individual- or system-level variables (e.g., use of public/private family planning services, availability of services in one's community, health professional seen at last family planning visit) more influential in determining health outcome? However, three of the four system-level variables that would serve as predictors could not be operationalized, given the nature of the data sets. Therefore, this research question could not be adequately addressed and was excluded from the present study.

hypotheses.

1. To what extent do the dimensions of Andersen's (1968) Health Service Utilization Model predict use of family planning services in the United States and Finland?

2. To what extent do the system- and individual-level categories of Andersen's (1995) expanded health model explain reproductive outcome (e.g., contraceptive use, knowledge, abortion, unintended pregnancy)?

3. Is the Health Belief Model's "barriers" component useful in predicting reproductive outcome?

In each of the models tested in the research questions using regression analyses, a multivariate effect was predicted. For the first research question, Andersen's (1968) Original Model predicted that collectively, "predisposing characteristics," "enabling resources," and "need variables" would explain a significant proportion of the variance in predicting utilization of family planning services. Similarly, for the second research question, Andersen's (1995) Revised Model predicted that "population characteristics," "environmental factors," and "health behavior" would collectively explain a significant proportion of the variance in predicting a variety of health outcome measures. Finally, for the third research question, the Health Belief Model stated that "barriers" to implementing health behavior would explain a significant proportion of the variance in predicting outcome.

Directional Hypotheses

Less implicit in each model are the nature of the relationships between the individual predictors and outcome variable, i.e., the univariate effects. To ascertain hypotheses concerning these specific relationships, it was necessary to turn to the research literature and, at times, rely on deductive reasoning. The rationale for inclusion of the predictors employed in this study is described below. Tables 1 through 4 display directional hypotheses for all outcome variables tested for each of the three research questions. Because of the differences in the organization of family planning services, culture, and health outcome (e.g., unintended pregnancy) in the U.S. and Finland, *country* was included as a predictor. It was typically hypothesized that living in Finland would be associated with more favorable health outcomes (e.g., more reliable contraceptive use). For five of the predictor variables, the nature of the relationships with several outcome measures were expected to vary according to country. These predictors (*age, urban residence, education, employment status, occupational status*) will be described first.

Age. In the United States, rates of unintended pregnancy were highest among younger women (aged 15-19) and older women (aged 40-44; AGI, 1993b). It was predicted that U.S. women in these age groups would use less reliable birth control methods and utilize family planning services less frequently. Thus, a quadratic rather than linear relationship with age was predicted for several outcome variables (*family planning service utilization, current birth control, and history of birth control*) in the

Table 1

Predicted Direction of Univariate and Interaction Effects for Research Question 1

<u>Predictors</u>	<u>Utilization of Family Planning Services</u>
Age	U.S.: - quadratic Finland: none
Marital Status ^a	+
Education	U.S.: + Finland: none
Occupational Status ^b	+
Employment Status ^c	U.S.: + Finland: none
Knowledge	+
Country ^d	+
Urban Residence ^e	U.S.: + Finland: none

Note. "+" indicates a positive, linear relationship between the outcome and predictor; "-" indicates a negative, linear relationship.

^a Single = 1; Widowed/Divorced/Separated = 2; Cohabiting = 3; Married = 4.

^b Lower = 0; Upper = 1.

^c Unemployed = 0; Student/Housewife = 1; Employed = 2.

^d United States = 0; Finland = 1.

^e Rural = 0; Suburban = 1; Urban = 2.

Table 2

Predicted Direction of Univariate and Interaction Effects for Birth Control and Knowledge Outcomes for Research Question 2

Predictors	Outcome	
	Birth Control ^a	Knowledge ^b
Country ^c	-	+
Urban Residence	U.S.: - F: none	U.S.: + F: none
Age	U.S. + quadratic F: none	+
Marital Status ^d	-	+
Education	U.S.: - F: none	+
Occupational Status ^e	U.S.: - F: none	+
Employment Status ^f	U.S.: - F: none	+
Knowledge	-	n.a.
Family Planning ^g Utilization	-	+
Preventative Services ^g Utilization	-	+
History of Birth ^h Control	+	-

Note. "+" indicates a positive, linear relationship between the outcome and predictor; "-" indicates a negative, linear relationship.

n.a. = not applicable.

^a Includes *Current* and *History of Birth Control*. Lower scores indicate more reliable method use; higher scores reflect use of less reliable methods.

^b Includes three knowledge items.

^c United States = 0; Finland = 1.

^d Single = 1; Widowed/Divorced/Separated = 2; Cohabiting = 3; Married = 4.

^e Lower = 0; Upper = 1.

^f Unemployed = 0; Student/Housewife = 1; Employed = 2.

^g Number of visits in previous year.

^h Entered into equation with *Current Birth Control* as outcome only.

Table 3

Predicted Direction of Univariate and Interaction Effects for Abortion, Female Sterilization, and Unintended Pregnancy for Research Question 2

<u>Predictors</u>	<u>Abortion</u>	<u>Female Sterilization</u>	<u>Unintended Pregnancy</u>
Country ^a	-	-	n.a.
Urban Residence	U.S.: + F: none	-	-
Age	+	+	+
Marital Status ^b	-	+	-
Education	U.S.: - F: none	-	-
Occupational Status ^c	n.a.	n.a.	-
Employment Status ^d	n.a.	+	-
Knowledge	-	n.a.	-
Family Planning Utilization ^e	-	n.a.	-
Preventive Services Utilization ^e	-	n.a.	-
History of Birth Control ^f	+	-	+

Note. "+" indicates a positive, linear relationship between the outcome and predictor; "-" indicates a negative, linear relationship.

n.a. = not applicable.

^a United States = 0; Finland = 1.

^b Single = 1; Widowed/Divorced/Separated = 2; Cohabiting = 3; Married = 4.

^c Lower = 0; Upper = 1.

^d Unemployed = 0; Student/Housewife = 1; Employed = 2.

^e Number of visits in previous year.

^f Lower scores indicate a history of more reliable method use; higher scores reflect use of less reliable methods.

Table 4

Predicted Direction of Univariate and Interaction Effects for Birth Control, Family Planning Utilization and Unintended Pregnancy for Research Question 3

<u>Predictors</u>	<u>Birth Control^a</u>	<u>Family Planning Utilization</u>	<u>Unintended Pregnancy</u>
Country ^b	-	+	n.a.
Knowledge	-	+	-
Education	U.S.: - F: none	U.S.: + F: none	-
Urban Residence ^c	U.S.: - F: none	U.S.: + F: none	n.a.
Employment Status ^d	n.a.	U.S.: + F: none	n.a.
Occupational Status ^e	n.a.	+	-

Note. "+" indicates a positive, linear relationship between the outcome and predictor; "-" indicates a negative, linear relationship.

n.a. = not applicable

^a Includes *Current and History of Birth Control*.

^b United States = 0; Finland = 1.

^c Rural = 0; Suburban = 1; Urban = 2.

^d Unemployed = 0; Student/Housewife = 1; Employed = 2.

^e Lower = 0; Upper = 1.

U.S. only.

Urban Residence. As discussed earlier, receipt of health care in Finland is determined by geographical residence, as services are equitably distributed across the nation. Further, family planning services in Finland are integrated with primary care, making services highly accessible. In contrast, family planning services in the U.S. tend to be provided separately from primary care, and women residing in rural areas may find family planning services less accessible than in urban areas.⁶ In this study, it was predicted that *urban residence* would be associated with increased *family planning service utilization, abortions, and knowledge*, and more reliable *current and history of birth control* use in the U.S. only.

Education. Higher levels of education are frequently associated with better health outcomes (e.g., Parker, Williams, Baker, & Nurss, 1996). With regard to the variables of interest in this study, women with a high school degree or more have fewer unintended pregnancies and increased contraceptive use than women who did not complete high school (Parker et al., 1996). Therefore, more *education* was hypothesized to predict generally more favorable outcomes.

Employment Status; Occupational Status. Unlike Finland, the receipt of and access to health care in the U.S. is primarily determined by having medical insurance (and being employed) or by the ability to pay. Therefore, these measures were more

⁶Recall that 98% of U.S. abortion providers were located in urban settings (Jones et al., 1989).

relevant to the U.S. than Finland (although equivalent measures were obtained in both countries for comparative purposes). Because no direct measure of income and medical insurance was available in both countries,⁷ two predictors (*employment status* and *occupational status*) were employed to approximate access to medical services. Previous research has reported that increased rates of unintended pregnancy were associated with being unemployed and lower socioeconomic status (Parker et al., 1996). Across research questions, it was generally predicted that U.S. women who were *unemployed* and/or had lower *occupational status* would have poorer health outcomes (e.g., less frequent *utilization of family planning services*, less reliable *current and history of birth control*). In Finland, it was predicted that *employment status* and *occupational status* would be unrelated to outcome because of the nature of their health care system in which universal health care access is required by law.

Marital Status. In the U.S. and Finland, previous studies have reported fewer abortions among married compared to single women (NCHS, 1993; Ritamies, 1993). Further, a greater proportion of U.S. married women used some method of contraception, although trends differed across method type.⁸ In Finland, though,

⁷Income was obtained in the U.S. survey but not in the Finnish survey; however, receipt of public medical assistance was not assessed in the U.S. Differences in the structure of the health care systems and allocation of resources in both countries would have made comparisons difficult in this regard.

⁸For example, oral contraceptive use was greater among single women compared to married women. Male and female sterilization was most common among previously married women (widowed, divorced, separated), followed by married

trends in some reproductive outcome variables according to marital status are not frequently reported due to socio-cultural differences in the significance of marriage.⁹ Therefore, the inclusion of *marital status* as a predictor in this study was primarily exploratory and partly based on the trends described (i.e., as noted in Tables 1, 2, and 3, it was hypothesized that being married would be associated with more favorable health outcomes such as increased *family planning service utilization*, more reliable *contraceptive use*, increased *knowledge*, and fewer *abortions* and *unintended pregnancies*).

Other predictors. The remaining predictor variables (*knowledge*, *family planning service utilization*, *preventive service utilization*, and *contraceptive use*) are non-demographic and more clearly related to the categories of the Andersen (1968, 1995) Models and HBM.

Knowledge. Lack of knowledge about contraception and reproduction has been cited as an important contributor to unintended pregnancy (Heinrich, 1993; Parker et al., 1996). Although results from intervention programs designed to

women, then single women (NCHS, 1993).

⁹This may be partially due to the fact that cohabitation is a more frequent and institutionally accepted arrangement in Finland than in the U.S. That is, couples live together and have children without becoming legally married. A distinct tax code exists for this situation in Finland because of its frequent occurrence. In this study, 22% of Finnish women were cohabiting, compared to 5% of U.S. women; percentages of women who were married were similar in both countries (46% in Finland; 48% in the U.S.).

increase knowledge have reported mixed results, some have demonstrated that increased knowledge was associated with increased contraceptive use (Eisen, Zellman, & McAlister, 1985; Marsh & Wirick, 1991). In the present study, it was hypothesized that increased *knowledge* would be associated with more positive health outcomes (e.g., more reliable contraceptive use, fewer abortions and unplanned pregnancies).

Family Planning Service Utilization/Preventive Services Utilization.

Engaging in a variety of health-promoting behaviors has been associated with consistent contraceptive use (Felton, 1996). Similarly, Andersen's (1995) Revised Model stated that "health behavior" was an important contributor to health outcome. In this study, it was expected that utilization of preventive medical services (e.g., annual blood pressure and PAP screenings) and family planning services, which are recommended health-promoting behaviors, would be associated with more favorable health outcomes (e.g., more reliable contraceptive use).

Contraceptive Use. Andersen's (1995) Revised Model stated that "health behavior" was important contributor to health outcome. In the present study, it was predicted that a history of more reliable *contraceptive use* would be associated with increased positive health outcomes (e.g., fewer abortions and unplanned pregnancies).

METHOD

Description of Sample

In order to examine the research questions, two sets of data, one from the

United States and the other from Finland, were examined. The U.S. data set was drawn from the 1988 National Survey of Family Growth (NSFG), which was conducted by the National Center for Health Statistics (U.S. Department of Health and Human Services [U.S. DHHS], 1988). The second, from Finland, was collected in 1994 by the National Research and Development Center for Welfare and Health (a division within the Ministry of Health that is somewhat equivalent to NCHS in the U.S.) in collaboration with the author.

United States Data Base

Based on sampling following a multistage stratified cluster design, the NSFG is implemented every several years.¹⁰ Potential participants were drawn from households in which someone had been interviewed for another NCHS survey (the National Health Interview Survey) between 1985 and 1987. African-American women were oversampled in order to increase the reliability of the data compared to previous cycles of the NSFG survey. Interviews were completed with 8,450 women¹¹ (79% final response rate) aged 15-44 living in the noninstitutionalized, civilian population of the United States between January and August 1988. Interviews were conducted by trained female interviewers in the respondent's home and lasted an

¹⁰Although the NSFG was most recently implemented in 1995, the 1988 Cycle IV data were employed because they were the most current data available at the time this study was conducted.

¹¹The race distribution of the final sample was white (N=5,354), black (N=2,771), and other races (N=325).

average of 70 minutes. A wide range of topics related to family planning were covered, including past and current contraceptive use, family formation, pregnancy and childbearing history, infertility, abortion, maternal and infant health, use of medical family planning services, marital history, sexual behavior, sexually transmitted diseases and AIDS, knowledge of, attitudes toward and opinions about a variety of family planning issues, and multiple demographic variables.

Finnish Data Base

A sample of 3,000 women aged 18-44 was randomly selected from Finland's National Population Registry. In May and June of 1994, potential participants were mailed surveys on family planning concerns, including contraception, abortion, pregnancies and children, use and evaluation of family planning services, infertility, prenatal care and labor, satisfaction with health care, and demographic information. A subset of questions from the NSFG were replicated in this survey for the purpose of the cross-national comparison in the present study. Unlike the NSFG, this was a one-time survey that was designed to assess the current state of primary and preventive health care in Finland,¹² using family planning as an example. The participants were identified by code number only and provided envelopes for return in order to ensure confidentiality and anonymity. Reminders and a second questionnaire were sent to

¹²The organization of health care in Finland, which has traditionally been highly centralized, has undergone some changes since 1993. Specifically, decision making and financial allocation of resources now occur at the local level. The impact of these changes had not been assessed prior to this survey.

those who did not respond to the first mailing. The final response rate was 74% of women (N=2,189).¹³

Measures

This study involved only those variables that were common to the surveys in both the United States and Finland. Note that some variables were conceptualized at different times as an outcome variable and predictor depending on the model being tested. For the sake of clarity, measures will be described according to the research question being investigated.

Measures Included in Research Question 1¹⁴

Outcome Variable for Research Question 1

The original Andersen (1968) model, tested in the first research question, defined one outcome variable: *utilization of family planning services*. Respondents

¹³Among the 3,000 women identified, 41 could not be located (living abroad, address unknown) or were ineligible (mentally retarded).

¹⁴Several dependent variables and predictors that were initially intended to be included were excluded in the final analyses; however, other variables were added (e.g., history of contraceptive use). Reasons for items' not being usable fell into one of the following categories: (a) upon closer examination of the actual data sets, items were coded incompatibly or were otherwise incomparable between the two countries, and (b) coding or classifying variables according to an ordinal scale (rather than nominal) was not possible. Such variables included family planning service utilization by setting and provider, income, availability of health care in community, and frequency of need for contraception. Other available outcome variables were omitted a priori because they were less directly related to the primary research questions (e.g., number of miscarriages, number of live births, satisfaction following sterilization).

were asked to report the number of visits made to a doctor, nurse, or other professional for family planning concerns in the previous 12 months. The distribution of values for this variable ranged from 0 to 25 visits ($\underline{M} = 1.21$; $\underline{SD} = 1.93$ in the U.S.; $\underline{M} = 0.73$; $\underline{SD} = 1.15$ in Finland).

Predictor Variables for Research Question 1

Predictor variables will be described according to the categories of Andersen's (1968) original model: "predisposing characteristics," "enabling resources," and "need variables."

Predisposing characteristics. Andersen defined "predisposing characteristics" as consisting of demographic variables and health beliefs/knowledge, both of which were represented in these data sets.

Demographics. Among the background information that participants were asked to provide, five demographic variables were comparable between both countries: *age, education, marital status, employment status, and occupational status.* The coding of several of these variables will be described in more detail below.

Education. Women were asked to provide the type of education that they completed (e.g., highest degree obtained). This item was scored as the total number of years of education obtained.¹⁵

¹⁵In the U.S., number of years of education completed was assessed directly by the NSFG, with a maximum score of 18 years. In Finland, education was estimated by the investigator based on the highest degree obtained.

Marital status was scored as follows: single=1, widowed=2, divorced/separated=3, cohabiting=4, and married=5. When *marital status* was entered into a regression equation, it was dummy coded such that *single*, *divorced/separated*, *cohabiting*, and *married* were entered on the same block as "one" variable.

Employment status was coded into three categories: employed=2, student/housewife=1, unemployed=0. This variable was also dummy coded such that *employed* and *unemployed* were entered on one block of each regression equation.

Occupational status was obtained by categorizing participants' report of their present occupation as follows: lower (i.e., clerical, service worker)=0; upper (i.e., managerial, professional)=1.

Knowledge. Respondents' knowledge of contraception and reproduction was assessed by the following three items:¹⁶

1. *Self-reported knowledge of contraceptive methods.* "Do you know how the following methods of contraception are used?" (list of five methods provided; "yes"

¹⁶Alphas were computed to indicate the extent to which these three knowledge items were related. Interitem consistency for this combined 3-item measure was low ($\alpha=.35$). Further, given that the first question was a measure of self-reported knowledge and not a test of actual knowledge as were the second and third questions, a possible 2-item measure of "actual knowledge" was tested. Interitem consistency was also low ($\alpha=.21$); therefore, each item appeared to be assessing different facets of knowledge and remained as separate variables.

or "no" answer requested for each).¹⁷ For each "yes" answer, one point was given (scores ranged from 0, least knowledgeable, to 5, most knowledgeable).

2. *Actual knowledge of contraceptive methods.* "Which method do you think is the most effective for preventing pregnancy?" (select one of seven methods listed). Answering pill or IUD (i.e., most reliable methods according to NSFG's contraceptive efficacy scale) was given 2 points; condom or diaphragm (moderately reliable methods) was given 1 point; and rhythm method, foam, or withdrawal (least reliable methods) was scored 0 points.

3. *Reproductive knowledge.* "At what point in the menstrual cycle do you think it is easiest for a woman to become pregnant? (select one of five time periods). Only the correct answer, "approximately two weeks after menstruation begins," was given one point; all other answers were given 0 points.

In all regression equations where these three individual knowledge items were predictors, they were entered on the same block. Note that the three knowledge variables were classified according to Andersen's expanded model as both an outcome variable and a predictor (population/predisposing characteristic) in separate analyses (see below).

¹⁷The Finnish survey listed two additional methods (Norplant, morning-after pill) that were not in the NSFG. The U.S. survey included ten additional "methods" (e.g., withdrawal) that were not included in the Finnish survey. Only the five methods common to both surveys (pill, IUD, condom, diaphragm, and female sterilization) contributed to this knowledge item.

Enabling resources. Andersen defined this as consisting of personal and community resources. Two variables fell under the latter category in the present study: *country* and *urban residence*.¹⁸

Country was scored as follows: United States=0 and Finland=1.

Urban residence. Women were asked to describe their city of residence as urban (scored 2), suburban (an option in Finland only; scored 1), or rural (scored 0). This variable was designed to indicate the extent of one's access to services, some of which tend to be located in urban areas of the U.S.

Need variables. There were no variables in this study that could be classified under Andersen's category of need variables (i.e., subjective or objective need for health care).

Measures Included in Research Question 2

Outcome Variables for Research Question 2¹⁹

This research question tested Andersen's (1995) expanded model. In contrast

¹⁸Because of the documented differences between the United States and Finland regarding health care structure, *country* and *urban residence* were considered measures of community resources.

¹⁹Some outcome variables are more directly related to the original research problem regarding unintended pregnancy and ineffective contraceptive use. For example, measures of contraceptive use and family planning service utilization were obtained in both countries. However, unintended pregnancy was assessed in the U.S. survey but not in Finland's; therefore, no comparisons can be conducted for this variable. Other outcome measures are less directly related to contraceptive use and unintended pregnancy but may provide a broader picture of family planning outcome in both countries.

to the original model that defined one type of outcome variable (service utilization), the revised model defined health outcomes more broadly (e.g., perceived and evaluated health status, consumer satisfaction).

Current birth control. Participants were provided a list of contraceptive methods and asked to indicate which one(s) they were currently using.²⁰ Responses were assigned a value of 1-4 based on the NSFG's contraceptive efficacy classification system, which ranks each of the available methods according to its effectiveness rate (U.S. DHHS, 1988). For example, highly effective methods at preventing pregnancy (sterilization, pill, IUD) were scored 1, moderately effective methods (diaphragm, condom) were scored 2, unreliable methods (withdrawal, rhythm method, spermicide) were scored 3, and no method when sexually active was scored 4. When more than one current method was reported, the most reliable method was scored. Women who were not currently using contraception because they did not need it (e.g., trying to get pregnant, not sexually active) were given a score of 0 and omitted from analyses where *current birth control* was the outcome variable. Note that *current birth control* was classified according to Andersen's expanded

²⁰Two contraceptive methods, Norplant and the "morning after pill," were included as options in the Finnish survey but not in the U.S. survey. These methods were not yet offered in the U.S. at the time of data collection (1988). Norplant has been available in Finland since 1983 and in the U.S. since 1990. Comparisons of utilization rates from more recent sources indicate that Norplant is used by a similarly low proportion of women (approximately 1%) in both countries (Kantrowitz & Wingert, 1993; Nikander, 1992). The morning after pill has been recently introduced in both countries; therefore, utilization rates have not been assessed.

model as both an outcome and predictor variable; therefore, in separate regression analyses for the second research question, *current birth control* will serve as a predictor (see below).

History of birth control. Participants were asked to indicate from a list which contraceptive method(s) they had ever used. As with the *current birth control* variable, the NSFG's contraceptive efficacy classification system (U.S. DHHS, 1988) was utilized. In order to account for a history of method use that may have varied in terms of its reliability, a 1-7 point scale was devised.²¹ Women who had never used contraception because they did not need it (e.g., never sexually active) were given a score of 0 and omitted from analyses where *history of birth control* was the outcome variable. Note that *history of birth control* was classified according to Andersen's expanded model as both an outcome and predictor variable; therefore, in separate regression analyses for the second research question, *history of birth control* will serve as a predictor (see below).

Knowledge. The three knowledge variables, *self-reported knowledge of birth*

²¹As described earlier, NSFG's contraceptive efficacy classification system (U.S. DHHS, 1988) defined three categories of contraceptives: Category I (most reliable), Category II (moderately reliable), and Category III (unreliable methods). Because *history of birth control* includes all methods ever used in addition to current method, a broader classification system was needed. Seven categories were created based on the NSFG system, where lower scores indicate a history of more reliable methods and higher scores reflect a history of less reliable methods: 1=Category I methods only; 2=Category I and II methods; 3=Category II methods only; 4=Category I, III and/or II methods; 5=Category II and III methods; 6=Category III methods only; and 7=no method when sexually active.

control, actual knowledge of birth control, and reproductive knowledge, were described earlier in the section on predictors for the first research question. One regression equation was conducted for each knowledge variable using the same set of predictors. Note that these three knowledge variables will also serve as predictors in several regression analyses for the second research question.

Abortion. Women were asked to report the number of induced abortions that they have had.²²

Female sterilization. The question "have you ever undergone a sterilization operation" was asked and coded as yes (1) or no (0).

Unintended pregnancy. In the United States survey only, participants were asked whether each pregnancy that they reported was intended or unintended. The number of unintended pregnancies was divided by the number of pregnancies to yield a percentage score for each participant. All Finnish women and women who had never been pregnant were omitted from this analysis. A total of 5,861 U.S. women (69% of U.S. sample) had at least one pregnancy and received an *unintended pregnancy* score.

²²Compared to other national sources of abortion statistics in the U.S., the National Survey of Family Growth tends to underestimate the total number of abortions. Specifically, the NSFG captures only 41% of abortions reported by the Centers for Disease Control and The Alan Guttmacher Institute, which tend to utilize abortion providers as their data sources (NCHS, 1993). Implications of this discrepancy will be discussed further in a later section.

Predictor Variables for Research Question 2

Predictors for Andersen's (1995) Revised Model will be outlined below, followed by the questionnaire items by which they were operationalized. They are described according to the three dimensions that comprise the revised Andersen model: "population characteristics," "environment," and "health behavior." Each dimension of the model will be listed followed by the survey items that operationalize them.

Population characteristics. Andersen defines this category as predisposing characteristics, enabling resources, and need variables, i.e., the three categories from his original model.

Demographic variables. The five demographic variables, *age, education, marital status, employment status, and occupational status*, were described earlier in the section on predictor variables for the first research question.

Knowledge. The three knowledge items, *self-reported knowledge of birth control, actual knowledge of birth control, and reproductive knowledge*, were described earlier in the section on predictors for the first research question. These items will be entered on one block in regression analyses for the following outcome variables: *current birth control, history of birth control, abortion, and unintended pregnancy*.

Environment. Andersen defines this dimension as consisting of two components: health care system and external environment.

Country. Country subsumes a number of different environmental factors, including important differences in health care system and culture as a whole. Although for the first research question, *country* was defined as an "enabling resource" in Andersen's original model, it was more appropriate to be defined in the "environment" dimension for the second research question. Coding for *country* was described earlier in the section of predictors for the first research question.

Urban Residence. This variable was also described in the section of predictors for the first research question.

Health behavior. The health behavior dimension includes personal health practices (e.g., contraceptive use) and use of health services.

History of birth control. This variable was described earlier in the section on outcomes for the second research question. It will be included as a predictor in regression analyses for the following outcome variables: *current birth control, self-reported knowledge of birth control, actual knowledge of birth control, reproductive knowledge, abortion, female sterilization, and unintended pregnancy.*

Family planning utilization. Recall that the category "use of health services" was an outcome variable in Andersen's original model; therefore, this item was described earlier in the section on the first research question. *Family planning utilization* will be entered as a predictor in regression analyses with the following outcome variables: *current birth control, history of birth control, self-reported knowledge of birth control, actual knowledge of birth control, reproductive*

knowledge, abortion, and unintended pregnancy.

Preventive services utilization. Participants were asked, "Have you undergone any of the following examinations in the last 12 months?" Pap test, ob/gyn exam, breast examination, and blood pressure test were assessed individually. For each preventive health exam obtained, a score of one point was given. A cumulative score (0-4) was created to represent this item. Interitem consistency for this item was conducted ($\alpha=.63$).

Measures Included in Research Question 3

The third research question tested the predictive ability of the Health Belief Model's "barriers" component.

Outcome Variables for Research Question 3

Four outcome variables, all of which have been described in previous sections, will be tested in the third research question: *current birth control, history of birth control, family planning service utilization, and unintended pregnancy.*

Predictor Variables for Research Question 3

The concept of barriers as defined in the HBM has been broadened to include actual as well as perceived barriers, although the emphasis is on barriers that exist on a broader level (e.g., within the system of health care, country) rather than within the individual. Predictor variables will include *country, urban residence, self-reported knowledge of birth control, actual knowledge of birth control, reproductive knowledge, education, occupational status, and employment status*, all of which have

been defined earlier.

Data Analyses

Regression analyses were undertaken to predict a variety of health outcome measures according to different theoretical models. Prior to these regression analyses, a series of preliminary analyses were conducted, the results of which influenced the nature of the regression analyses used to answer the research questions.

Preliminary Analyses

Three types of preliminary analyses were conducted and are described as follows:

1. Frequency analyses were conducted for each outcome variable that was continuous in order to check for a sufficient range of responses. Once this criterion was met, a series of hierarchical, blocked entry regression equations were conducted for those outcome variables.

2. Intercorrelations among all predictors were computed to guard against multicollinearity. If two predictors were highly correlated (i.e., $>.5$), only one was entered in the regression equation.²³

3. For several outcome variables, a quadratic relationship with age was predicted. Separate, preliminary regression equations were conducted where only *age*

²³The correlation between the predictors *age* and *future intention to have a child* was the only one that was greater than .5. *Age* was considered to be a more important predictor because of the age difference of the two samples (see below); therefore, *future intention to have a child* was excluded.

and *quadratic expression of age* (i.e., age squared) were entered as predictors on separate blocks. If the *quadratic expression of age* increased R^2 compared to entering *age* alone (which was entered first), both predictors were entered on the same block in the main regression equation. If entering *quadratic expression of age* did not increase R^2 , then it was not included in the regression analysis. Tables displaying these preliminary regression analyses testing the *quadratic expression of age* can be obtained from the author.

Regression Analyses

Predictors were entered individually on separate blocks, with the exception of a few variables. When *quadratic expression of age* was employed in a given regression equation, it was included on the same block with *age*. Both predictors were counted as one variable when reporting the number of predictors entered into a regression equation. Further, dummy coded variables were entered on the same block and also considered to represent one variable. That is, *marital status* variables (*married, cohabiting, divorced/separated, single*) were entered on one block, as were *employment status* categories (*employed, unemployed*). When reporting the number of predictors entered in each regression equation (see Results), the number provided will count these dummy-coded variables as one variable. The three *knowledge* items (*self-reported knowledge, actual knowledge, and reproductive knowledge*) were also entered on the same block, but were counted as three separate predictor variables.

Across all regression analyses, two criteria were utilized to determine the

order in which predictor variables were entered. First, predictors that were determined to be the most important or critical to the analyses were entered early in the equation. Two predictors, *age* and *country*, met this criterion. In order to control for sampling differences in the United States (ages 15-44) and Finland (ages 18-44), *age* (and *quadratic expression of age*, when appropriate) were entered on the first block for all analyses. *Country* was deemed important because differences between the U.S. and Finland were an integral aspect of this study. Therefore, *country* was entered on the second block for all analyses.²⁴

The second criterion, the research model being tested, was used to determine the order in which predictors would be entered on the third and subsequent blocks (after the first two blocks of *age* and *country* were entered). The two Andersen models depicted the three categories that would predict health outcome (see Figures 1 and 2). Predictors were entered according to the "order" of the dimensions of the particular model being tested (although the two Andersen Models did not specify any dimension to be more important in predicting health outcome than others). For example, for the first research question, *utilization of family planning services* was the outcome variable. After the first predictors (*age*, *age quadratic*, and *country*) were entered, predictors that defined the "predisposing variables" dimension of Andersen's (1968) Original Model (e.g., demographic and knowledge variables) were entered.

²⁴Because *unintended pregnancy* was only assessed in the United States, *country* was not entered as a predictor when *unintended pregnancy* was the outcome variable.

Predictors that comprised the "enabling resources" block followed. Variables were entered in this order for the first and second research questions in accordance with Andersen's models. Because the third research question only tested the "barriers" dimension of the HBM, these predictors, which were a subset of predictors from the first two research questions, were entered in a similar order to that of the previous research questions.

For some predictors and outcome variables, an interaction effect was hypothesized and tested in a separate regression equation. Typically, the expected interaction effect would involve a different relationship for a given variable in each country. In order for an interaction effect to be probed further, one criterion had to be met: the beta weight of the interaction effect (*country* x predictor) had to be statistically significant at $p < .001$.²⁵ Probing the interaction term (if the criterion was met) would consist of obtaining the correlation coefficient between the outcome variable and predictor for each country separately.

Additional Exploratory Analyses

All of the regression analyses were also conducted using the entire Finnish

²⁵Initially, the criteria was that the beta weight of the interaction effect had to be statistically significant at $p < .05$ and a medium-sized effect. However, this was too stringent, as no interaction effects were probed. Therefore, the latter criterion was discontinued and the p value made more conservative, which increased the number of interactions that met the criteria for decomposition and probing. Note that there was only a small difference in the number of interaction effects that met the $p < .001$ criterion compared to less conservative p values.

sample (N=2,189) and a U.S. subsample (N=2,449; described below). It was hypothesized that differences between the U.S. and Finland, if found in the previous analyses, could be attributable to a number of differences between the two countries (e.g., race, religiosity). That is, U.S. women as a whole are more diverse than Finnish women. In order to detect differences in reproductive health outcomes between the U.S. and Finland that could partially be explained by their different health care systems or other systemic factors, an attempt was made to minimize this diversity in the U.S. sample. An American subsample was designed to be similar to the Finnish sample, i.e., more homogeneous in terms of its demographics and similar in terms of the total sample size. A list of important criteria was made, and women were eliminated from the U.S. sample until the total N was similar to that of the Finnish sample. First, women who were younger than 18 were omitted from the U.S. sample, because the Finnish survey was not administered to this age group. Subsequently, U.S. women who were white and Protestant were selected, as well as those who had not received religious education (i.e., attended public school).²⁶ Regression analyses were conducted for the same three research questions, outcome variables, and predictors using this reduced sample.

²⁶The Finnish population as a whole tends to be less religious compared to the United States. As discussed earlier, religiosity has an impact on contraceptive and sexual behavior (Mosher & McNally, 1991). Therefore, U.S. women who attended public school (as opposed those who received religious schooling) were selected to match the Finnish sample.

RESULTS

Descriptive statistics for each country are provided in Table 5. Demographic information and means on relevant predictor and outcome variables are included.²⁷

Table 6 presents intercorrelations of predictors for the three research questions.

For all regression analyses, power was in excess of .99, which is sufficient to detect small effect sizes. In this study, a small multivariate effect size was defined as $R^2=.02$, a medium effect $R^2=.13$, and a large effect $R^2=.51$ (Cohen, 1988).

Statistically significant univariate effect sizes were defined according to the magnitude of the correlation between the predictor and outcome:²⁸ small or weak, $r=.1$; medium or moderate, $r=.3$; large, $r=.5$.

In the sections that follow, results for each of the three research questions will be presented separately. Included in each section will be descriptions of the multivariate, univariate, and interaction effects for each outcome variable tested.

Research Question 1: Regression Analyses Investigating

Andersen's (1968) Original Health Service Utilization Model

Andersen's (1968) Model states that three types of factors account for utilization of health services: predisposing characteristics (including *demographics*,

²⁷It should be noted that normative data from the present study were generally comparable to other national surveys (e.g., Nikander, 1992).

²⁸This correlation, rather than the beta weight, was used to determine the size of the univariate effect because r is not affected by the number of predictors entered in a given regression equation.

Table 5

Means and Standard Deviations for Predictor and Outcome Variables in the United States and Finland

Measures	United States			Finland		
	n	M	(SD)	n	M	(SD)
Predictors						
Age	8,450	29.50	(8.13)	2,179	31.51	(7.41)
Marital Status ^a	8,450	2.66	(1.37)	2,184	2.89	(1.24)
Education	8,450	12.57	(2.52)	2,150	11.86	(3.01)
Occupational Status ^b	7,378	.65	(.48)	2,189	.70	(2.21)
Employment Status ^c	8,412	1.64	(.51)	2,159	1.53	(.73)
Urban Residence ^d	8,450	1.55	(.84)	2,189	1.52	(1.19)
Preventive Services Utilization ^e	8,450	2.86	(1.58)	2,172	2.51	(1.26)
Outcome Variables						
Family Planning						
Utilization ^e	5,130	1.21	(1.93)	2,153	.73	(1.15)
Current Birth Control ^f	8,444	1.10	(1.12)	1,807	1.20	(.67)
History of Birth Control ^f	7,619	2.56	(1.43)	2,189	2.74	(1.42)
Self-Reported						
Knowledge	8,447	4.18	(1.12)	2,186	4.04	(1.03)
Actual Knowledge	8,434	1.78	(.53)	2,167	1.87	(.35)
Reproductive						
Knowledge	8,445	.42	(.49)	2,164	.78	(.42)
Abortions	8,450	.18	(.54)	2,189	.16	(.45)
Female Sterilization ^g	8,450	.25	(.43)	2,189	.51	(1.88)
Unintended Pregnancy ^h	5,861	.51	(.40)	-	-	

^a Single = 1; Widowed/Divorced/Separated=2; Cohabiting = 3; Married = 4.

^b Lower = 0; Upper = 1.

^c Unemployed = 0; Student/Housewife = 1; Employed = 2.

^d Rural = 0; Suburban = 1; Urban = 2.

^e Number of visits in previous year.

^f Lower scores indicate a history of more reliable method use; higher scores reflect use of less reliable methods.

^g Sterilized = 1; Not sterilized = 0.

^h Proportion of pregnancies that were unintended.

Table 6

Correlations Among Predictor Variables for All Research Questions

Measures	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Country ^a	-	.10***	.07***	-.11***	.02	-.08***	-.01	-.09***	.13***	.03***	.05***	-.05***	.06***	.29***
2. Age		-	.49***	.17***	.01	.21***	-.02	.06***	-.20***	.06***	-.11***	.17***	.07***	.15***
3. Marital Status ^b			-	.12***	.01	.13***	-.10***	.11***	-.04***	.08***	-.11***	.14***	.09***	.20***
4. Education				-	.12***	.23***	.11***	.17***	-.01	.04***	-.03**	.28***	.16***	.24***
5. Occupational Status ^c					-	.01	.03**	.00	-.03**	.01	.01	.03**	.01	.05***
6. Employment Status ^d						-	.00	.10***	-.02	-.02	-.08***	.10***	.07***	.07***
7. Urban Residence ^e							-	.04***	.02	.02	.00	.02*	.01	-.01
8. Preventive Services Utilization ^f								-	.29***	.04***	-.16***	.13***	.11***	.02*
9. Family Planning Utilization ^f									-	-.11***	-.15***	.04**	.06***	.07***
10. Current Birth Control ^g										-	.13***	.01	-.02*	.06***
11. History of Birth Control ^g											-	-.11***	-.16***	.05***
12. Self-Reported Knowledge												-	.17***	.17***
13. Actual Knowledge													-	.12***
14. Reproductive Knowledge														-

Table 6 , cont'd.

a United States = 0; Finland = 1.

b Single = 1; Widowed/Divorced/Separated = 2; Cohabiting = 3; Married =4.

c Lower = 0; Upper = 1.

d Unemployed = 0; Student/Housewife = 1; Employed = 2.

e Rural = 0; Suburban = 1; Urban = 2.

f Number of visits in previous year.

g Lower scores indicate a history of more reliable method use; higher scores reflect use of less reliable methods.

* $p < .05$; ** $p < .01$; *** $p < .001$.

knowledge), enabling resources (e.g., community resources), and need variables (e.g., perceived need for health care). One outcome variable was tested using this model.

Outcome Variable: Family Planning Service Utilization

Table 7 displays the results of the regression analysis that examined the efficacy of Andersen's (1968) Model in predicting the number of visits to family planning service providers in the past year. A total of 10 variables were entered as predictors in a hierarchical, blocked-entry fashion. The outcome variable was *family planning service utilization*. As Table 7 indicates, the array of variables entered according to Andersen's (1968) Original Model accounted for 7% of the variance in predicting *family planning service utilization*, reflecting a small multivariate effect. Among the five significant univariate effects, two *knowledge* variables were in the hypothesized direction. That is to say, increased visits to family planning service providers in the past year was associated with increased *self-reported knowledge of birth control* and *actual knowledge of birth control*. The remaining three significant univariate effects were not in the hypothesized direction and can be described as follows: Increased *utilization of family planning services* was associated with (a) living in the United States, (b) lower *occupational status*, and (c) less *reproductive knowledge*. All significant univariate effects were considered to be small (absolute values of r ranged from .03 to .13).

Interaction effects. Four interactions were hypothesized, each reflecting the moderating effects of *country* on the relationship between another predictor and the

Table 7

Regression Analysis Testing Andersen's (1968) Original Health Service Utilization Model to Predict Utilization of Family Planning Services

<u>Predictors</u>	<u>Number of Family Planning Visits in Past Year</u>	
	β	r^a
<u>Predisposing Characteristics</u>		
<u>Demographics</u>		
Age	-.12	-.20***
Age/Quadratic Term	-.12	
<u>Marital Status</u>		
Married	-.04	-.06***
Cohabiting	-.01	.01
Divorced/Separated	-.04	-.03**
Single	-.12	.05***
Education	-.01	-.01
Occupational Status	-.03*	-.03**
<u>Employment Status</u>		
Employed	-.01	-.04***
Unemployed	-.01	-.03**
<u>Knowledge Variables</u>		
Self-reported Knowledge of Birth Control	.05***	.04**
Actual Knowledge of Birth Control	.08***	.06***
Reproductive Knowledge	-.04**	-.07***
<u>Enabling Resources</u>		
Country ^b	-.10***	-.13***
Urban Residence	.02	.02
<hr/>		
R	.26	
R^2	.07***	
	(n=6,715)	

Note. Women who did not need family planning services in the past year were not included in this analysis.

^a Point biserial correlation coefficients are provided for the following dichotomous predictor variables: marital status, occupational status, employment status, reproductive knowledge, and country.

^b United States=0; Finland=1.

* $p < .05$; ** $p < .01$; *** $p < .001$.

outcome, *family planning service utilization*. Specifically, *country* was expected to interact with the predictors (a) *quadratic expression of age*, (b) *education*, (c) *employment status*, and (d) *urban residence*. As indicated in Table 8, none of these interactions met the criterion for decomposition and probing (i.e., statistically significant at $p < .001$).

Research Question 2: Regression Analyses Investigating

Andersen's (1995) Revised Model

A series of multiple regression analyses were conducted to test Andersen's (1995) Revised Model, which states that three types of factors account for health outcomes: "population characteristics" (the three categories from his Original Model, which include demographics and knowledge), "environmental factors" (e.g., health care system), and "health behavior." Specifically, eight outcome variables were employed in separate regressions. Those outcome variables included: *current birth control*, *history of birth control*, three *knowledge* variables (*self-reported knowledge of birth control*, *actual knowledge of birth control*, and *reproductive knowledge*), *abortion*, *female sterilization*, and *unintended pregnancy*. The regression analyses for each of these outcome variables will be presented separately in the sections that follow.

Outcome Variable: Current Birth Control

Table 9 displays the results of the regression analyses that examined the efficacy of Andersen's (1995) Revised Model predicting the reliability of current

Table 8

Regression Analyses Using Interaction Terms to Predict Utilization of Family Planning Services According to Andersen's (1968) Original Model

<u>Predictors for Interaction #1</u> <u>Year</u>	<u>Number of Family Planning Visits in Past</u>	
	β	r^a
Age	.25**	-.19***
Age/Quadratic Term	-.49***	
Country ^b	-.20	-.06***
Country x Age	-.57*	
Country x Age/Quadratic Term	-.85	
<hr/>		
R	.23	
R ²	.05***	
	(n=7,273)	
<hr/>		
<u>Predictors for Interaction #2</u>		
Education	-.04**	-.01
Country ^b	-.22***	-.06***
Country & Education	.10	
<hr/>		
R	.13	
R ²	.02***	
	(n=7,246)	
<hr/>		
<u>Predictors for Interaction #3</u>		
Employed	-.04**	-.04***
Unemployed	-.02	-.03**
Country ^b	-.10***	-.06***
Country x Employed	-.03	
Country x Unemployed	-.01	
<hr/>		
R	.13	
R ²	.02***	
	(n=7,236)	

Table 8. cont'd.

Number of Family Planning Visits in Past Year

<u>Predictors for Interaction #4</u>	<u>β</u>	<u>r</u>
Urban Residence	.03	.02
Country ^b	-.10***	-.06***
Country x Urban Residence	-.03	
<hr/>		
R	.13	
R^2	.02***	
	(n=7,283)	

Note. Women who did not need family planning services in the past year were not included in these analyses.

^a Point biserial correlation coefficients are reported for country.

^b United States=0; Finland=1.

*p<.05; **p<.01; ***p<.001.

Table 9

Regression Analyses Testing Andersen's (1995) Revised Model to Predict Reliability of Contraceptive Use

Predictors	Reliability of Contraceptive Use ^a			
	Current Birth Control ^b		History of Birth Control ^c	
	β	r^d	β	r^d
<u>Environment</u>				
Country ^e	-.15***	-.13***	-.02	.04***
Urban Residence	.03*	.04***	.00	.00
<u>Population Characteristics</u>				
Age	.14	-.10***	-.98***	-.09***
Age/Quadratic Term	-.19*		.86***	
Education	-.01	-.00	.10***	.08**
<u>Marital Status</u>				
Married	-.15***	-.08**	.05	-.02*
Cohabiting	-.08***	-.04***	.01	-.01
Divorced/ Separated	-.08***	-.02	.01	-.06***
Single	-.05***	.12***	.06	.08***
Occupational Status	.01	.01	.00	.02
<u>Employment Status</u>				
Employed	-.03	-.06***	-.01	-.02*
Unemployed	-.01	-.02	.00	.01
<u>Knowledge</u>				
Self-Reported	-.05***	-.09***	-.01	-.02
Actual	-.07***	-.16***	-.10***	-.09***
Reproductive	.02	-.02	.13***	.13***
<u>Health Behavior</u>				
<u>Family Planning</u>				
Utilization	-.17***	-.19***	-.08***	-.10***
<u>Preventive Services</u>				
Utilization	-.02	-.09***	-.08***	-.10***
History of Birth Control	.33**	.38***	-	-
<hr/>				
R	.46		.27	
R ²	.21***		.08***	
	(n= 4,984)		(n=6,388)	

Table 9, cont'd.

Note. Dash indicates that the variable was not entered as a predictor.

^a Low scores on both variables indicate use of more reliable contraception; higher scores reflect use of less reliable methods.

^b Women who did not currently need contraception were not included in this analysis.

^c Women who have never needed contraception were not included in this analysis.

^d Point biserial correlation coefficients are reported for the following dichotomous variables: country, marital status, occupational status, employment status, and reproductive knowledge.

^e United States = 0; Finland = 1.

* $p < .05$; ** $p < .01$; *** $p < .001$.

contraceptive method.²⁹ A total of 13 variables were entered as predictors in a hierarchical, blocked-entry fashion. As Table 9 indicates, the variables entered according to Andersen's (1995) Revised Model accounted for 21% of the variance in predicting *current birth control*, a medium-sized multivariate effect. Among the seven significant univariate effects, five were in the hypothesized direction: more effective *current birth control* use was associated with: (a) living in Finland, (b) greater *self-reported knowledge of birth control*, (c) greater *actual knowledge of birth control*, (d) increased *family planning service utilization* in the past year, and (e) a history of effective birth control use. There were two significant univariate effects that were not in the hypothesized direction: more effective *current birth control* use was associated with (a) residing in a rural area (interaction predicted), and (b) being younger (e.g., 15-20) and older (e.g., 39-44). Regarding *marital status*, the change in R^2 (and F value) after entering the *marital status* block was examined, rather than the individual beta weights of the dummy coded categories, to determine its significance

²⁹To provide context for the findings, frequency analyses of current birth control methods by country were conducted. Among women who needed contraception (i.e., sexually active women who were not seeking pregnancy or infertile), 67% of U.S. women were using a highly reliable method (defined as female or male sterilization, oral contraceptives, IUD, Norplant) compared to 73% of Finnish women. As noted earlier, female sterilization is more frequently selected in the U.S. than in Finland, where IUDs are a more common method. In addition, the proportion of sexually active women who used either an unreliable method (e.g., withdrawal, spermicide alone, rhythm method) or no method was 17% in the U.S. and 3% in Finland.

as a predictor. These changes were negligible; therefore, *marital status* did not explain a significant portion of the variance for *current birth control*. Six of the seven significant univariate effects described were considered small (absolute values of r ranged from .01 to .19). One significant univariate effect, *history of birth control*, was a medium-sized effect ($r=.38$).

Interaction effects. Five interactions were hypothesized, each reflecting the moderating effects of *country* on the relationship between another predictor and the outcome (*current birth control*). Specifically, *country* was expected to interact with the predictors (a) *quadratic expression of age*, (b) *education*, (c) *employment status*, (d) *occupational status*, and (e) *urban residence*. As indicated in Table 10, two interaction effects (*country x quadratic expression of age*, *country x urban residence*) met the criteria for decomposition and probing (i.e., the beta weight of the interaction effect was statistically significant at $p<.001$) and are described below.

Country x Quadratic Expression of Age. Decomposition and probing of this interaction were conducted in a variety of ways (e.g., scatterplots and correlations of the relationship between the outcome, *current birth control*, with *age*, and then with *country*). No clear pattern emerged when scatterplots and correlations were examined. It was hypothesized that younger and older U.S. women (but not Finnish women) would use less reliable birth control. Although no such relationship was identified in the U.S., in Finland, as predicted, *age* was unrelated to reliability of *current birth control* use.

Table 10

Regression Analyses Testing Interaction Terms to Predict Reliability of Contraceptive Use According to Andersen's (1995) Revised Model

	<u>Reliability of Contraceptive Use^a</u>			
	<u>Current Birth Control^b</u>		<u>History of Birth Control^c</u>	
	β	r^d	β	r^d
<u>Predictors for Interaction #1</u>				
Age	-.64***	-.10***	-1.02***	-.09***
Age/Quadratic Term	.53***		.95***	
Country ^e	-.29***	-.13***	-.51**	.04***
Country x Age	2.43***		1.37***	
Country x Age/Quadratic Term	-1.32***		-.86***	
R_1	.18		.15	
R^2	.03***		.02***	
	(n=7,409)		(n=9,338)	
<u>Predictors for Interaction #2</u>				
Education	-.04**	.00	.11***	.08***
Country ^e	-.23***	-.13***	.20***	.04***
Country x Education	.10*		-.15**	
R_2	.13		.10	
R^2	.02***		.01**	
	(n=7,387)		(n=9,313)	
<u>Predictors for Interaction #3</u>				
Employed	-.08***	-.06***	-.01	-.02*
Unemployed	.02	-.02	.00	.01
Country ^e	-.17***	-.13***	-.11***	.04***
Country x Employed	.05*		-.07***	
Country x Unemployed	-.02		-.04	
R_3	.15		.06	
R^2	.02***		.00***	
	(n=7,382)		(n=9,297)	

Table 10, cont'd.

	Reliability of Contraceptive Use ^a			
	Current Birth Control ^b		History of Birth Control ^c	
	β	r^d	β	r^d
Predictors for Interaction #4				
Occupational Status	.00	.01	.21***	.02
Country ^e	-.13***	-.13***	.10***	.04***
Country x Occupational Status	.00		-.21***	
<hr/>				
R	.13		.09	
R^2	.02***		.01***	
	(n=6,883)		(n=8,724)	
<hr/>				
Predictors for Interaction #5				
Urban Residence	.08***	.04***	.01	.00
Country ^e	-.07**	-.13***	.05*	.04***
Country x Urban Residence	-.09***		-.01	
<hr/>				
R	.15		.04	
R^2	.02***		.002**	
	(n=7,717)		(n=9,347)	

^aLow scores on both variables indicate use of more reliable contraception; higher scores reflect use of less reliable methods.

^bWomen who did not currently need contraception were not included in this analysis.

^cWomen who have never needed contraception were not included in this analysis.

^dPoint biserial correlation coefficients are reported for country.

^eUnited States = 0; Finland = 1.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Country x Urban Residence. The correlation between *urban residence* and the outcome (*current birth control*) was .06 ($p < .001$) in the U.S. and -.05 ($p < .05$) in Finland. Inconsistent with the hypotheses, U.S. women living in urban areas were more likely to use an unreliable birth control method than women in rural areas. The opposite pattern emerged in Finland: women living in urban areas tended to use more reliable birth control.

Outcome Variable: History of Birth Control

Table 9 displays the results of the regression analyses that examined the efficacy of Andersen's (1995) Revised Model to predict the history of reliable contraceptive use. A total of 12 variables were entered as predictors in a hierarchical, blocked-entry regression equation. As Table 9 indicates, the variables defined by Andersen's (1995) Revised Model accounted for 8% of the variance in predicting *history of birth control* use, reflecting a small multivariate effect. There were six significant univariate effects, four of which were in the hypothesized direction. Specifically, as predicted, a history of more effective birth control use was associated with: (a) being in the middle reproductive age groups (i.e., mid 20s to mid 30s), (b) increased *actual knowledge of birth control*, (c) increased *family planning service utilization* in the past year, and (d) increased *utilization of preventive services* in the past year. The two significant univariate effects inconsistent with the hypotheses were that a history of more effective birth control use was associated with: (a) less *education* and (b) less *reproductive knowledge*. All significant univariate effects were

considered weak (absolute values of r ranged from .08 to .13).

Interaction effects. Similar to the first outcome variable (i.e., *current birth control*) employed for the second research question, five variables were hypothesized to interact with *country* in predicting *history of birth control: quadratic expression of age, education, employment status, occupational status, and urban residence*. As indicated in Table 10, two interaction effects were significant (*quadratic expression of age, occupational status*).

Country x Quadratic Expression of Age. Decomposition and probing of this interaction (conducted via scatterplots and correlations of the relationship between the outcome, *history of birth control*, with *age*, and then with *country*) did not reveal any clear patterns. It was expected that younger and older U.S. (but not Finnish) women would have a history of less reliable birth control use; such hypotheses were not supported.

Country x Occupational Status. The correlation between *occupational status* and the outcome (*history of birth control*) was .09 ($p < .001$) in the U.S. and -.02 ($p = n.s.$) in Finland. As expected, there was no relation between *occupational status* and *history of birth control* in Finland. Inconsistent with the hypotheses, U.S. women with higher occupational status tended to have a history of unreliable birth control use compared to women with lower occupational status.

Outcome Variables: Three Knowledge Variables

Table 11 displays the results of the three regression analyses that examined the

Table 11

Regression Analyses Testing Andersen's (1995) Revised Model to Predict Knowledge

<u>Predictors</u>	<u>Knowledge Variables</u>					
	<u>Self-Reported Knowledge</u>		<u>Actual Knowledge</u>		<u>Reproductive Knowledge</u>	
	β	r^c	β	r^c	β	r^d
<u>Environment</u>						
Country ^e	-.03*	-.05***	.10***	.07***	.31***	.28***
Urban Residence	.00	.02*	-.01	.01	-.02*	-.01
<u>Population Characteristics</u>						
Age	.08***	.17***	.01	.08***	.00	.15***
Education	.24***	.28***	.14***	.15***	.25***	.24***
<u>Marital Status</u>						
Married	.03	.13***	.10	.07***	.14*	.18***
Cohabiting	.01	-.02	.05	.02*	.02	.04***
Div/Sep.	.02	.04***	.04	-.01	.03	-.05***
Single	-.04	-.15***	.05	-.09***	-.03	-.17***
Occupat'l St.	.00	.03**	-.01	.01	.01	-.05***
<u>Employment Status</u>						
Employed	-.02	.11***	.03**	.09***	.01	.10***
Unemployed	.01	-.04***	.01	.00	-.01	.03**
<u>Health Behavior</u>						
<u>Family Planning</u>						
Utilization	.03*	.04**	.05***	.06***	-.02	-.07***
Preventive Utiliz.	.05**	.13***	.05***	.11***	.00	.02*
<u>History of</u>						
Birth Control	-.05**	-.11***	-.14***	-.17***	.06***	.05***
<hr/>						
R	.33		.26		.43	
R ²	.11***		.07***		.19***	
	(n=6,715)		(n=6,715)		(n=6,715)	

Note. Dash indicates that the variable was not entered as a predictor.

^aWomen who did not currently need contraception were not included in this analysis.

^bWomen who have never needed contraception were not included in this analysis.

^c Point biserial correlation coefficients are reported for country, marital status, occupational status, and employment status.

^dPhi coefficients are reported for country, marital status, occupational status, and employment status; otherwise, point biserial correlations are reported.

^eUnited States = 0; Finland = 1.

* $p < .05$; ** $p < .01$; *** $p < .001$.

efficacy of Andersen's (1995) Revised Model to predict each *knowledge* measure (*self-reported knowledge of birth control, actual knowledge of birth control, and reproductive knowledge*). Findings from the regression equations predicting each of these knowledge variables will be presented separately in the ensuing paragraphs. In each equation, a total of 10 variables were entered as predictors in hierarchical, blocked-entry fashion.

Self-reported knowledge of birth control. As Table 11 indicates, the variables entered according to Andersen's (1995) Revised Model accounted for 11% of the variance in predicting self-reported knowledge of contraceptive methods, a small-sized multivariate effect. There were six significant univariate effects, five of which were in the hypothesized direction. Specifically, increased *self-reported knowledge of birth control* methods was associated with: (a) increased *age*, (b) increased *education*, (c) greater *utilization of family planning services* in the past year, (d) greater *utilization of preventive services* in the past year, and (e) a history of more reliable contraceptive use. All of the significant univariate effects described above were considered small (absolute values of r ranged from .04 to .28). One significant but weak ($r=-.05$) univariate effect that was not in the hypothesized direction indicated that increased *self-reported knowledge of birth control* was associated with living in the United States.

Interaction effect. One interaction effect was hypothesized for *self-reported knowledge of birth control: country by urban residence*. It was predicted that in the

U.S., *self-reported knowledge of birth control* would be greater for women residing in urban areas compared to rural areas. As displayed in Table 12, this effect was not significant, and the hypothesis was not supported. Therefore, no probing was necessary.

Actual knowledge of birth control. As Table 11 indicates, the variables entered according to Andersen's (1995) Revised Model accounted for 7% of the variance in predicting *actual knowledge of birth control*, a small multivariate effect. There were six significant univariate effects, all of which were in the hypothesized direction. Specifically, increased *actual knowledge of birth control* was associated with: (a) living in Finland, (b) increased *education*, (c) being employed, (d) increased *utilization of family planning services* in the past year, (e) increased *utilization of preventive services* in the past year, and (f) a history of more reliable contraceptive use. All of the significant univariate effects described were considered weak (absolute values of r ranged from .06 to .17).

Interaction effect. One interaction effect was hypothesized for *actual knowledge of birth control: country by urban residence*. It was predicted that in the U.S., *actual knowledge of birth control* would be greater for women residing in urban areas compared to rural areas. As displayed in Table 12, this effect was not significant, and the hypothesis was not supported. Therefore, no probing was necessary.

Reproductive knowledge. As displayed in Table 11, the variables entered

Table 12

Regression Analyses Testing Interaction Terms to Predict Knowledge According to Andersen's (1995) Revised Model

	Knowledge Variables					
	Self-Reported Knowledge		Actual Knowledge		Reproductive Knowledge	
Predictors for Interaction #1	β	r^a	β	r^a	β	r^b
Urban Residence	.02	.02*	-.00	.01	-.02	-.01
Country ^c	-.06***	-.05***	.05**	.07***	.27***	.28***
Country x Urban Residence	.01		.03		.02	
R	.06		.08		.29	
R ²	.003***		.01***		.08***	
	(n=10.633)		(n=10.607)		(n=10.601)	

^aPoint biserial correlation coefficient is reported for country.

^bPhi coefficient is reported for country; point biserial correlation coefficient is reported for urban residence.

^cUnited States = 0; Finland = 1.

* $p < .05$; ** $p < .01$; *** $p < .001$.

according to Andersen's (1995) Revised Model accounted for 19% of the variance in predicting *reproductive knowledge*, indicating a medium-sized multivariate effect. There were five significant univariate effects, three of which were in the hypothesized direction. Greater *reproductive knowledge* was associated with: (a) living in Finland, (b) increased *education*, and (c) being married. Findings that were not in the expected direction indicated that increased *reproductive knowledge* was associated with: (a) residing in an urban area (interaction predicted) and (b) a history of less reliable contraceptive use. All of the significant univariate effects described were considered small (absolute values of r ranged from .01 to .29).

Interaction effect. One interaction effect was hypothesized for *reproductive knowledge: country by urban residence*. It was predicted that in the U.S., reproductive knowledge would be greater for women residing in urban areas compared to rural areas. As displayed in Table 12, this effect was not significant, and the hypothesis was not supported. Therefore, no probing was necessary.

Outcome Variable: Abortions

Table 13 displays the results of the regression analyses that examined the efficacy of Andersen's (1995) Revised Model to predict number of *abortions*. A total of 11 variables were entered as predictors in a hierarchical, blocked-entry regression equation. As Table 13 indicates, the variables entered accounted for 5% of the variance in predicting *abortions*, a small multivariate effect. There were six significant univariate effects, one of which was in the hypothesized direction.

Table 13

Regression Analyses Testing Andersen's (1995) Revised Model to Predict Abortion, Female Sterilization and Unintended Pregnancy

Predictors	Outcome Variables					
	Number of Abortions ^a		Female Sterilization ^b		Unintended Pregnancy ^{a,c}	
Environment	β	r^d	β	r^e	β	r^d
Country ^f	.03	.01	-.17***	-.13***	-	-
Urban Residence	.06***	.09***	-.03*	-.05***	.06***	.10***
<u>Population Characteristics</u>						
Age	-.05**	-.09***	.40***	.40***	-.09***	-.25***
<u>Marital Status</u>						
Married	.08	-.18***	-.04	.17***	1.01***	-.34***
Cohabiting	.16***	.09***	-.03	-.05***	.59***	.10***
Divorced/Sep.	.17**	.06***	.03	.17***	.85***	.08***
Single	.20***	.13***	-.08	-.27***	1.18***	.31***
Education	.05**	.03*	-.15***	-.07***	-.05**	-.13***
Occupational Status	-	-	-	-	-.05**	-.10***
<u>Employment Status</u>						
Employed	-	-	-.05***	.04***	.04*	-.02
Unemployed	-	-	-.02	-.04***	.02	.03**
<u>Knowledge</u>						
Self Reported	.03*	.02*	-	-	-.01	-.07***
Actual	.00	.01	-	-	-.01	-.03*
Reproductive	.03	.01	-	-	-.06***	-.15***
<u>Health Behavior</u>						
<u>Family Planning</u>						
Utilization	.04**	.06***	-	-	.04*	.08***
<u>Preventive Services</u>						
Utilization	.00	.03*	-	-	.02	.05***
<u>History of</u>						
Birth Control	.02	.01	-.11***	-.17***	-.04*	-.04**
<hr/>						
R ₁	.23		.48		.45	
R ²	.05***		.23***		.20***	
	(n=4,794)		(n=9,605)		(n=3,046)	

Table 13, cont'd.

Note. Dash indicates that the variable was not entered as a predictor.

^aWomen who had never been pregnant were not included in these analyses.

^bWomen who had never needed contraception were not included in this analysis.

^cU. S. women only were included in this analysis.

^dPoint biserial correlation coefficients are reported for country, marital status, employment status, occupational status, and reproductive knowledge.

^ePhi coefficients are reported for country, marital status, employment status, occupational status, and reproductive knowledge; otherwise, point biserial correlation coefficients are reported.

^fUnited States = 0; Finland = 1.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Specifically, a greater number of *abortions* was associated with being unmarried (single, cohabiting, or divorced/separated). Significant univariate effects that were not in the hypothesized direction revealed that having a greater number of *abortions* was associated with: (a) younger *age*, (b) increased *education*, (c) residing in an urban area (interaction predicted), (d) increased *self-reported knowledge of birth control*, and (e) greater *utilization of family planning services* in the past year. All significant univariate effects were small (absolute value of r ranged from .02 to .12).

Interaction effects. Table 14 displays the two interactions hypothesized for *abortions*: *country by education* and *country by urban residence*. Only the effect size for the latter interaction term was significant.

Country x Urban Residence. The correlation between *urban residence* and the outcome (*abortion*) was .11 ($p < .001$) in the U.S. and .03 ($p = n.s.$) in Finland. Consistent with the hypotheses, abortions in the U.S. were associated with living in urban areas. There was no relation between abortions and urban-rural residence in Finland.

Outcome Variable: Female Sterilization

Table 13 displays the results of the regression analyses that examined the efficacy of Andersen's (1995) Revised Model to predict *female sterilization*. A total of 7 variables were entered as predictors in a hierarchical, blocked-entry regression equation. As Table 13 indicates, the predictors accounted for 23% of the variance in predicting *female sterilization*, a medium-sized multivariate effect. There were six

Table 14

Regression Analyses Testing Interaction Terms to Predict Abortions According to Andersen's (1995) Revised Model

<u>Predictors for Interaction #1</u>	<u>Number of Abortions^a</u>	
	β	r^b
Education	.05***	.03*
Country ^c	.16***	.01
Country x Education	-.15**	
<hr/>		
R	.05	
R ²	.002***	
	(n=7,170)	
<hr/>		
<u>Predictors for Interaction #2</u>		
Urban Residence	.12***	.09***
Country ^c	.07***	.01
Country x Urban Residence	-.08***	
<hr/>		
R	.10	
R ²	.01***	
	(n=7,187)	

^aWomen who had never been pregnant were not included in these analyses.

^bPoint biserial correlation coefficients are reported for country.

^cUnited States = 0; Finland = 1.

* $p < .05$; ** $p < .01$; *** $p < .001$.

significant univariate effects, five of which were in the hypothesized direction. Specifically, having obtained a female sterilizing operation was associated with: (a) older *age*, (b) living in the U.S., (c) residing in rural areas, (d) less *education*, and (e) a history of more effective birth control use. There was one significant univariate effect that was not in the hypothesized direction: *female sterilization* was associated with not being employed. All significant univariate effects were small (absolute values of r ranged from .06 to .20). No interactions were hypothesized for this outcome variable.

Outcome Variable: Unintended Pregnancy

Table 13 displays the results of the regression analyses that examined the efficacy of Andersen's (1995) Revised Model to predict the proportion of pregnancies that were unintended in the United States. A total of 13 variables were entered as predictors in a hierarchical, blocked-entry regression equation. This analysis excluded Finnish women (because *unintended pregnancy* was not assessed in the Finnish survey) and women who had never been pregnant. As Table 13 indicates, the predictors accounted for 20% of the variance in predicting *unintended pregnancy*, reflecting a medium-size multivariate effect. There were nine significant univariate effects, four of which were in the hypothesized direction. Specifically, a higher proportion of *unintended pregnancies* was associated with: (a) being unmarried, (b) less *education*, (c) lower *occupational status*, and (d) decreased *reproductive knowledge*. The remaining significant univariate effects were not predicted and

indicated that a higher proportion of *unintended pregnancies* was associated with: (a) decreased *age*, (b) residing in an urban area, (c) being employed, (d) increased *utilization of family planning services* in the past year, and (e) a history of more reliable birth control use. All univariate effects were weak (absolute values of r ranged from .02 to .25), with the exception of a medium-sized effect for *marital status*. No interactions were hypothesized for this outcome variable.

Research Question 3: Regression Analyses Investigating

Health Belief Model's "Barriers" Component to Predict Outcome

Four outcome variables were employed in investigating the efficacy of the Health Belief Model's (HBM) "barriers" component in predicting health outcome: *current birth control*, *history of birth control*, *family planning service utilization*, and *unintended pregnancy*. Results of the regression analyses for each of these outcome variables will be presented separately in the paragraphs that follow.

Outcome Variable: Current Birth Control

Table 15 displays the results of the regression analyses that examined the efficacy of the "barriers" component of the HBM to predict the reliability of *current birth control*. A total of six variables were entered as predictors in hierarchical, blocked-entry fashion. As Table 15 indicates, the variables entered accounted for 5% of the variance in predicting *current birth control*, a small multivariate effect. Among the five significant univariate effects, three were in the hypothesized direction: more effective *current birth control* use was associated with (a) living in Finland, (b)

Table 15

Regression Analyses Testing Health Belief Model's Barriers Component to Predict Outcome

Predictors	Outcome Variables							
	Current Birth Control ^a		History of Birth Control ^b		Family Planning Utilization		Unintended Pregnancy ^c	
	β	r	β	r	β	r	β	r
Country ^d	-.14***	-.13***	.02	.04***	-.11***	-.06***	-	-
Knowledge								
Self-Reported	-.10***	-.09***	-.04***	-.02	.04**	.04**	.02	.07***
Actual	-.14***	-.16***	.07***	.08***	-.02	-.01	-.08***	-.13***
Reproductive	.05***	-.02	.12***	.13***	-.04**	-.07***	-.11***	-.15***
Education	.00	.00	.07***	.08***	-.02	-.01	-.08***	-.13***
Urban Residence	.04***	.04***	.00	.00	.02	.02	.11***	.10***
Employment Status								
Employed	-	-	-	-	-.05***	-.04***	-	-
Unemployed	-	-	-	-	-.02	-.03***	-	-
Occupational Status	-	-	-	-	-.02*	-.03***	-.06***	-.11***
R	.23		.18		.17		.22	
R ²	.05***		.03***		.03***		.05***	
	(n=7,368)		(n=9,287)		(n=6,715)		(n=5,218)	

Note. Dash indicates that the variable was not entered as a predictor.

^aWomen who did not currently need contraception were not included in this analysis.

^bWomen who have never needed contraception were not included in this analysis.

^cU.S. women who had had at least one pregnancy were included in this analysis.

^dUnited States = 0; Finland = 1.

*p<.05; **p<.01; *** p<.001.

increased *self-reported knowledge of birth control*, and (c) increased *actual knowledge of birth control*. The two significant univariate effects that were not in the expected direction indicated that more effective *current birth control* use was associated with: (a) decreased *reproductive knowledge* and (b) living in an urban area (interaction predicted). All of the significant univariate effects described were considered small (absolute values of r ranged from .02 to .16).

Interaction effects. *Country* was hypothesized to interact with (a) *urban residence* and (b) *education*. As indicated in Table 16, both interaction effects were statistically significant: however, only *country x urban residence* met the criterion for decomposition and probing.

Country x Urban Residence. The correlation between *urban residence* and the outcome (*current birth control*) was .06 ($p < .001$) in the U.S. and -.05 ($p < .05$) in Finland. Inconsistent with the hypotheses, living in an urban area in the U.S. was associated with less reliable current birth control use compared to living in a rural area. Conversely, in Finland, living in an urban area was correlated with more reliable current birth control use.

Outcome Variable: History of Birth Control

Table 15 displays the results of the regression analyses that examined the efficacy of the "barriers" component of the HBM to predict the history of reliable contraceptive use. A total of six variables were entered as predictors in a hierarchical, blocked-entry fashion. As Table 15 indicates, the variables entered accounted for 3%

Table 16

Regression Analyses Using Interaction Terms to Predict Outcome According to Health Belief Model's Barriers Component

	Outcome Variables					
	Current Birth Control ^a		History of Birth Control ^b		Family Planning Utilization	
	β	r	β	r	β	r
Predictors for Interaction #1						
Education	-.04**	.00	.11***	.08***	-.04**	-.01
Country ^c	-.23***	-.13***	.20***	.04***	-.22***	-.06***
Country x Education	.10*	-.12***	-.15**	.04***	.10	
R	.13		.10		.13	
R ²	.02***		.01***		.02***	
	(n=7,387)		(n=9,313)		(n=7,246)	
Predictors for Interaction #2						
Urban Residence	.07***	.04***	.01	.00	.03	.02
Country ^c	-.06**	-.13***	.05*	.04***	-.10***	-.06***
Country x Urban Residence	-.09***	-.11***	-.01	.03**	-.03	
R	.15		.04		.13	
R ²	.02***		.002**		.02***	
	(n=7,417)		(n=9,347)		(n=7,283)	
Predictors for Interaction #3						
Employed	-	-	-	-	-.04**	-.04***
Unemployed	-	-	-	-	-.02	-.03***
Country ^c	-	-	-	-	-.10***	-.06***
Country x Employed	-	-	-	-	-.03	
Country x Unemployed	-	-	-	-	-.01	

Table 16, cont'd.

R	.13
R ²	.02***
	(n=7,236)

Note. Dash indicates that the variable was not entered as a predictor.
^aWomen who did not currently need contraception were not included in this analysis.
^bWomen who have never needed contraception were not included in this analysis.
^cUnited States = 0; Finland = 1.
 *p.<05; **p.<01; ***p.<001.

of the variance in predicting *history of birth control*, a small multivariate effect. Among the four significant univariate effects, two were in the hypothesized direction: a history of more effective birth control use was associated with (a) increased *self-reported knowledge of birth control* and (b) increased *actual knowledge of birth control*. The two significant univariate effects that were not in the expected direction indicated that a history of more reliable birth control use was associated with (a) decreased *reproductive knowledge* and (b) less *education* (interaction predicted). All of the significant univariate effects described were considered small (absolute values of r ranged from .02 to .13).

Interaction effects. *Country* was hypothesized to moderate the relationship between the outcome variable (*history of birth control*) and the predictors, *urban residence* and *education*. As indicated in Table 16, neither of these interactions met the criterion for decomposition and probing.

Outcome Variable: Utilization of Family Planning Services

Table 15 displays the results of the regression analyses that examined the efficacy of the "barriers" component of the HBM to predict *family planning service utilization* during the past year. A total of eight variables were entered as predictors in a hierarchical, blocked-entry fashion. As Table 15 indicates, the variables entered accounted for 3% of the variance in predicting *family planning service utilization*, a small multivariate effect. Among the six significant univariate effects, two were in the hypothesized direction: greater *utilization of family planning services* in the past

year was associated with: (a) increased *self-reported knowledge of birth control* and (b) increased *actual knowledge of birth control*. The four significant univariate effects that were not in the expected direction indicated that more family planning visits was associated with: (a) living in the United States, (b) decreased *reproductive knowledge*, (c) not being currently employed (interaction predicted), and (d) lower *occupational status*. All of the significant univariate effects described were considered small (absolute values of r ranged from .03 to .13).

Interaction effects. *Country* was hypothesized to interact with (a) *urban residence*, (b) *education*, and (c) *employment status*. As indicated in Table 16, none of these interaction terms was statistically significant.

Outcome Variable: Unintended Pregnancy

Table 15 displays the results of the regression analyses that examined the efficacy of HBM's "barriers" component to predict *unintended pregnancy* in the United States only. Women in Finland were not included because *unintended pregnancy* was not assessed in the Finnish survey. A total of six variables were entered as predictors in a hierarchical, blocked-entry fashion. As Table 15 indicates, the variables entered accounted for 5% of the variance in predicting *unintended pregnancy*, a small multivariate effect. Among the four significant univariate effects, three were in the hypothesized direction: a higher proportion of *unintended pregnancies* was associated with: (a) decreased *self-reported knowledge of birth control*, (b) less *education*, and (c) lower *occupational status*. The one significant

univariate effect that was not in the expected direction indicated that a higher proportion of *unintended pregnancies* was associated with residing in an urban area. All of the significant univariate effects were considered small (absolute values of r ranged from .10 to .16). Because this regression equation did not include Finnish participants, no interactions involving *country* were predicted.

Exploratory Regression Analyses Utilizing the Finnish Sample and U.S. Subsample

Regression analyses were conducted for the same three research questions, outcome variables, and predictors, using the entire Finnish sample and a U.S. subsample that was designed to match that of Finland in terms of important demographics (total $N=4,638$). The results across all analyses were less predictive (e.g., lower R^2 , fewer significant univariate effects) than those conducted on the entire sample ($N=10,639$), although similar in overall trends.

Summary of Results

By chance, 0.5 significant predictors would have been expected for the first research question, and 5 were found. Across the 8 outcome variables tested for the second research question, a total of 4.3 significant predictors would have been expected by chance, and 48 were found. Across the four outcome variables tested for the third research question, 1.3 significant univariate effects were expected by chance, and 15 were obtained. Although multivariate effects tended to be small or medium, overall the models tested appeared to have some value in predicting a variety of

reproductive outcome measures. Andersen's (1995) Revised Model was the only one of the three models tested to yield medium-sized multivariate effects (for the four outcomes, *current birth control*, *unintended pregnancy*, *reproductive knowledge*, *female sterilization*).

As will be discussed in more detail in the following section, the variables that pertain to the level of the individual (e.g., knowledge, demographics) were more consistently predictive of outcomes than the system-level variables (e.g., *country*, *urban residence*). For example, the "health behavior" variables were associated with a variety of reproductive outcomes (e.g., a history of reliable birth control use, increased visits to family planning service providers, and increased general preventive medical visits predicted more reliable *current birth control* use and increased *knowledge of birth control*).

Country was not as effective in its ability to predict reproductive outcome as expected; however, there were some significant univariate effects. Specifically, U.S. women had more *female sterilizations* and greater *self-reported knowledge of birth control* compared to Finnish women. In addition, Finnish women had more reliable *current birth control* use, and greater *actual knowledge of birth control* and *reproductive knowledge* compared to U.S. women.

DISCUSSION

The aim of the present study was to investigate the problem of unintended pregnancy and other reproductive outcomes in the United States compared to Finland.

Specifically, the extent to which reproductive outcome could be explained by a combination of system- and individual-level factors was evaluated. A cross-national approach and multiple regression analyses were utilized to test the predictive ability of three health behavior models. These models were selected because of their inclusion of a broader range of contributors to outcome, rather than focusing solely on individual-level factors. Mixed but generally weak support for the hypotheses was found. In the following sections, (a) findings will be reviewed and interpretations, discussed. (b) limitations of this study will be addressed, and (c) directions for future research will be presented.

Major Findings

Findings from the regression analyses will be discussed separately for each of the three models tested in the present study. Multivariate effects, univariate effects, findings as they correspond to the model, and then an overall appraisal of the model will be addressed in each section.

Test of Andersen's (1968) Original Health Service

Utilization Model (HSUM)

Andersen's (1968) HSUM stated that three categories of variables ("predisposing characteristics," "enabling resources," and "need variables") would predict the utilization of health services. Ten variables that represented two of this model's three categories were tested.

Multivariate Effect

It was hypothesized that the combination of "predisposing characteristics" (e.g., *knowledge*, demographics) and "enabling resources" variables (e.g., *country*, *urban residence*) would predict the frequency of *family planning service utilization* in the past year. That is, a multivariate effect was predicted. The constellation of predictors accounted for a statistically significant but small (7%) proportion of the variance. Given the high power and number of predictors entered into the equation, this finding was not a substantial or meaningful effect.

Univariate Effects

Expected findings. Only two of the five predictors determined to be significant (i.e., two of the three knowledge areas assessed) in the regression analysis testing Andersen's (1968) HSUM were in the hypothesized direction, and these effects were weak. Specifically, increased *family planning service utilization* in the past year was associated with greater *self-reported* and *actual knowledge of birth control*. These relationships had been predicted because previous research has reported that lack of knowledge about contraception is an important contributor to poor reproductive outcome (e.g., Parker et al., 1996).

Unexpected findings. One unexpected finding was the significant negative relationship between the predictor *reproductive knowledge*³⁰ and outcome (*family*

³⁰This was assessed by the question, "When during the menstrual cycle is pregnancy most likely to occur?".

planning service utilization). An attempt was thus made to reconcile this finding with that of the expected significant positive relationship between the *knowledge of birth control*³¹ predictors and the same outcome. Although counterintuitive to the original hypotheses, it may be that women with less *reproductive knowledge* require more visits to service providers. In other words, in order to obtain necessary information, more contact with knowledgeable professionals would be sought. Regarding the opposite findings for *knowledge of birth control*, it is possible that family planning providers focus more on the provision of information about contraception compared to reproduction. Consequently, women who have more visits may be more knowledgeable about birth control than reproduction per se.

Another surprising finding was that living in the U.S. was predictive of greater *family planning service utilization*. It had been expected that Finnish women, who have lower rates of unintended pregnancy and improved access to services, would have increased utilization of services compared to U.S. women. One possible explanation for this finding is that the U.S. interview involved more prompting of the range of family planning services offered (e.g., pregnancy test, continue or change contraceptive method), which may have increased U.S. women's recall and thus

³¹Includes *self-reported knowledge of birth control*, which was assessed by the question "Do you know how (5 contraceptive methods) are used?" and *actual knowledge of birth control*, measured by asking women to identify from a list the most effective contraceptive method.

reporting of service utilization compared to that of Finnish women.³² A second possible explanation is that U.S. women have higher rates of abortion as well as repeat abortions; such procedures may require several visits and partially account for the increased number of visits. Another possibility is related to the more extensive school sex education and public health education in Finland compared to the U.S. It may be that Finnish women are more knowledgeable about contraceptive and reproductive matters³³ and do not require frequent visits to address their needs. Moreover, a greater proportion of Finnish teens use condoms compared to U.S. trends: because obtaining condoms does not require a visit to a provider, this may partially account for decreased visits in Finland. It may also be the case that occasional waiting lists for outpatient services in Finland (e.g., Hermanson et al., 1993) deter some women from seeking appointments for preventive, non-illness concerns such as family planning. Note, though, that family planning services in Finland are integrated with primary care services, which may have contributed to the present findings in a variety of ways. For example, at some health care centers,

³²In the Finnish questionnaire, a similar "prompting" question regarding the *reason* for a woman's most recent family planning visit was asked after the question about *when* this visit occurred. Unless they went back to change their original answer, Finnish women may not have accurately interpreted or remembered a family planning visit when this information was requested.

³³This was supported by the present finding that living in Finland predicted increased *reproductive knowledge* and *actual knowledge of birth control*. This will be discussed further later in this section.

providers devote one day per week exclusively to family planning. This may contribute to further delays in receiving care or otherwise limit the availability of services. On the other hand, a potential positive consequence of service integration is that women's family planning concerns may be addressed when they have a visit to a provider for another reason. Therefore, if the primary reason for seeking an appointment was not for family planning - but some of these concerns were addressed - women may not have endorsed the present survey's question: "How many times did you visit a provider for family planning concerns in the past year?" either intentionally or due to forgetting.

Appraisal of Findings Related to Andersen's (1968) HSUM

Recall that 10 predictors were entered into regression analyses testing Andersen's (1968) HSUM (see Table 7). It must be kept in mind that entering a large number of predictors as such will often account for some portion of variance of an outcome, regardless of the conceptual fit between predictors and outcome. Note too that the large sample size of this study likely contributed to the multivariate effect's being statistically significant. Therefore, it must be considered that only minimal support for the ability of Andersen's (1968) HSUM to predict *family planning service utilization* was obtained. It is important to highlight, however, that only two of three categories of the model were tested,³⁴ and this may explain, in part, the small amount

³⁴Recall that the reason for the exclusion of the "need variables" category was the lack of predictors that were comparable between the U.S. and Finnish surveys that

of variance predicted.

When examining trends among the significant predictors according to categories of Andersen's (1968) HSUM, "predisposing characteristics" was more consistent in predicting the outcome (*family planning service utilization*) compared to "enabling resources." That is to say, the category that encompassed variables at the level of the individual was more predictive than the category of system-level variables. It must be kept in mind, however, the possibility that there were too few system-level factors (i.e., two "enabling resources" predictors: *country* and *urban residence*, compared to eight "predisposing characteristics") to adequately test this category of the model.

Test of Andersen's (1995) Revised Health Model

In his revised model, Andersen (1995) suggested that three categories of variables ("population characteristics," "environment," and "health behavior") would predict a variety of health outcomes. A total of eight outcome variables were tested with this model, and a range of 7-13 predictors were entered in these analyses.

Multivariate Effects

Across the eight regressions, there was a range in how much variance could be explained by this model, i.e., between 5 and 23%. Medium-sized multivariate effects were obtained for the four outcomes: *current birth control*, *reproductive knowledge*,

could be defined under this category.

unintended pregnancy, and female sterilization. The remaining four outcomes (*history of birth control, self-reported and actual knowledge of birth control, and abortion*) yielded small multivariate effects.

An attempt was made to understand why Andersen's (1995) Revised Model was better at predicting certain outcomes (i.e., the four medium-sized effects) compared to others. However, it was difficult to ascertain a meaningful, consistent pattern among the nature of these four outcome variables compared to the four others. For example, it was perplexing that one type of *birth control* outcome was associated with a medium-sized effect and another with a small-sized effect. One possibility is that, compared to *current birth control, history of birth control* may have been a problematic measure because (a) its retrospective nature rendered it more susceptible to memory distortion and forgetting and (b) it was limited in its ability to capture overlap and variation in method use (or nonuse) over time.³⁵ In addition, because past behavior is known to predict current/future behavior, the inclusion of the predictor, *history of birth control*, for the outcome, *current birth control*, may have contributed to this medium-sized multivariate effect.

Another potential explanation for the fact that across the eight outcomes some yielded medium- and others small-sized effects was related to variability in the outcome measures. Perhaps those in which predictors accounted for small-sized

³⁵Issues of measurement in these and other variables will be addressed further in the discussion of limitations in a later section.

effects were outcomes with less variability to explain, i.e., more restricted range.³⁶ To assess this possibility, coefficients of variability were computed (by dividing the standard deviation by the mean) for each of the eight outcomes. All coefficients of variability were greater than .10, indicating sufficient range for each outcome such that this possible explanation was ruled out (Tabachnick & Fidell, 1989).

Also explored was the possibility that the number of predictors entered into each regression equation contributed to whether a small- or medium-sized effect emerged. Across the eight outcome variables tested using Andersen's (1995) Revised Model, there was some variability regarding the number of predictors entered, i.e., between 7 and 13. However, fewer predictors entered was not consistently associated with small-sized univariate effects, or vice-versa.

Thus, a number of plausible explanations were considered and tested without support. It is likely that problems with measurement of some outcome variables may have contributed to their small vs. medium multivariate effect size. This will be discussed in greater detail later in the section on limitations.

Univariate Effects

Expected findings. In order to best interpret the pattern of results across the eight outcome variables tested with this model, univariate effects were examined according to (a) their statistical significance and (b) whether the relationship between

³⁶Recall that in the preliminary analyses, the standard deviations and ranges of all outcome variables were checked for sufficient variability.

the predictor and outcome was in the expected direction. Predictors that comprised the "health behavior" category of Andersen's (1995) Revised Model were the most consistent in predicting outcome. That is, the three "health behavior" predictors (*family planning and preventive service utilization*, and *history of birth control*) were significant and in the expected direction 52% of the time they were entered in the regressions. The two remaining categories of Andersen's (1995) Revised Model less consistently predicted outcome: Across the eight regression analyses, 39% of the "population characteristics" predictors and 27% of the "environment" predictors were significant and in the expected direction. It should be kept in mind that all significant predictors yielded a small-sized univariate effect, with the exception of three that were medium-sized.³⁷ Overall, the categories that encompassed variables at the level of the individual (i.e., "health behavior" and "population characteristics") were more predictive than the category of system-level variables ("environment"). This finding, similar to that for Andersen's (1968) Original HSUM, appears inconsistent with one of the central hypotheses of this study, i.e., that system-level variables are at least - if not more - important than individual-level variables in predicting health outcome.

Regarding specific univariate effects that were consistent with the hypotheses,

³⁷Only one medium-sized univariate effect occurred among the "health behavior" variables: *history of birth control*, when predicting the outcome, *current birth control*. The other medium-sized univariate effects occurred for *marital status* when predicting the outcome, *unintended pregnancy*, and for *age* when predicting *female sterilization*.

as noted above the three variables that comprised the "health behavior" category were predictive of more favorable outcomes. That is, increased *family planning* and *preventive services utilization* and a more reliable *history of birth control use* consistently predicted more positive outcomes in five of the regressions (i.e., predicting more reliable *current* and *history of birth control* use, increased *female sterilizations*,³⁸ and increased *self-reported* and *actual knowledge of birth control*).

One variable from the "population characteristics" category that was somewhat consistently predictive of more favorable outcome was *education*. That is, as expected, more *education* was associated with fewer *unintended pregnancies*, greater *knowledge* (all three types), and fewer *female sterilizations*. The unexpected finding that increased *education* was associated with a greater number of *abortions* may reflect the tendency of more educated women to (a) delay childbearing to pursue careers, (b) have pro-choice rather than antiabortion views (e.g., Szafran & Clagett, 1988), and (c) have increased means of accessing abortion services, particularly in the U.S., where services may be more difficult to obtain (Jones et al., 1989). All of these factors may explain, in part, the increased number of *abortions* among more educated women.

Unexpected findings. One unexpected finding regarding the "health behavior" predictors was that (a) a more reliable *history of birth control* use and (b) increased

³⁸Among the three "health behavior" variables, only one (*history of birth control*) was entered in the regression equation for the outcome, *female sterilization*.

utilization of family planning services predicted poor outcome, i.e., higher rates of *unintended pregnancy* in the U.S. In attempt to understand why a history of more reliable birth control use predicted *unintended pregnancy*, it is possible that women with more *unintended pregnancies* have either (a) defensively distorted their birth control history,³⁹ or (b) changed methods often in attempt to avoid another unintended pregnancy or otherwise used a variety of methods, which was likely to be scored as a history of more reliable method use (even if this was not actually the case). One way of understanding why increased *family planning service utilization* predicted poor outcome is that an *unintended pregnancy* may require women to initiate more contact with service providers in order to confirm the pregnancy and/or obtain information about possible options. That is to say, the expected relationship between some "health behaviors" and outcome was actually a hypothesized sequence, i.e., that engaging in more healthy preventive behaviors (such as reliable birth control use over time and increased family planning service utilization) would bring about more health outcomes. The above explanation accounts for alternative sequences, i.e., poor

³⁹Previous researchers have reported that when subjects are asked to describe an aspect of their sexual behavior that may be discrepant with their self-image, this information may be distorted, withheld, or otherwise underreported (Clement, 1990). That is to say, women may have been embarrassed to report one or more unintended pregnancies in conjunction with (perhaps repeated) failure to use reliable contraception. Further, such social desirability may have been more prevalent in the U.S. face-to-face interview than the Finnish mail-in questionnaire. Implications of the different forms of data collection will be discussed later in the section on limitations.

outcome may necessitate increased "health behaviors" in the short term and perhaps initiate lasting, positive behavioral changes in the long term, which may have contributed to the unexpected findings.

Although a greater number of statistically significant univariate effects emerged than was expected by chance, these effects were not always in the hypothesized direction. Such mixed findings (i.e., some expected, some unexpected) emerged for the following predictors: *country*, *urban residence* (two system-level factors from the "environment" category of the model), and *age*, *knowledge*, *occupational*, and *employment status* (four individual-level, "population characteristics" predictors). Univariate findings for each will be discussed in the paragraphs that follow.

Mixed support was obtained for *country* as a predictor. When significant, it was in the predicted direction for four outcomes (i.e., more reliable *current birth control*, fewer *female sterilizations*, and greater *actual knowledge of birth control* and *reproductive knowledge* were found among Finnish women) and in the unexpected direction for one outcome (*self-reported knowledge of birth control* was higher among U.S. women). Note that there were mixed findings for the *knowledge* outcomes: Finnish women had greater *actual knowledge of birth control* and *reproductive knowledge*, and U.S. women had greater *self-reported knowledge of birth control*. Because of Finland's more effective public health and school sex education, it had been hypothesized that Finnish women would be more

knowledgeable on all three items. However, the only item on which U.S. women scored higher was the measure of self-reported knowledge, and not a test of actual knowledge like the others. This combination of findings could indicate that U.S. women believe that they are more knowledgeable about contraception than they actually are. Implications of this include the possible tendency of U.S. women to not seek family planning services or not ask questions about contraception when they truly need to. Another possibility is that the translation of this U.S. survey question into Finnish slightly changed its meaning in a way that made it a more difficult question to endorse. Specifically, the U.S. *self-reported knowledge of birth control* item was assessed in the following manner: "Do you know how each of the following methods is used?" Because there was no equivalent Finnish translation, the final wording of the question was "Are you familiar with the following methods and do you know how they work?", which appears to be a more difficult test of knowledge than the U.S. question. It is possible that Finnish women only endorsed this question (i.e., answered "yes") when the mechanism of action was known. For example, women may have known how oral contraceptives or IUDs are used (the U.S. wording) without knowing how they work to prevent pregnancy (Finnish wording). Therefore, Finnish women may have scored lower on the *self-reported knowledge of birth control* measure than U.S. women.

Urban residence was a relatively poor predictor in that it predicted only two of eight outcomes (i.e. *abortion, female sterilization*) in the hypothesized direction. The

expected findings were that in the U.S. fewer *female sterilizations* and more *abortions* were predicted by residing in an urban area, while in Finland no relation existed between *abortion* and *urban residence*. However, significant univariate effects for *urban residence* were not in the hypothesized direction for three outcomes (*current birth control*, *reproductive knowledge*, *unintended pregnancy*). Specifically, residing in an urban area was predictive of poor outcome, i.e., less reliable *current birth control* use, less *reproductive knowledge*, and more *unintended pregnancies*. One possible explanation for these unexpected findings involves the sampling bias in the U.S. survey, where black women were oversampled. Given the previously published trends of poor reproductive outcome among black women⁴⁰ (NCHS, 1993) and the current structure of U.S. cities (i.e., where sections of individuals who are predominantly poor and minorities often exist), over-representation of black women in the U.S. sample may have contributed to the unexpected findings of poor outcome. To test this possibility, the regression analyses performed using the more homogeneous U.S. subsample (created to have similar demographics as the Finnish sample) were re-examined. Specifically, the univariate effects for *urban residence* were inspected across all eight outcomes tested using Andersen's (1995) Revised Model. What was determined was that the univariate effect for *urban residence* was not a significant predictor for any outcomes. Therefore, such findings leave open the

⁴⁰For example, black women have higher abortion rates and lower rates of overall contraceptive use compared to white women (NCHS, 1993).

possibility that the racial composition (and associated demographic factors) in the U.S. sample may have contributed to the unexpected findings for *urban residence*. However, this is speculative and remains an empirical question.

Mixed support was obtained for *age* as a predictor. As expected, increased *age* was associated with more *female sterilizations* and greater *self-reported knowledge of birth control*. However, inconsistent with the hypotheses, *age* was unrelated to the two remaining knowledge outcomes (*actual knowledge of birth control, reproductive knowledge*). Other unexpected findings were that younger *age* was predictive of increased *unintended pregnancies* and *abortions*. It had been predicted that older women, simply as a function of their relative longevity, would have more *unintended pregnancies* and *abortions*. It is likely that the way in which the *unintended pregnancy* variable was calculated was biased on the basis of age and thus contributed to this unexpected finding. Specifically, unintended pregnancy was calculated as the percentage of all pregnancies that were unintended for each woman (i.e., number of unintended pregnancies divided by the total number of pregnancies). This method was selected because of its common use in reporting population statistics. However, this measure may be insufficient when applied to individual women as in the present study because of a possible age bias. That is, women with fewer total pregnancies (e.g., more likely younger women) tended to receive a higher score simply because of their smaller number of pregnancies. Older women, who were likely to have increased pregnancies as a result of having completed more of

their reproductive years, may have more total pregnancies. Consider an illustration: A teenager whose only pregnancy was unintended would receive a percentage of 100; an older woman who had three pregnancies where one was unintended would receive a percentage of 33. This would explain the unexpected finding in this study of younger *age* predicting a greater proportion of *unintended pregnancies*. Perhaps a better measure of unintended pregnancy for this study would have been a weighted index for unintended pregnancy (i.e., number of unintended pregnancies squared, then divided by the total number of pregnancies), which would decrease the age/longevity bias (by decreasing the impact of total number of pregnancies in the equation). Another possibility is to use the average number of unintended pregnancies that occurred within a particular time period, e.g., one or two years. It would be ideal if periods where it was not possible for women to become pregnant (i.e., during pregnancy prior to an abortion or birth) were not included in such a time frame.

Regarding the unexpected finding of increased *abortions* among younger women, it was considered that the legalization of abortion in the early 1970s⁴¹ may have influenced the findings in several ways. First, abortions have been more accessible to younger women, who have never experienced a time when abortions were illegal.⁴² It may be that older women did not opt for an abortion when they were

⁴¹Abortion has been legal in the U.S. since 1973, and in Finland since 1970.

⁴²This may apply to a greater number of U.S. women, who were interviewed 15 years after the legalization of abortion, compared to the Finnish women, surveyed 24

younger, or sought an illegal abortion and did not report it in this study.

Unfortunately, accurate data on pre-legalization abortions for the "older" women in this study (i.e., when they were younger) are not available for comparison. Second, negative stigmatization of abortion in the U.S. has decreased since legalization; therefore, younger women may have felt more comfortable accurately reporting the number of abortions they have had.⁴³ Thus, increased access to and public acceptance of abortion over recent decades likely contributed to the unexpected finding that younger age was associated with more *abortions*.

Mixed support was obtained for the *knowledge* variables as predictors. Unlike the first research question (where increased *knowledge of birth control* was predictive of greater *family planning service utilization*), the three *knowledge* variables were less predictive of outcomes tested using Andersen's (1995) Revised Model. Specifically, *knowledge* only predicted three outcomes significantly (albeit weakly) in the expected direction: (a) greater *reproductive knowledge* predicted fewer *unintended*

years after abortion became legal. Note that women age 30-44 at the time of the U.S. survey were of reproductive age (15-29) in 1973. That is, half of the U.S. women sampled experienced a time during their reproductive years when abortion was illegal. By comparison, in Finland only women aged 39-44 at the time of the survey (less than one-quarter of the Finnish sample) were of reproductive age (15-20) when abortion was illegal.

⁴³This was not expected to occur to the same extent in Finland, where abortion has not been negatively stigmatized or a topic of political debate as has been the case in the U.S. Also, recall that the NSFG tends to underreport the number of abortions compared to other U.S. estimates.

pregnancies, (b) greater *actual knowledge of birth control* predicted a history of more reliable birth control use, and (c) greater *self-reported and actual knowledge of birth control* were associated with more reliable *current birth control* use. Similar to the first research question, the findings were different between the *reproductive knowledge* and the two *knowledge of birth control* predictors. One reason for this may relate to the mixed reports from previous studies regarding the effect of increased knowledge on reproductive outcome. For example, some interventions designed to increase women's knowledge about reproductive matters have been ineffective with regard to improving contraceptive use (Caron et al., 1992; Ku et al., 1992; Vicenzi & Thiel, 1992). Other researchers have demonstrated increased contraceptive use in response to their interventions, although other reproductive outcomes such as repeat unintended pregnancies did not show similar improvement (e.g., Marsh & Wirick, 1991). It may be that certain types of knowledge are more relevant to specific types of reproductive outcome.⁴⁴ Future research should more carefully address such issues, perhaps by conducting a meta-analysis on knowledge-based intervention studies examining precisely which knowledge areas were targeted and the resulting impact (i.e., improvement, decline, or lack of change) on different types of outcome. Further, because knowledge has not been as strong or consistent a predictor as

⁴⁴For example, *reproductive knowledge*, or knowing when during the menstrual cycle pregnancy occurs, may be most relevant in predicting outcome for a specific group of women, i.e., those using contraceptive methods such as natural family planning or rhythm method.

expected in the present or previous studies, perhaps current knowledge-based intervention programs could be enhanced by also teaching the capacity to apply knowledge about contraception and reproduction.⁴⁵

Occupational and employment status were also poor predictors across the eight outcomes tested with Andersen's (1995) Revised Model. It should be noted, however, that in Finland no relation was expected between some outcome variables and *occupational and employment status* because health care access does not rely on one's employment as is often the case in the U.S. Recall that these variables were intended to estimate access to health services, because no direct measure of income or insurance status was available in both countries. However, it should be noted that some Americans who are uninsured are also employed. In addition, women who receive Medicaid have access to services but may not be employed. A likely explanation for the poor predictive ability of these variables is that they were not sufficiently strong or accurate indicators of access to services.

Appraisal of Findings Related to Andersen's (1995) Revised Model

Andersen's (1995) Revised Model was found to be moderately effective (e.g., generated four medium-sized multivariate effects). This model's inclusion of a

⁴⁵Specifically, instructing and/or role playing how to initiate discussion with one's partner about using contraception, and how to obtain condoms (or other contraception) and cope with one's feelings about doing so (e.g., embarrassment) could be just as useful as teaching the more traditional, practical aspects of contraceptive use. At least one such film (i.e., on purchasing condoms) is available in Finland for the purpose of school sex education.

broader range of variables (compared to Andersen's [1968] Original HSUM) that represented all three categories of the model most likely contributed to its increased predictive utility. The category of "health behavior" variables most consistently predicted outcome, particularly the *birth control use* and *knowledge* outcomes. Although inconsistent with the hypotheses, the two categories of the model that accounted for individual-level variables ("predisposing characteristics" and "health behavior") were better predictors than the category of system-level variables ("environment"). The majority of predictors were inconsistent in their ability to predict outcome in the hypothesized direction.

Test of Health Belief Model's (HBM) Barriers Component

The HBM's "perceived barriers" component was expanded to include actual, systemic barriers. A total of eight variables were tested using this abbreviated model to predict four outcomes.

Multivariate Effects

Across the four regressions, multivariate effects were weak (between 3 and 5% of the variance was explained). The fact that a relatively small number of predictors⁴⁶ were entered and only one component of the HBM was tested, may have contributed to the small-sized multivariate effects.

⁴⁶Recall that additional variables unique to this research question were planned to be entered in these regression analyses, but they turned out to be incomparable between the U.S. and Finnish surveys. Therefore, the final set of predictors entered were a subset of predictors used in the second research question.

Univariate Effects

Expected findings. Only two significant univariate effects were consistently in the hypothesized direction: *self-reported* and *actual knowledge of birth control*. Together, they were predictive of the four outcomes seven out of eight times; however, all were small-sized univariate effects.

Unexpected findings. In contrast to the two knowledge items reported above, *reproductive knowledge* was statistically significant for three of the four outcomes but in the unexpected direction each time. Mixed support was obtained for the remaining predictor variables: *country*, *education*, *employment status*, *occupational status*, and *urban residence*. That is, no one of these variables was significant and in the expected direction more than one time it was entered across the four equations. As mentioned in the discussion with respect to Andersen's (1995) Revised Model, problems with some of these measures likely contributed to the unexpected findings. For example, *employment* and *occupational status* may not have been accurate estimates of access to services in the U.S., and *urban residence* may have been affected by the racial composition of the U.S. sample.

Appraisal of Findings Related to HBM

A very small proportion of the variance was explained by this model across all outcomes; however, only one category of the HBM was tested. Specifically, the "perceived barriers" category was expanded to include actual barriers (i.e., those that exist at a system-level). Given the findings from the two previous research questions

where the categories of individual-level variables in Andersen's (1968, 1995) Models were more consistently predictive of outcome than the system-level categories, it is possible that more variance would have been accounted for if such individual-level predictor variables were available in the present study.⁴⁷

Comparison of the Three Models

Andersen's (1995) Revised Model was the most predictive of the three models, producing four medium-sized multivariate effects. The reason for its increased effectiveness was likely that the categories of this model were (a) better represented by the available predictors in this study and (b) most thorough in their coverage of what contributes to health outcome, i.e., inclusion of some important individual-level factors, including past/present health behavior, and some systemic, i.e., environmental variables. The relative strength of individual-level compared to system-level variables to predict outcome was evident across tests of all three models. It may be premature to comment on the importance of individual vs. systemic factors prior to assessing the quality of the predictors and the extent that they adequately represented the categories of the model. Nonetheless, that the primarily weak multivariate and univariate effects highlight the notion that the variables tested in this study - both individual and systemic - were insufficient in explaining and accounting

⁴⁷Recall that the three remaining categories of the HBM are "perceived susceptibility" to and "perceived severity" of some illness or condition, and "perceived benefits" to taking some health action, all of which pertain to the individual.

for reproductive outcome.

Limitations

A number of limitations inherent in the two nationally representative data sets employed in this study may have interfered with optimal testing of the hypotheses.

Broadly, limitations were related to issues of (a) sampling and (b) measurement.

Sampling

There were two potential limitations with regard to sampling that may have influenced the tests of this study's hypotheses. Specifically, implications of (a) participation rates (i.e., differences in responders vs. nonresponders), and (b) different time frames of the U.S. and Finnish surveys, will be discussed.

Participation Rates

Overall participation rates were similar between the two countries: 79% in the U.S. and 74% in Finland. Although these response rates are within acceptable parameters, questions arise regarding the impact of the findings of the 21% and 26% of women who did not participate in the present study. In order to address such questions, the literature on participant recruitment for sex-related research was reviewed. In general, the literature suggests that individuals who volunteer for sex-related research may be a select group of individuals, and that findings from such a sample may be of limited generalizability (e.g., Catania, McDermott, & Pollack, 1986; Wolchik, Spencer, & Lisi, 1983). One important way that volunteers are not representative of the population is that they tend to be more sexually experienced

(Catania et al., 1986; Wolchik et al., 1983). This suggests that women who chose not to participate in the present study would be in large part those with no (or limited) sexual experience. Because such women were excluded from most analyses anyway, it is believed that the participation rates did not markedly affect the tests of the hypotheses. Concerns regarding non-participants are allayed further, given that the overall response rates were at expected, average rates, according to Clement (1990). Clement cautioned that studies with response rates that were either "too high" or "too low" are potentially less valid than those with average rates.⁴⁸

Different Sampling Time Frame Across Countries

The fact that the U.S. survey was conducted in 1988⁴⁹ and the Finnish survey in 1994, may have somewhat limited the generalizability of the U.S. findings to the current situation in two ways. First, FDA approval of some new contraceptive methods had not yet occurred at the time the U.S. survey was administered.⁵⁰ However, this likely had minimal impact, as recent data indicate that a small

⁴⁸In studies involving sex surveys that had high response rates (e.g., approximately 90%), latent or overt pressure to participate may have existed, which could have contributed to individuals' "safeguard[ing] sexual secrets by replying incorrectly" (Clement, 1990; p.51). Conversely, studies with very low response rates may not be representative, in that only individuals with particular interest or motivation may be prone to participate.

⁴⁹Recall that the NSFG was readministered in 1995, but the data were not available at the time the present study was conducted.

⁵⁰For example, Norplant received FDA approval in 1990 and was approved for use in Finland in 1983.

percentage of women (1%) in both countries use these newer methods (e.g., Depo-provera, Norplant, morning-after pill) (Kantrowitz & Wingert, 1993; Nikander, 1992). Second, in 1988 concern regarding HIV/AIDS had not yet peaked in the U.S.; therefore, its influence on contraceptive and sexual practices was not captured in the present study. Although HIV/AIDS rates in Finland have remained low by international comparison (Hermanson et al., 1994), extensive sexually transmitted disease (STD) prevention campaigns have been initiated in response to awareness of this epidemic in other nations. Recent trends in contraceptive use in both countries include an increase in condom use (AGI, 1993c; Kosunen, 1994). Therefore, the 1988 U.S. survey does not reflect increased use of contraception that may be motivated by STD prevention. This may partially account for the finding that *current birth control use* was less reliable in the U.S. than in Finland.

Measurement

Several types of limitations regarding measurement existed in the present study. One concerns general difficulties that occur when conducting sex-related research. Others involve the discrepant survey methods (i.e., interview vs. questionnaire) used in the two countries, the different purposes of foci of the two surveys, the use of primarily single-item measures, as well as difficulties in language translation. Additional limitations relate to the selection of measures in the use of pre-existing data sets.

General Problems in Assessing Sex-related Behavior

Previous commentators (e.g., Clement, 1990) have discussed difficulties in conducting research on private, sensitive topics such as sexuality. Although the present study did not focus on sexual behavior per se, its questions regarding contraception are certainly related and may also be considered potentially sensitive to participants.

Two main problems in conducting sex-related research have been highlighted: issues related to recall of information and social desirability. The majority of such research is dependent on self-report, i.e., participants' ability to accurately remember details of their sexual behavior. In addition, it is often the case that reports of "actual" behavior are also reflective of participants' ideal behavior, i.e., ways that they would like to view themselves sexually. Social desirability, on the other hand, refers to subjects' hoping to be perceived as sexually "normal." Because of the highly personal, sensitive nature of the surveys, social desirability and recall problems may be exacerbated and may increase (intentional and unintentional) distortion of responses. However, such factors may have been more problematic in the U.S. compared to Finland, given the different cultural norms regarding sexuality in the two countries. That is, in Finland there has been more open discussion of sexual matters compared to the U.S., as evidenced by public acceptance of advertising of contraception, school sex education, distribution of birth control methods in school health clinics, and other public health promotion efforts (Helmig & Hemminki, 1997:

Hermanson et al., 1994; Jones et al., 1989).

Different Survey Methods: Interview vs. Questionnaire

The fact that different methods of data collection were used in the two countries (interview in the U.S., questionnaire in Finland) raises questions about the relative validity of each method and the resultant impact on the present findings. Advantages of face-to-face interviews include the increased likelihood of obtaining more accurate and detailed responses to complex questions and the greater motivating effect of interacting with an interviewer (Clement, 1990). Advantages of self-administered questionnaires, particularly regarding sensitive topics such as sexuality, include increased anonymity (Sorensen, 1972) and less social desirability (Knudsen, Pope, & Irish, 1967). In general, conclusions regarding which method has greater validity are mixed, with some stating that interviews are more valid (Solstad & Davidsen, 1993), some that questionnaires are most valid (e.g., Sorensen, 1972), and others stating that there are no significant differences (DeLamater & MacCorquodale, 1975). In the present study, it is possible that the use of the interview exacerbated the problem of social desirability in the U.S. Tentative evidence for this conclusion can be obtained from the finding of a greater discrepancy between women's *actual knowledge of birth control* and *self-reported knowledge of birth control* in the U.S. compared to Finland. The fact that U.S. (and not Finnish) women reported that they were perhaps more knowledgeable than they actually were, suggests that social desirability may have been a greater factor in the U.S. interview than in the Finnish

questionnaire. Additional evidence of the problem of social desirability in the U.S. survey includes the NSFG's underreporting of U.S. abortions compared to estimates that rely on providers' reports.

Different Purposes of Foci of U.S. and Finnish Surveys

The two surveys were conducted for different purposes, which resulted in each survey's having a distinct focus, and may have influenced women's level of openness vs. guardedness during participation. The U.S. survey was conducted to assess trends in contraceptive use, pregnancy, abortion, family formation, etc. such that obtaining detailed histories on each individual was critical. The Finnish survey, on the other hand, was primarily designed to assess the adequacy of family planning service delivery. Therefore, a number of open-ended questions about women's satisfaction with services were asked, and their opinions about how to improve services were sought. Although questions regarding personal contraceptive and pregnancy history were also posed in the Finnish survey, they occurred in a broader context, i.e., as background information rather than the focus of investigation. Several findings suggested that perhaps the U.S. women responded to the generally more "invasive" interview questions with slightly less openness and increased guardedness. For example, women with a history of more reliable birth control use had a greater number of *unintended pregnancies*. As discussed earlier, it is possible that women with more unintended pregnancies were guarded in reporting their birth control histories, i.e., were hesitant or embarrassed to acknowledge possible periods of

unreliable contraceptive use to the interviewer.

Limitations of Measures Related to Use of Pre-existing Data

Because one previously existing data set was employed in the present study,⁵¹ the variables were largely not of the investigator's choosing, and only measures that were common to both surveys could be utilized. These shared variables were limited not only in terms of number but also in terms of direct applicability to the models. A major reason for this is that, as noted above, the two surveys were conducted for different purposes from one another, as well as from that of this study. A result of this was that the models could not be fully tested as all categories could not always be operationalized. For example, in testing Andersen's (1968) Original HSUM, the category of "need variables" was not represented because variables initially intended to be employed could not be operationalized in such a way to allow comparability between the two countries. Contributing to the difficulty matching variables across the two data sets were challenges in language translation and reconciling structural aspects of health care delivery in two distinct systems. An illustration of the latter occurred with a potential variable assessing the type of provider seen at last family planning visit. Available response choices in each country were sufficiently discrepant that this variable was ultimately excluded. Given these limiting factors,

⁵¹The Finnish survey was created by a team of researchers with some input from this investigator. Therefore, in order to allow comparability, certain questions from the U.S. survey were selected for inclusion in the Finnish survey.

the constellation of variables that could be employed in the present study were less than ideal for testing the hypotheses and, in hindsight, may have been responsible for the relatively small variance accounted for in predicting outcomes. Nonetheless, the decision was made *a priori* that the use of the large, nationally representative samples of two nations and the relevant variables that the surveys did have in common would be potentially valuable in further elucidating contributors to reproductive outcome.

Another limitation of the present study was its use of primarily single-item measures, which may have resulted in smaller effect sizes and more measurement error. Although attempts were made to have more reliable, multiple-item measures (e.g., a combined knowledge variable), this was not always possible. As a result, it may be that some measures were less ideal predictors than if comprised of multiple items.

Other limitations inherent in using data from studies designed for other purposes include variables that were omitted (from the standpoint of the present study) or problematic in some fashion. These concerns will be discussed in the following sections.

Omitted measures. There are numerous variables that could have been assessed to account for portions of the variance. Two important ones are unintended pregnancy resulting from sexual victimization, and sexual orientation.⁵² Previous

⁵²Other variables that were not assessed in the present study will be reviewed later in the section on future research.

researchers (e.g., Campbell, Pugh, Campbell, & Visscher, 1995) have noted that rape and incest-related pregnancies cause many unintended pregnancies in the U.S. Specifically, among women aged 12-45 who are rape victims, 5% become pregnant each year (over 32,000; Holmes, Resnick, Kilpatrick, & Best, 1996). Pregnancies that result from sexual victimization represent one aspect of the problem of unintended pregnancy in the U.S. that has not been a topic of research inquiry. The U.S. survey, which did assess unintended pregnancy (unlike the Finnish survey), did not inquire about those that resulted from sexual victimization. Therefore, this contributor to unintended pregnancy, which potentially could have explained some portion of the variance, was not accounted for in the present study.

Another potential limitation involves the failure of both surveys to inquire about women's sexual orientation. Given that in modern, industrial societies, it is estimated that approximately 5-10% of the population is homosexual (Bullough & Bullough, 1994), the surveys' assumption of heterosexuality may have influenced the data for a significant proportion of women. For example, some homosexual women may have been categorized in this study as sexually active, non-users of contraception and, thus, at high risk of unintended pregnancy. This misrepresentation could partially account for some of the unexpected findings, e.g., a greater number of unintended pregnancies was predicted by a history of more reliable birth control use.

Problematic measures. A number of variables (*education, employment/occupational status, and current/history of birth control*) were clearly

less than ideal in terms of operationalizing aspects of the models being tested.

Education. In the present study, *education* was measured by the number of years of education completed. This may have been sufficient for women with more education, as the findings for *education* were largely consistent with the hypotheses and with previous research (i.e., more education was predictive of better outcomes). For women with less education, however, number of years of education may have been a less meaningful measure. Parker et al. (1996) have suggested that assessing literacy rather than years of education provides potentially more valuable information in predicting outcome for women with less formal education. This suggestion is based on the notion that these women may not be able to read or fully understand basic medical instructions such as that contained in inserts to contraceptive methods (e.g., oral contraceptives, condoms, spermicides). In the present study, *education* may have been an even stronger predictor had it been operationalized in terms of literacy in addition to years of formal education completed.

Employment/occupational status. As discussed earlier, these variables were included to approximate the construct access to and affordability of health services, because measures of income and insurance were not available in both surveys. Both variables were relatively poor predictors, leaving the question unanswered whether this was the result of inadequate operationalization of access to health services, or the inapplicability of the construct itself to the models or to reproductive outcome.

Current/history of birth control. The two measures of contraceptive use in

this study, *current birth control* and *history of birth control*, may have been more accurate predictors (and better outcomes) if they accounted for consistency and correctness of method use (i.e., only for methods for which this applies, such as barrier methods and oral contraceptives).⁵³ Several studies (e.g., Helmig & Hemminki, 1997; Jones et al., 1989) have noted the fact that overall rates of contraceptive use in the U.S. do not vary significantly from that of other industrialized nations including Finland (even though preferred methods may vary) despite the higher incidence of unintended pregnancy and abortion in the U.S. One possible explanation of this phenomenon is that reported "users" of some methods may not be using their selected method correctly and/or consistently. Measuring correctness and consistency of contraceptive use would likely yield a more accurate variable (and a stronger test of the hypotheses), rather than having women report their current birth control method or all the methods that they had ever used. A study by Berenson, Wiemann, Rickerr, and McCombs (1997) illustrates the limitation of a measure such as *current birth control* as defined in the present study. Their one-year follow-up of adolescents using Norplant and oral contraceptives reported that 91% of Norplant users continued to use Norplant (where correctness and consistency is implied by mere use) compared to only 34% of oral contraceptive users. Further, 25% of pill

⁵³In addition, recall the previously noted problems unique to *history of birth control*: its retrospective nature rendered it more susceptible to forgetting and memory distortion, and it was limited in its ability to measure periods of method non-use and combinations of method use.

users had become pregnant, compared to 0% of the adolescents using Norplant.

Findings from this study provide some explanation for several unexpected findings in the present study. That is, women who reported "use" of birth control methods that rely on user consistency/correctness, may not have done so; therefore, poor reproductive outcome may have been associated with such contraceptive "use."

Directions for Future Research

When considering directions for future research on the problem of unintended pregnancy and other reproductive outcomes, it must be kept in mind that, at most, 23% of the variance was accounted for in the present study. This raises the question as to what factors contributed to the remaining over three-quarters of the variance. As discussed in the context of this study's limitations, the models were not fully tested because of (a) problems related to measurement and (b) the fact that the categories of the models could not always be adequately represented. Future researchers should continue to employ a theoretical approach that considers a broad range of factors, i.e., both system- and individual-level, and models and variables that more fully operationalize such factors. However, it should be emphasized that the U.S. problem of unintended pregnancy (and other reproductive outcomes) is very complex; even the present study with its large sample (over 10,000) could only account for a relatively small portion of the variance. When selecting which individual- and system-level variables to include in future studies, contributions from multiple theoretical perspectives could be of value. In the present study, the individual-level predictors

were limited to those in common to both countries and tended to include more demographic than complex, psychological or interpersonal factors. In other words, variables that tap into the more inner workings of the individual and relationships were not available to potentially account for variance. Examples of both system- and individual-level variables that are recommended for use in future research will be presented below.

Among the system-level variables to be suggested, the majority were proposed for use in the present study but could not be operationalized in both countries. For example, it was hypothesized that physical proximity to the nearest health center and type of professional seen for family planning concerns (e.g., general physician or specialist) would be associated with some health outcomes (e.g., frequency of utilization of family planning services). In addition, extent of formal sex education received and availability/cost of contraceptive methods are system-level variables that may account for variance in some reproductive outcomes. Further, because the Finnish government has prioritized highly extensive, accessible health services for its citizens, it could be potentially valuable to assess the extent to which Finnish women were aware of the range of services available to them. To obtain such a systemic measure, women could be asked who they would contact in the health care system or where they would visit if faced with some family planning concern.⁵⁴

⁵⁴The Finnish, but not the U.S., survey posed such a question regarding women's actions in order to confirm or rule out a suspected pregnancy.

Several individual-level factors are interpersonal in nature, and others are related to characteristics of one's family of origin and/or informed by social learning theories. For instance, interpersonal factors worthy of investigation involve measures of various relationship dynamics surrounding contraceptive use. Whitley and Schofield (1985/6) have suggested that although contraceptive use is typically thought of as simply a means of preventing pregnancy, nonuse can serve a number of functions within a couple's relationship. For example, one partner's refusal to use contraception could also be a means of impression management, refusing intercourse, or controlling the relationship (Whitley & Schofield, 1985/6). Further, as noted earlier, sexual abuse as a potential contributor to unintended pregnancy has received little research attention (Campbell et al., 1995).

Perhaps in-depth interview studies could be conducted on a small sample to further elucidate the process by which sexual and contraceptive decisions are made. One possibility might be to conduct interviews with couples jointly as well as individually in order to fully assess the relationship dynamics (healthy and problematic) that may contribute to reproductive outcomes.⁵⁵

Employing measures informed by social learning theories and the concept of

⁵⁵In Campbell and colleagues' (1995) investigation of relationship dynamics and reproductive outcome in focus group settings, they reported that some women tended to yield to their male partner's wishes regarding contraceptive use/nonuse and pregnancy, even when different from their own wishes. These women also stated that they would not have revealed such feelings if their partner was present, i.e., in a joint interview.

modeling (e.g., Bandura, 1986) may account for the relationship between poor reproductive outcomes and some individual/interpersonal variables. For example, previous commentators have reported that teenagers who become mothers are more likely to have been raised by one parent, had mothers who also became pregnant as a teenagers, and had repeated moves and changes in primary caretaker(s) (e.g., LaBarre, 1972; Sugar, 1979). Potential measures could include such an assessment of one's family history (e.g., age of woman's and mother's first pregnancy, information about primary caretakers).

There is an extensive literature on psychodynamic contributions to reproductive outcomes (e.g., Ballou, 1978; Bibring, 1961; Frank, Tuber, Slade, & Garrod, 1994; Klyman, 1986; Menninger, 1943; Notman & Lester, 1988; Pines, 1990; Raphael-Leff, 1993), which has largely been excluded from informing empirical research. It is recommended that some of these psychodynamic factors, which have been observed clinically, be operationalized and tested empirically in future studies to the extent possible. Findings from the present as well as previous research (e.g., Whitley & Schofield, 1985/6) have indicated an inconsistent relationship between knowledge of contraceptive information and reproductive outcomes (i.e., greater knowledge of contraception and/or reproduction was not always associated with better outcomes). This discrepancy suggests the possibility that something outside of individuals' awareness (e.g., unconscious factors) may be interfering with their ability

to apply such knowledge.⁵⁶

Variables that have been identified in the psychodynamic literature as contributing to unintended pregnancy include difficulty completing the separation-individuation phase of adolescent development (Notman & Lester, 1988), absence of a father figure or loss of a sibling or one or both parents before age 11 (Hetherington, 1972; Klyman, 1986), and rivalry with or dependency on one's own mother (Sugar, 1979). Such variables could be operationalized by use of previously existing scales, such as the Separation-Individuation Test for Adolescence (Levine, Green, & Millon, 1986), and Psychological Separation Inventory (Hoffman, 1984). Self-report measures (e.g., of significant childhood losses) could also be employed. In addition, some commentators have discussed the quality of relationship with one's mother as a potential contributor to unintended pregnancy (e.g., Notman & Lester, 1988; Sugar, 1979). Specifically, feelings of disappointment and anger toward mother may contribute to strong motivations to have a baby in order to "right the wrongs of the past," i.e., be a better mother to a baby than her own mother was to her. Therefore, for some women, pregnancy may be a potential effort or means to rework some

⁵⁶Whitley and Schofield (1985/6) have suggested that knowledgeable women who fail to use contraception may be experiencing guilt or lack of acceptance of their own sexuality. These authors note that nonuse of contraception implies that sexual activity is "unintentional," which serves to reduce guilt that may arise from planned sexual intercourse. As women's acceptance of their sexuality increases, nonuse of birth control is less necessary to reduce guilt, and contraceptive use increases (Whitley & Schofield, 1985/6).

problematic aspect of the relationship with their mother (Notman & Lester, 1988). These factors could be measured via self-report questions comparing women's actual relationships with their mother and child/baby, and wishes regarding the quality of these relationships. One example of an established measure that could assess various aspects of the woman's relationship with her mother include the Differentiation in the Family System Scale (Anderson & Sabatelli, 1992).

The developmental and psychodynamic literature also speaks to potential contributors to unintended pregnancy in older women. For instance, Erickson (1963) discussed generativity as a developmental goal of adulthood, which involves establishing and guiding the next generation, partly as a way of decreasing one's sense of mortality. The Loyola Generativity Scale (McAdams & de St. Aubin, 1992) could be utilized in the operationalization of this potential factor.

Another possible way to improve this area of research would be to include men as participants, i.e., not only in conjunction with their female partners, as suggested earlier.⁵⁷ The tendency of the majority of research on pregnancy and contraception to focus on women (including the "nationally representative" NSFG) may perpetuate the idea that such issues are only a female problem. To study men's role in contraceptive use and unintended pregnancy could potentially explain more contributing factors to reproductive outcomes (e.g., Zimmerman & Berg, 1985).

⁵⁷The Finnish survey was adapted for males and mailed to 200 men for exploratory purposes. The U.S. survey was not administered to any men.

In addition, future researchers should be mindful of the cultural, economic, and psychological diversity in the U.S. Cole (1996) concluded that such diversity implies that no one approach toward the provision of contraceptive and sex education, and of family planning services (particularly for teenagers) has been or could possibly be successful. The relative lack of significant problems of reproductive outcome in Finland could partially be explained by this notion; that is, the homogeneous population has possibly been more conducive to creating a system of education and service delivery that has been effective for the majority of its users. Researchers should give thought to whether to pursue cross-national research or study the many sources of diversity within the U.S. Recall that, in the present study, *country* as a predictor did not consistently explain much of the variance. Clearly, investigation of more elaborate individual-level factors and the broader context in which they occur, i.e., system-level factors, could be of potential benefit in better understanding the U.S. problems of poor reproductive outcome.

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Appendix

Finland's Women's Survey

BACKGROUND INFORMATION

1. Where do you live? _____
2. When were you born? 19__
3. What is the level of education have you completed ?
 - 1 elementary/primary school
 - 2 middle school or junior high school
 - 3 high school
4. What is your vocational education?
 - 1 none
 - 2 vocational school or other courses
 - 3 passed special vocational examination
 - 4 technical college/institute
 - 5 university degree
5. What is your marital status?
 - 1 single
 - 2 cohabiting
 - 3 married
 - 4 divorced/separated
 - 5 widow
6. Are you at the moment
 - 1 working fulltime
 - 2 working parttime
 - 3 selfemployed farmer
 - 4 selfemployed business owner
 - 5 unemployed
 - 6 retired
 - 7 student
 - 8 long-term sick leave
 - 9 maternity
 - 10 homemaker
 - 11 other, what? _____
- 7 What is your occupation? If you are not working currently, give latest occupation

HEALTH AND HEALTH CARE

8. How would you rate your current level of health?
 - 1 good
 - 2 fairly good
 - 3 middle
 - 4 fairly poor
 - 5 poor

9. Do you have some long-term illness, disability, or handicap? (Identified by a doctor, or has lasted at least 3 months, and affects your functioning or ability to work)

1 no

2 yes, what? _____

3 don't know

10. Do you have your own doctor?

1 no

2 yes

3 don't know

11. Is this doctor in:

1 municipal health center (i.e. in local station or preventive health station)

2 school or student health care

3 occupational health care

4 private practice

5 elsewhere, where? _____

6 friend or relative

7 I don't have my own doctor

12. Do you have your own public health nurse who you can contact when you need help and advice in health matters?

1 no

2 yes

3 don't know

13. Is this public health nurse or nurse in

1 municipal health center

2 school or students' health care

3 occupational health care

4 private practise

5 somewhere else, where? _____

6 friend or relative

7 I don't have my own nurse

14. Do you think that it is important for a woman to visit a gynecologist (specialist in women's diseases) regularly even if she doesn't have any specific problems?

1 no, why? _____ >

2 yes, why? _____ >

3 don't know

15. Have you visited a gynecologist during the last 5 years?

1 no

2 couple of times

3 regularly

4 other, what? _____

5 don't remember

16. Have you undergone any of these operations? (You can choose many)

1 removal of uterus or uterine cervix

2 removal of one or both ovaries

3 sterilization

4 none of these (go to question 18)

17. Have you regretted your decision for this/these operation(s)?

- 1 no
- 2 yes, what operation and why? _____ >
- 3 don't know

18. Have you undergone any of the following examinations during the last year?

	Yes	No
PAP-smear	1	2
Gynecological examination		
Breast examination (doctor or nurse)		
Blood pressure		

PREGNANCIES AND CHILDREN

19. What is the number of your previous pregnancies ? (put 0 if you haven't had any/some of these)

- ___ childbirth, in years _____
- ___ miscarriage/spontaneous abortions, in years _____
- ___ ectopic pregnancies
- ___ induced abortions

20. Are you planning to have a child or children in the future?

- 1 no
- 2 maybe
- 3 yes
- 4 don't know
- 5 I am pregnant at the moment
- 6 I can't get pregnant eventhough I would like to
- 7 other, what? _____

21. Have you ever thought about adopting a child?

- 1 no
- 2 yes
- 3 we are on a waiting list to adopt
- 4 we already have an adopted child
- 5 other, what? _____

[Next we describe different kinds of situations that women are often confronted with. We ask you to estimate what you would do if this happened to you.]

22. If you suspected you could be pregnant, what would you do first verify it?

- 1 I would wait until I would be sure of it myself
- 2 I would do a pregnancy test at home
- 3 I would take a test directly in a laboratory
- 4 I would contact a doctor or public health nurse
- 5 I don't know what would I do
- 6 Other, what ? _____

23. Which signs would make you to suspect that you were pregnant?

- 1 _____
- 2 I don't know what the signs of pregnancy are

24. If you were pregnant now and you would like to continue the pregnancy, where in the health care system would you contact first?

- 1 _____
- 2 I don't know where to contact
- 3 I don't know

25. How soon would you contact the health care system ?

- 1 Right away once suspecting a pregnancy
- 2 Right away upon knowing I'm pregnant
- 3 Only when the pregnancy is more advanced: about _____ weeks after my period was supposed to start
- 4 I don't know

26. If you were pregnant now, and you would not like to continue the pregnancy, where in the health care system would you contact first?

- 1 _____
- 2 I don't know where to contact
- 3 I don't know

27. How do you think a woman's age affects her ability to get pregnant?

- 1 It is easier for women who are 35 than women 25 years old
- 2 It is almost as easy for women 35 and 25 years old
- 3 It is more difficult for women 35 than 25 years old
- 4 It is almost impossible for women over 35 years old
- 5 Age makes no difference
- 6 I don't know

28. At what point in the menstrual cycle do you think it is easiest for a woman to become pregnant?

- 1 Just before period
- 2 After period
- 3 About a week after period has started
- 4 About two weeks after period has started
- 5 There is no difference
- 6 don't know

CONTRACEPTION

[If you have never used or needed birth control, go to question 36.]

29. What contraceptive method are you currently using? (If several, circle all)

- 1 I don't need/use any contraceptive method
- 2 The pill
- 3 Mini-pill
- 4 Contraceptive capsules (Norplant)
- 5 IUD (ordinary, inert)
- 6 Hormonal IUD
- 7 Vaginal ring
- 8 Condom
- 9 Foam, cream, suppositories
- 10 Sponge
- 11 Diaphragm
- 12 Sterilization, own
- 13 Sterilization, partner
- 14 Rhythm method (counting safe days)
- 15 Withdrawal
- 16 "Morning after pill"
- 17 Some other method, what? _____

30. What methods have you used? (circle all that you have ever used)

- 1 I don't need/use any contraceptive method
- 2 The pill
- 3 Mini-pill
- 4 Capsules (Norplant)
- 5 IUD (ordinary, inert)
- 6 Hormonal IUD
- 7 Vaginal ring
- 8 Condom
- 9 Foam, cream, suppositories
- 10 Sponge
- 11 Diaphragm
- 12 Sterilization, your own
- 13 Sterilization, partner
- 14 Rhythm method (counting safe days)
- 15 Withdrawal
- 16 Morning after pill
- 17 Some other method, what? _____

31. How satisfied are you with your current method?

- 1 very satisfied
- 2 fairly satisfied
- 3 fairly dissatisfied
- 4 very dissatisfied
- 5 I don't use contraception at the moment

32. Have you needed contraception during the last year?

- 1 weekly
- 2 a few times a month
- 3 almost every month
- 4 a few times a year
- 5 I have not needed contraception during the last year

33. Where did you obtain your most recent method?

- 1 in pharmacy, with prescription
- 2 in pharmacy, without prescription
- 3 from doctor, public health or other nurse
- 4 my partner obtained it
- 5 from vending machine
- 6 grocery store
- 7 elsewhere, where? _____
- 8 I don't know/ remember

34. How much would you estimate that your current method of contraception costs you per year? (in addition to contraceptive, add cost of doctor's visit, PAP-smear test and other test needed)

- 1 about _____ mk / year
- 2 I can't estimate
- 3 I don't use contraception at the moment

35. Have the costs affected your decisions of using contraception during the last year? (Choose all that apply)

- 1 no
- 2 because of the cost, I haven't used the method I would have liked to
- 3 I have not visited a doctor as often as I consider necessary
- 4 I have not had all laboratory tests needed
- 5 I don't know
- 6 other, what ? _____
- 7 I don't need contraception at the moment

36. Have you ever been afraid of adverse health effects of some contraceptive method?

- 1 No
- 2 Yes, what method and what effects _____

37. Are you familiar with the following methods and do you know how they are used?

	yes	no
Oral Contraceptives	1	2
IUD	1	2
Contraceptive capsules	1	2
Condom	1	2
Diaphragm	1	2
Morning-after pill	1	2
Sterilization (female)	1	2

38. Which of the following methods do you think is the most effective for preventing pregnancy?

- 1 diaphragm
- 2 condom
- 3 IUD
- 4 rhythm method (calendar, safe days)
- 5 foam
- 6 pill
- 7 withdrawal

39. What do you think about contraceptive capsules (Norplant ^R)?

1 I have heard positive things about it. What and from whom?

2 I have heard negative things about it. What and from whom?

3 I have never heard about it, I don't know the method

4 other, what? _____

40. How many times have you visited a doctor, public health nurse or midwife because of contraception related questions **during the last year**?

- 1 not at all
- 2 public health nurse or midwife, _____ times
- 3 doctor's office, _____ times
- 4 I don't remember

41. Have you visited a doctor or public health nurse for contraception related questions with your husband/partner **during the last year** (circle all that apply)?

- 1 no
- 2 a public health nurse, _____ times
- 3 a doctor, _____ times

42. Have some of the following imbeded you to visit a doctor for contraception during the last year (circle all that apply)?

- 1 It was difficult to get an appointment
- 2 Doctor was far away or bad transportation connections
- 3 There were only male doctors available (I prefer a female doctor)
- 4 Gynecologist's (a specialist in women's diseases) services were not easily available
- 5 I didn't know where to find a good gynecologist
- 6 I would like to visit someone else than my own doctor
- 7 Previous negative experiences
- 8 I was ashamed to visit a doctor
- 9 I was afraid of the gynecological examination
- 10 other reason, what? _____
- 11 I have not have any problems
- 12 I haven not needed any physician services because of contraception

43. Where would you prefer to go for a contraceptive visit?

- A 1 my own doctor (the doctor whom I visit for other reasons, too)
2 another doctor
3 doesn't matter if I know the doctor or not
4 conno say
- B 1 gynecologist
2 general practitioner
3 doesn't matter
4 cannot say
- C 1 male doctor
2 female doctor
3 doesn't matter
4 cannot say
- D 1 private physician
2 family planning clinic
3 elsewhere in health center
4 doesn't matter
5 connot say

44. In your opinion, which of the following is the best way to organize contraceptive and maternity care?

- 1 separate family planning and maternity clinics
- 2 combined family planning and maternity clinic
- 3 combined to other services of health center doctor
- 4 some other way, how? _____
- 5 cannot say

45. Would it be better that contraceptive and maternity care would be provided by

- 1 public health nurse or midwife specializing only on these matters
- 2 the same public health nurse who also takes care of your other health matters
- 3 in some other way, how? _____
- 4 cannot say

46. If you needed contraceptive pills, where would you prefer to obtain them? (If they were available from all of the places and persons listed below)

- 1 from a regular shop or pharmacy without prescription
- 2 from public health nurse or midwife
- 3 from general practitioner
- 4 from gynecologist
- 5 elsewhere, where? _____
- 6 cannot say

47. It has been said that men participate too little in contraception and childbirth. In your opinion, should men's role/involvement be changed in regard to: (circle one alternative from each line)

Responsibility for contraception?

Responsibility for costs of contraception?

Participation in childbirth?

Responsibility in induced abortion?

1 increased a lot

2 somewhat increased

3 no change necessary

4 decreased

5 cannot say

48. How would you like to improve services related to contraception?

_____ >

YOUR LAST VISIT FOR CONTRACEPTION

[If you never have visited a doctor, nurse or midwife because of contraception, move to question no 56]

49. When did you last visit a doctor, public health nurse or midwife because of contraception?

- 1 less than 6 months ago
- 2 6-12 months ago
- 3 more than one year but less than 2 years ago
- 4 2-5 years ago
- 5 more than 5 yrs
- 6 don't remember

50. Where did you last visit because of contraception?

- 1 separate family planning clinic
- 2 family planning clinic connected with maternity clinic
- 3 school health care
- 4 students' health care
- 5 occupational health
- 6 doctor in municipal health center
- 7 private health center
- 8 hospital outpatient clinic
- 9 other, where? _____
- 10 don't remember

51. Who did you visit there? (circle as many as apply)

- 1 general practitioner
- 2 gynecologist
- 3 other physician
- 4 public health nurse or midwife
- 5 don't remember

52. How long did it take to get the appointment?

- 1 I didn't need an appointment
- 2 about ____ days, or about ____ weeks
- 3 don't remember

53. Was the reason for the last visit:

- 1 stopping use of contraception
- 2 to choose a method for the first time
- 3 start contraception after pause
- 4 to change a method
- 5 routine visit/check-up (e.g., renewal of pill prescription, change or check of IUD)
- 6 information or counseling about different options/methods
- 7 discussion about unwanted pregnancy and abortion
- 8 other reason, what? _____
- 9 don't remember

54. If the purpose of our visit was to select a contraceptive method, to what extent were your views considered while choosing the method?

- 1 not at all
- 2 somewhat
- 3 well
- 4 don't know / remember
- 5 the visit was not about choosing a contraceptive method

55. Evaluate how well the following aspects of care were carried out during your last visit. (circle one from each row) I was:

- | | |
|-------------------|-------------------------|
| Friendliness? | 1 very dissatisfied |
| Competence? | 2 slightly dissatisfied |
| Confidentiality? | 3 slightly satisfied |
| Adequacy of time? | 4 very satisfied |
| | 5 don't know / remember |

MISCARRIAGES AND ABORTIONS

56. If you have had a miscarriage, did you visit a doctor because of it? (last miscarriage, you can circle several)

- 1 I have not never had a miscarriage
- 2 I am not sure if I have had a miscarriage
- 3 No,

I did not visit a doctor

- 4 Yes, I visited a doctor
- 5 Yes, I visited the hospital outpatient clinic
- 6 I was at the hospital as an inpatient
- 7 other, what? _____
- 8 don't remember

[The following questions concern induced abortions. If you have had more than one abortion, answer according to the most recent abortion. If you have never had an abortion, move to question 69.]

57. When did you have the (lastest) abortion?

- 1 Less than a year ago
- 2 1-2 years ago
- 3 3-4 years ago
- 4 5-10 years ago
- 5 over 10 years ago

58. Was this abortion done

- 1 in a central hospital
- 2 other hospital (e.g., health center hospital or district hospital)
- 3 private clinic or practice
- 4 somewhere else, where? _____

59. How long were you in the hospital or clinic?

- 1 I was discharged on the same day
- 2 I was at the hospital _____ nights
- 3 other, what? _____

60. What were the most important reasons for you to choose an abortion?

_____ >

61. With whom did you discuss the abortion beforehand? (circle as many as apply)

- 1 no one
- 2 with my partner/boyfriend
- 3 with my girlfriend
- 4 mother
- 5 father
- 6 sister(s) or brother(s)
- 7 someone else, who? _____

62. What contraceptive method were you using when you became pregnant?

- 1 I used _____
- 2 nothing at that time
- 3 don't remember

63. Did you have any difficulties in obtaining a physician's referral to the hospital for the abortion?

- 1 no
- 2 yes, what kind? _____

64. Where did you have a follow-up visit after the abortion? (circle as many as apply)

- 1 at the hospital
- 2 health center
- 3 somewhere else, where? _____
- 4 I did not go anywhere, why? _____
_____ >

65. Evaluate the amount of discussion you had with doctor and nurse before and after the abortion. (circle one for each)

- With a doctor before abortion
- With a doctor after abortion
- With nurse before abortion
- With nurse after abortion

Would you have liked to discuss

- 1 more
- 2 the amount was right
- 3 less
- 4 cannot say

66. If you would have liked to discuss more, which kind of topics?

_____ >

67. Were you satisfied with the treatment you received in the hospital or clinic during abortion?

- 1 very satisfied
- 2 slightly satisfied
- 3 slightly dissatisfied
- 4 very dissatisfied
- 5 cannot say

68. Was there anything that, you would have hoped to have been done differently or that, you yourself would have done differently in regard to the abortion?

- 1 no
 - 2 yes, what? _____
- _____

PRENATAL CARE AND LABOR

69. If you could choose, where would you rather give a childbirth?

A First childbirth:

- 1 in a hospital, inpatient care
- 2 in a hospital, polyclinically (so that I get home within 24 hrs after delivery)
- 3 at home, with a midwife or a doctor
- 4 somewhere else, where? _____
- 5 cannot say

B Following childbirths:

- 1-5 same as above

[The following questions concern improving the services of maternity centers. Answer according to your latest pregnancy (which lead to labor) or your current pregnancy. **If you have never visited a maternity center, move to question no 77**]

70. Which different places did you visit during your latest or current pregnancy? (Circle all that apply)

- 1 a maternity center
- 2 a private clinic
- 3 maternity outpatient clinic
- 4 private physician's office
- 5 somewhere else, where? _____
- 6 don't remember

71. The following are topics that can be discussed in a maternity center. Evaluate (1) is it important to discuss this topic and (2) whether the topic was discussed during your latest pregnancy

	Importance of the topic	Was it discussed
Pregnancy & time right after labor	very important	yes
- normal pregnancy	rather important	no
- depression during pregnancy	not important	don't remember
- monitoring the condition of the fetus		
- labor		
- recovery from labor		
- breast-feeding		
Health status and habits		
- nutrition and eating		
- resting and exercise		
- smoking		
- alcohol consumption		
- use of medicines		
-Familial Factors		
- economical situation		
- relation between the couple		
- sex life		
-mother's working outside the home		
Preparing for the birth		
- care of the infant		
- possibility of the birth of a sick child		
- preparing siblings		
- emotions and experiences related to being a mother		
- emotion and experiences involved in being a father		
- something else, what? _____		

72. Besides regular visits, did you participate in birth- and family counseling arranged by the maternity center?

- 1 yes
- 2 no
- 3 don't remember

73. How important it is for a first-time mother to receive birth- and family counseling ?

- 1 very important
- 2 important
- 3 less important
- 4 not at all important
- 5 cannot say

74. How important do you think the house-call of the maternity center's public health nurse or midwife was after your latest labor?

- 1 very important
- 2 important
- 3 less important
- 4 not at all important
- 5 cannot say
- 6 a nurse did not make a house-call

75. The following sentences deal with your relations with a nurse or midwife. Estimate the extent to which each occurred during your latest pregnancy.

- | | |
|---------------------------------------------------------------------------|---------------------|
| - I could influence topics that were discussed in maternal care | 1 enough |
| - different options were discussed in situation requiring decision making | 2 almost enough |
| - I had enough information when decisions were made | 3 not nearly enough |
| - I felt I could influence certain decisions | 4 way too little |
| - my self-confidence was reinforced | |
| - maternal care visits corresponded my expectations | |

76. Which of the following describes your opinion how number of visits to maternal centers could be changed? (Circle all that apply) Number of visits could be:

- 1 increased for women having their first child
- 2 increased for women having their second or more child
- 3 decreased for women having their first child
- 4 decreased for women having their second or more child
- 5 changed some other way, how? _____
- 6 no need for changes in the number of visits; current policy is good

INFERTILITY

77. Have you ever had difficulties in getting pregnant and having a child?

- 1 no
- 2 yes
- 3 don't know because I haven't tried

[The following questions deal with difficulties in having a child and possible treatments. If you have had several periods when getting pregnant has been difficult, answer according to the latest time. If you have never had difficulties getting pregnant and having a child, move to question no 86]

78. How long have you tried/ did you try to become pregnant and have a child? (Answer according to most recent efforts)

- 1 less than a year
- 2 1-2 years
- 3 3-5 years
- 4 over 6 years

79. Have you sought doctor's help for infertility? (circle all that apply)

- 1 no
- 2 from a doctor in a municipal health center
- 3 from a private doctor
- 4 from a doctor in a public hospital
- 5 from some other doctor, whom? _____

80. When was the last time you have been examined or treated for infertility?

- 1 less than a year ago / I am currently being treated
- 2 1-2 yrs ago
- 3 over 2 but less than 5 yrs ago
- 4 over 5 yrs ago

81. If you haven't sought for doctor's help for your infertility, why not?(circle all that apply)

- 1 I still want to wait and try to become pregnant naturally
- 2 I don't want interference from outsiders
- 3 I haven't been aware that treatments for infertility are available
- 4 I'm too old to get treatment
- 5 treatments are too expensive
- 6 hospital and infertility clinics are too far away
- 7 other reason, what? _____

82. What treatments have you received? (choose all that apply, according to your latest infertility period)

- 1 basic investigations
- 2 hormonal treatment
- 3 surgical treatment
- 4 insemination, _____ times
- 5 in vitro fertilization _____ times
- 6 other treatment, what? _____

83. If you have given birth as a result of infertility treatments, when was/were your child/children born?

year(s): _____

84. Have you been satisfied with the infertility treatment you received?

- 1 yes, why? _____ >>
- 2 no, why? _____ >>
- 3 cannot say

85. Is there something you would like to improve in the treatment of infertility?

_____ >>

VALUATION OF SERVICES

86. How important do you consider that following services would be provided for customers free of charge through taxpayers' money?

- | | |
|-------------------------------------------------------|------------------------|
| - doctor's visits for contraception | 1 not at all important |
| - contraceptive devices | 2 less important |
| - abortion | 3 rather important |
| - infertility treatments | 4 very important |
| - mass screening for cervical cancer (PAP-smear test) | 5 cannot say |
| - mass screening for breast cancer (mammography) | |
| - follow-up maternity care visits | |
| - screening for fetal malformations | |
| - ultrasound examinations of fetus | |

87. If you were suffering from infertility, how many months' salary would you be willing to pay, so that you would get treatment (if it would be the only way for you to have a child)?

_____ months' salary

POSITIVE AND NEGATIVE EXPERIENCES

88. Describe the **most positive** experience that you have had when receiving health care. (Explain the type of situation in which it occurred, how long ago it was, where it happened, and what it meant to you.)

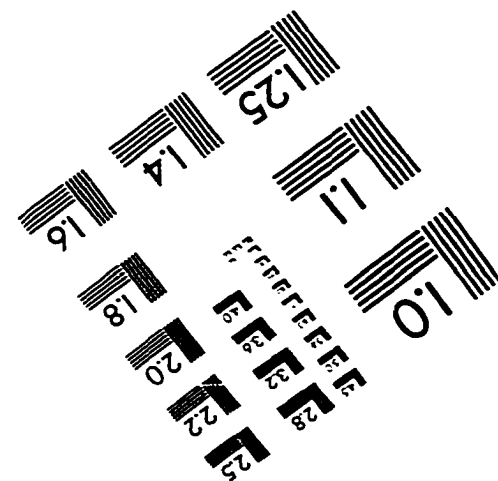
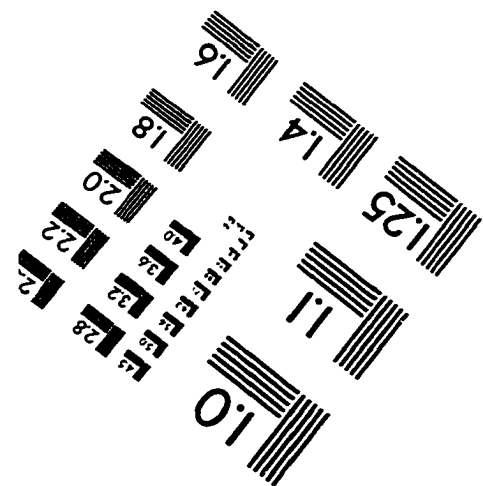
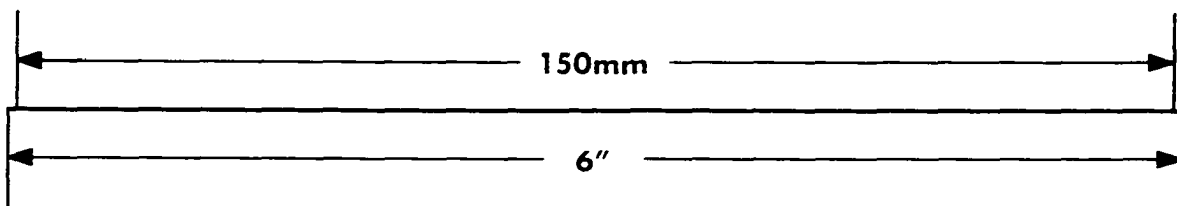
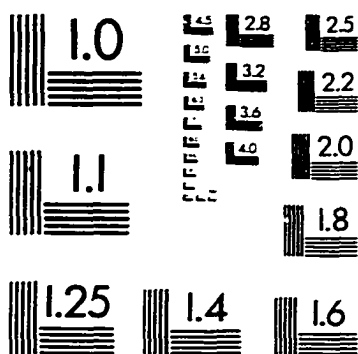
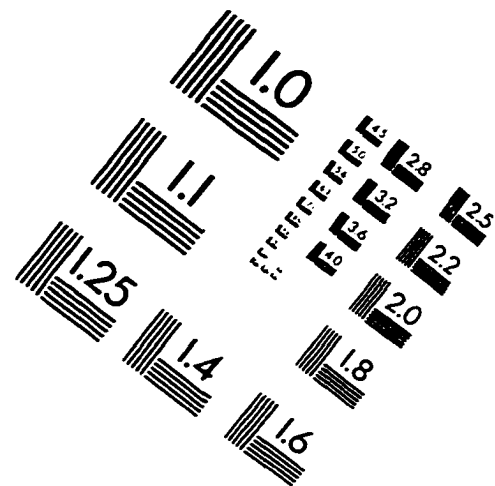
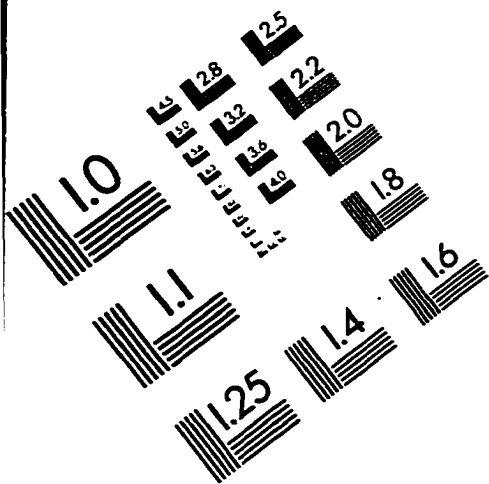
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89. Describe the **most negative** experience that you have had when receiving health care. (Explain the type of situation in which it occurred, how long ago it was, where did it happen, and what it meant to you.)

>>

If there is anything else regarding the topics of the questionnaire that you would like to discuss, please write below.
Thank you for all of your efforts!

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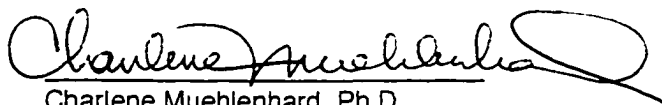
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YOUNG WOMEN'S AND MEN'S PERCEPTIONS OF SEXUAL CONSENT
IN HETEROSEXUAL SITUATIONS

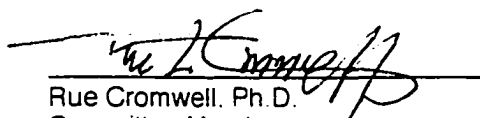
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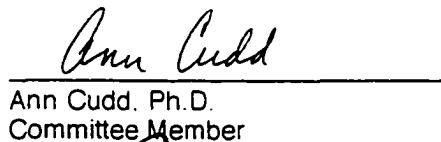


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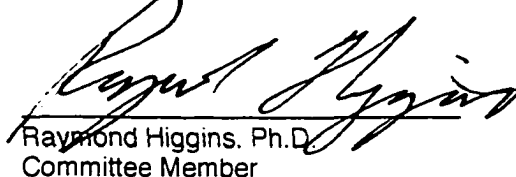


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Abstract

In 1990, Antioch College developed mutual sexual consent guidelines in part because of a concern that gender-based miscommunication about consent can lead to rape. The guidelines generated intense public discussion about the nature of sexual consent. Little is known about how women and men convey and infer sexual consent, however, because most research on sexual communications has focused on signals used to initiate and refuse sexual activity rather than on consent.

In this study, 378 undergraduate women and men completed a questionnaire designed to examine how they convey and infer consent in heterosexual situations. Participants were asked to imagine themselves in two scenarios in which they or their date initiated sex verbally or nonverbally. They were then asked to rate how representative each of 34 signals were of their dates' consent (date-consent ratings) and of their own consent (self-consent ratings) to sexual intercourse. They were also asked how frequently they used each of these signals to indicate their sexual consent in actual situations.

Participants' ratings of the meaning of their dates' signals and their own signals were factor analyzed, and six types of signals emerged: direct verbal, indirect verbal, direct nonverbal, indirect nonverbal, statements about intoxication, and a direct refusal. There was some evidence of gender differences in perceptions of consent that could lead to miscommunications: men's date-consent ratings were slightly but significantly higher than women's self-consent ratings. Women's date-consent ratings were slightly but significantly lower than men's self-consent ratings. Women and men also reported some differences in the ways in which they convey consent in actual situations.

The results of this study suggest that gender-based miscommunications about consent are possible but not inevitable. Although men do view their behavior and their dates' behavior somewhat more sexually than do women, women and men do not have diametrically

opposed views of what constitutes sexual consent. Thus, miscommunication is an unlikely explanation for rape. Rape prevention educators should stress that women and men are responsible for obtaining consent from their date, and that miscommunication is an unacceptable excuse for rape.

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I would like to take this opportunity to acknowledge the unique contributions of the many people in my life who have enabled me to complete my doctorate. First, I would like to thank Charlene Muhelenhard, my advisor and mentor. I will be eternally thankful that I had the opportunity to work with a person who is intelligent, insightful, committed to her work, and supportive of her students, not to mention funny, cat-loving, and caring. I feel lucky to have had the fortune to have worked with a great mind who successfully combines intellect, practicality, and a social conscience. Charlene, I view you as a exemplary model of how to be mentor in the truest sense of the word. Thank you for everything.

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In the fall of 1990, students and administrators at Antioch College in Yellow Springs, Ohio, joined forces to develop a mutual sexual consent policy. It required, among other things, that all Antioch students obtain consent from their partners prior to engaging in any sexual contact and before proceeding to the next level of sexual intimacy, unless the sexual activity was mutually initiated. Consent was defined as "the act of willingly and verbally agreeing to engage in specific sexual contact or conduct" (Antioch College, 1990, p.1).

When the national press brought this policy to the attention of the general public in the fall of 1993, it created an international controversy. According to Alan Guskin, President of Antioch College, newspapers ranging from the New York Times to the Bangkok Post covered the policy on their front pages. Television reports appeared on every major network. Columnists in major newspapers across the country debated the necessity and utility of such a policy, often poking fun at it in the process. Saturday Night Live, a television comedy show, satirized it in a skit (Guskin, 1994).

In a response to the public's reaction, Guskin (1994) discussed the history and reasoning behind the mutual consent policy. According to Guskin (1994), the goal of the policy was to enable women and men to communicate freely about their sexual wishes in an open and honest manner. Ideally this would reduce the incidence of sexual assault on campus. In reflecting on the international press coverage this policy received, Guskin (1994) stated,

I believe it's not just sex that has created the reaction, but the Antioch requirement that students talk about sex! Talking about it with someone whom you desire; getting consent before having sex; having to think about sexual acts that you are about to do; communicating with a partner about your interests. (p. 2)

The uproar that surrounded the introduction of Antioch College's consensual sex guidelines to the general public highlights the sensitive and unclear nature of sexual consent.

It also illustrates the importance of how sexual consent is defined. Sexual consent is an important issue for numerous reasons. Consent is a central issue in defining rape both in rape research and in legal cases (Burt & Albin, 1981; Estrich, 1987). The way in which nonconsent is defined can affect our estimates of the prevalence of rape (Muehlenhard, Powch, Phelps, & Giusti, 1992). It has been suggested that gender-based misunderstandings regarding whether different signals represent consent can lead to sexual assault (Abbey, 1991; Crawford, 1995). Additionally, the way in which consent is defined can affect the outcome of rape trials (Estrich, 1987; Sanday, 1996)

Unfortunately, there has been little research to help clarify how people perceive and communicate sexual consent. Given the implications of this issue and the fact that the majority of sexual intercourse is consensual (e.g., Koss, Gidycz, & Wisniewski, 1987; Russell, 1982), we are missing essential information about an important element of human sexuality. Research on sexual consent could provide us with information about what signals are considered representative of consent, how people communicate consent, and whether there are gender differences in the perception and use of sexual consent signals.

Sexual Consent

Defining consent. The term sexual consent is often used without any discussion as to its many possible meanings (Muehlenhard et al., 1992). However, sexual consent is defined differently by different people. There are several ideas to take into consideration when thinking about consent.

First, there is the issue of whether consent should be defined as a physical act--that is, the verbal or nonverbal expression of agreement--or a mental act--that is, the decision that one agrees (Muehlenhard, 1995/1996; Muehlenhard et al., 1992). If consent is defined as a physical act, this ensures that people must physically indicate their consent. If consent is defined as a physical act, there is the issue of whether consent should be expressed verbally or nonverbally. It has been argued that consent should be verbally expressed, and that

nonverbal expressions of consent are unacceptable (Antioch 1990; Sanday, 1996). However, restricting consent to verbal expressions is problematic, for most sexual scripts do not involve explicitly given verbal consent (Muehlenhard, 1995/1996; Muehlenhard et al., 1992). As Muehlenhard et al. (1992) observed, "if definitions of sexual assault were to include all sexual behavior that occurs without explicit verbal consent, they would include much behavior in which those involved consider themselves to be willing participants" (p. 31). Such definitions of consent do not allow for the possibility that people utilize a variety of verbal and nonverbal behaviors to communicate consent.

However, reliance on nonverbal communications of sexual consent is also problematic, for such signals can create ambiguity. There is no guarantee that both parties attribute the same meanings to different signals. This creates the potential for miscommunication that can lead to sexual assault. Reliance on nonverbal signals allows one person to ignore another's refusal signals, to selectively interpret another's signals, or to claim miscommunication as an excuse for sexual assault. Clearly, defining consent exclusively as a physical act is problematic.

Defining consent as a purely mental act is problematic, too. If consent is not communicated in some manner, how can one tell if one's partner or date has consented? If people assume that consent is a mental act, then one is forced into a position in which one person can never truly know if another consented. This allows for the possibility of misunderstandings, or claims of misunderstandings, that can lead to sexual assault.

The issue of willingness should also be considered when discussing consent as a mental act. Research regarding the phenomena of token resistance, in which a person feigns reluctance to engage in a sexual activity despite willingness and intentions to engage in the activity (O'Sullivan & Allgeier, 1994), highlights the fact that the communication of sexual consent and willingness to engage in sexual activity are two different things. A person can be willing to engage in sexual activity but not communicate their consent for a variety of reasons

(O'Sullivan & Allgeier, 1994). Thus, willingness is an important component of consent.

Finally, when conceptualizing consent, it is important to take into consideration the context in which consent occurs. In some situations, a person is not able to consent freely due to coercive circumstances that make true consent impossible. A person may lose the ability to consent as a result of economic coercion, alcohol or drugs, compulsory heterosexuality, or other factors (Muehlenhard, 1995/1996; Muehlenhard & Schrag, 1991; Tong, 1984). Also, a person can be unwilling but communicate "consent" due to fear, the threat of harm, or physical force. Thus, when conceptualizing consent, one must take into account the circumstances under which consent is communicated.

For purposes of this paper, I had to choose a working definition of consent taking into consideration the issues raised above. Thus, I define consent as the free verbal or nonverbal communication of a feeling of willingness. This definition includes a conceptualization of consent as both a physical and a mental act, and takes into account the context in which consent is communicated by requiring that consent be expressed freely.

Research on consent. The existing empirical research on sexual consent provides minimal information about how consent is inferred and conveyed. An extensive literature review revealed only four empirical studies in which the authors addressed sexual consent signals. There have been numerous other studies that have addressed perceptions of related topics, such as how interested someone is in sex or how much they want to have sex, but these concepts differ from the definition of consent being used in this study.

To date, only one study has examined how women and men infer sexual consent. In a 1980 study, participants were provided with a list of eight behaviors thought to possibly indicate consent (Byers, 1980). They were asked to rate which of the behaviors were most indicative of the woman's consent to sexual intercourse on a scale ranging from (0) not at all important to (3) very important. Byers found that equal numbers of women (31%) and men (31%) ranked "fondles male's genitals" as the most important way a woman could

communicate consent to sexual intercourse. Women gave "fondles male's genitals" a mean rating of 1.52, and men gave it a mean rating of 1.57. "Clear verbal consent" was rated as the most important way for women to communicate consent to sexual intercourse by similar numbers of women (26%) and men (28%). Women gave "clear verbal consent" a mean rating of 1.14, and men gave it a mean rating of 1.28. These findings suggest that both nonverbal and verbal signals are important in signaling consent. Unfortunately, the author did not assess whether these gender differences were statistically significant. Additionally, this study only examined perceptions of women's consent, not perceptions of men's consent.

Other studies in this area have focused on signals used to convey sexual consent. In a study designed to examine sexual initiations and refusals, the authors included an examination of "positive responses" to sexual initiations (Byers & Heinlen, 1989). Although this study was not specifically designed to study consent, "positive responses" to sexual initiations could be defined as consent. Female and male participants recorded all sexual interactions with their partners over the course of a week. These descriptions were then coded by two trained raters. Of the participants who described an initiation in which the partner responded positively, 41.8% of the positive responses were nonverbal, 28.8% were verbal, and 26.9% were both verbal and nonverbal. Nonverbal responses included initiating the sexual activity and continuing the sexual interaction. Verbal responses included requesting clarification, saying "yes," or making an invitation. Unfortunately, information regarding gender differences in the use of these responses was not provided. Additionally, information about the operational definitions of the responses was not provided.

In O'Sullivan and Byers (1992), female and male participants recorded aspects of their sexual interactions in dating situations over a two-week period, including responses to sexual initiations. The data suggest that nonverbal responses were more common than verbal responses: 90.9% of women and 82.9% of men reported making a positive nonverbal response to an initiation. In contrast, 56.3% of women and 49.9% of men reported making a

positive verbal response to an initiation. The data also indirectly suggest that some women and men responded both verbally and nonverbally to initiations. It is unclear whether there were significant gender differences in the use of different positive responses. Neither Byers and Heinlen (1989) or O'Sullivan and Byers (1992) examined whether participants viewed the signals they reported using as representative of consent.

A more recent study examined consent signals used by heterosexual female and male college students for a variety of sexual behaviors, ranging from kissing to anal intercourse (Hall, 1995). Hall found that most sexual behavior proceeded without specific consent, though participants reported giving verbal and nonverbal consent to each of the behaviors some of the time. Of those who said that they had been in a situation in which they and their partner had wanted to engage in intimate sexual activity and they had indicated this to their partner, participants reported giving consent most frequently for penile-vaginal intercourse (78.8%) and anal intercourse (73.4%). It is unclear whether participants indicated their consent differently depending on the type of sexual experience to which they were consenting. There were no significant gender differences in how frequently women and men reported giving consent for these activities. These findings suggest that in examining consent, it is important to specify what kind of sexual behavior is in question.

Hall (1995) also asked participants how they indicated "yes" to their partner for their most recent sexual experience. Most participants reported they indicated yes both verbally and nonverbally (60.9%), although some reported that they indicated yes only nonverbally (28.2%) or only verbally (11.0%). There were no significant gender differences in whether participants reported consenting verbally or nonverbally. When participants were asked to report how they nonverbally indicated "yes," 75.0% of women and 72.0% of men reported that they "kissed," 70.8 % of women and 69.5% of men "got closer," 62.0% of women and 69.5% of men "intimately touched," and 35.4% of women and 33.9% of men reported that they "smiled" to show consent. There were no significant gender differences on any of these

variables. However, significantly more women (72.4%) than men (63.6%) indicated that they "hugged or caressed" to indicate consent, and significantly more women (58.9%) than men (47.5%) indicated that they "did not move away" to indicate their consent. Participants were not asked how they indicated "yes" verbally, so it is not clear how participants interpreted these items when responding to the questionnaire. Overall, these results suggest that there are some gender differences in the use of consent signals.

Although this study suggests that nonverbal signals are more popular in showing consent than are verbal signals and that people often use a combination of signals to consent, this study did not examine whether different ways of consenting are considered more or less effective depending on the situation. However, it is likely that consent is situationally specific. For example, saying yes to a specific verbal initiation such as "Do you want to have sex?" probably has a different meaning than saying yes to a nonverbal initiation such as being undressed by a partner. Unfortunately, there was no information about participants' perceptions of how representative each signal was of sexual consent at all, let alone whether perceptions of signals are situationally specific.

The existing literature on consent provides us some important information on consent, but many unanswered questions remain. For example, our knowledge about perceptions of women's and men's consent is limited, and we do not know whether there are significant gender differences in how consent is inferred. Additionally, we do not know what kinds of signals are perceived as most representative of sexual consent, or if consent is situationally specific. In terms of actual signals used to convey consent, the data suggest that nonverbal consent signals are preferred over verbal consent signals, but our information about verbal signals is limited. It is unclear how women and men consent verbally. Additionally, there is mixed evidence as to whether women and men use different signals to convey consent. Finally, the information we do have regarding sexual consent provides us with an assortment of alternatively vague (e.g., verbal consent) and specific (e.g., smiling) signals,

without providing any organizational schema to aid our understanding of consent.

The Traditional Sexual Script, Sexual Initiations, and Sexual Refusals

The omission of sexual consent. One of the primary reasons we have so little information about sexual consent is that the vast majority of research on sexual communications has focused almost exclusively on sexual initiations and sexual refusals (e.g., Byers & Heinlen, 1989; Byers & Lewis, 1988; Christopher & Frandsen, 1990; Jesser, 1978; LaPlante, McCormick, & Brannigan, 1980; McCormick, 1979; Metts, Cupach, & Imahori, 1992; O'Sullivan & Byers, 1992; O'Sullivan & Byers, 1993; Perper & Weis, 1987; Quinn, Sanchez-Hucles, Coates, & Gillen, 1991). This focus most likely arose out of an adherence to the theory of the "traditional sexual script." Many researchers believe that the "traditional sexual script" serves as a prototype for women's and men's behavior in sexual situations. In the "traditional sexual script," men are responsible for initiating and pursuing sexual encounters whereas women are responsible for restricting the level of sexual activity, serving as "gate keepers" in sexual encounters (Gagnon & Simon, 1973; Peplau, Rubin, & Hill, 1977; Perper & Weis, 1987; Safilios-Rothschild, 1977; Sprecher & McKinney, 1993). Noticeably absent in the traditional sexual script is the concept of sexual consent. Although one might assume (rightly or wrongly) that a man who initiates a sexual encounter is also communicating consent to participate, it is unclear how the woman is to respond if she also wishes to engage in that activity. Despite the fact that research on the sexual communication signals has virtually ignored sexual consent signals, it can still provide us with some direction to facilitate our examination of sexual consent.

Conceptualizing sexual signals. One of the problems in research on sexual initiations and refusals is that the wide variety of methodologies used to examine them produces very different information about what supposedly are the same types of signals. For example, some researchers conceptualize sexual intent signals at a macrobehavioral level whereas others conceptualize them at a microbehavioral level. In other words, some researchers view

sexual signals as broad categories that encompass numerous related behaviors (macrobehaviors) such as "coercion" and "emotional and physical closeness" whereas others conceptualize sexual signals as separate, specific behaviors (microbehaviors) such as "kissing" and "allowing hands to wander." Similar problems could arise in studies of consent signals. What is needed is some sort of organizational schema to help conceptually organize very different kinds of information about the same topic.

McCormick (1987) provided such a schema in a review of the sexual initiation and refusal literature and the applications of sexual script theory. She categorized initiation and refusal signals as either direct or indirect and as either verbal or nonverbal. The direct/indirect categorization of sexual signals is based on research on more general influence strategies (Falbo, 1977; Falbo & Peplau, 1980) whereas the verbal/nonverbal categorization reflects a commonly understood distinction between communication approaches, one often used in sexual signal research (e.g., Byers & Heinlen, 1989; Byers & Lewis, 1989; Metts et al., 1992; Perper & Weis, 1987). McCormick (1979, 1987) defined direct sexual influence signals as strategies that depend on the influencees' awareness of how power is being used on them--the purpose of the signal is clear to both persons involved. Indirect sexual influence signals were defined as strategies that depend on the influencees' ignorance of how power is being used to influence them--the purpose of the influencers' actions are intentionally unclear. Initiations can be direct or indirect, as well as verbal or nonverbal, resulting in four categories of initiations. Similarly, refusals can be direct or indirect, verbal or nonverbal, resulting in four categories of refusals.

Such a schema might be useful in the examination of sexual consent signals as well, with some modifications. The definitions of indirect and direct "sexual influence strategies" used by McCormick (1979, 1987) are problematic when applied to consent for several reasons. Both definitions refer to initiation and refusal signals as "strategies," suggesting that people use "power" in an attempt to manipulate the situation to their advantage regardless of

their partner's wishes. Consent signals cannot be "strategies" because the term strategy contradicts the definition of consent used in this study: The free expression of willingness to engage in sexual activity. The definitions of "direct" and "indirect" used by McCormick (1979, 1987) are also problematic for similar reasons: Both definitions include the use of power to influence another, which contradicts the definition of consent used in this study. Moreover, a person cannot convey her or his willingness to have sexual intercourse if the other person is unaware they are doing so, as that definition of "indirect" implies. For these reasons, we will use the term "signals" rather than "strategies" to refer to behaviors and statements used to demonstrate consent. We will define "direct" consent signals as signals that are straightforward and unambiguous, and "indirect" consent signals as signals that are roundabout and ambiguous.

Gender and Perceptions of Sexual Intent

A common theme in the literature on sexual signals is that women and men use and perceive sexual signals differently (e.g., McCormick, 1987). Numerous studies using a variety of methodologies have found that, on average, men view things more sexually than do women. Measures used to assess sexual perceptions include ratings of sexiness, seductiveness, and promiscuity (Abbey, 1982; Abbey, Cozarelli, McLaughlin, & Harnish, 1987; Abbey & Harnish, 1995; Abbey & Melby, 1986; Johnson, Stockdale, & Saal, 1991; Saal, Johnson, & Weber, 1989; Shea, 1993; Shotland & Craig, 1988), perceptions of willingness to engage in sex (Botswick & DeLucia, 1992; DeSouza, Pierce, Zanelli, & Hutz, 1992; Muenlenhard, 1988), perceptions of a woman's sexual interest in a man (DeSouza et al., 1992; Shotland & Craig, 1988), and men's attraction for female targets (Abbey, 1982; Abbey & Melby, 1986). These findings have been replicated using a variety of methodologies. Researchers have examined participants' ratings of sexual perceptions in studies using photographs (Abbey et al., 1987; Abbey & Melby, 1986), video-taped conversations (Johnson et al., 1991; Saal et al., 1989; Shotland & Craig, 1988), written

vignettes (Abbey & Harnish, 1995; Botswick & DeLucia, 1992; DeSouza et al., 1992; Muehlenhard, 1988), and live interactions (Saal et al., 1989; Shea, 1989). Given the widespread evidence that gender does affect perceptions of sexual intent, it is probable that gender differences also affect perceptions of sexual consent.

Gender-based misperceptions and rape. It has been suggested that gender differences in perceptions of sexual intent can lead to sexual assault and rape (Abbey, 1991; see Crawford, 1995, for a further discussion). Indeed, anecdotal evidence suggests that gender-based misunderstandings do sometimes lead to rape (Bart & O'Brien, 1985; Warshaw, 1994). Empirical research has also found support for this hypothesis. In a study examining naturally occurring misperceptions of sexual intent, it was found that such misperceptions are common between women and men (Abbey, 1987). Seventy-two percent of women and 60% of men reported that they had at least one experience in which a member of the "opposite sex" misperceived their friendly behavior as sexually interested behavior. Although most misperceptions were minor in nature and were resolved quickly, some did lead to forced sexual activity, ranging from kissing to sexual intercourse. Significantly more women than men reported experiencing misperceptions, suggesting that gender differences in perceptions of sexual intent do contribute to misunderstandings between women and men. However, it is unclear from the data whether the men actually misunderstood the women's signals or deliberately ignored them.

Given the overwhelming evidence that gender affects perceptions of sexual intent, it is likely that gender affects perceptions of sexual consent as well. Men's tendency to view things more sexually than women may lead men to interpret more signals as representative of consent than women. Gender-based confusion about consent may contribute to misunderstandings that lead to sexual assault.

The Present Study

The present study is an exploratory investigation of how young women and men infer

and convey sexual consent. Female and male participants were given scenarios in which sex was initiated either verbally or nonverbally along with a list of possible responses someone could make to such initiations. They were asked to rate how representative each response would be of their own sexual consent (self-consent ratings), how representative each response would be of their date's sexual consent (date-consent ratings), and how frequently they use each response to signal their sexual consent in actual situations. The information provided will be used to address the following research questions:

1. Do consent signals factor analyze into conceptually clear factors reflecting direct/indirect and verbal/nonverbal dimensions?
2. What consent signals do participants report using the most? The least?
3. Is there a relationship between the consent signals participants report using themselves and their self-consent ratings?
4. Do women and men report using different consent signals?
5. Does the type of initiation (verbal or nonverbal) affect ratings of how representative the signals are of sexual consent?
6. Do women and men rate sexual consent signals differently in terms of how representative they are of their own sexual consent? Of their dates sexual consent?
7. Do women's self-consent ratings match men's date-consent ratings? Conversely, do men's self-consent ratings match women's date-consent ratings?

Method

Pilot Study

Purpose. The purpose of the pilot study was to gather information regarding how women and men communicate sexual consent both verbally and nonverbally. The responses to this pilot questionnaire were used to create items for the questionnaire used in the second phase of the study.

Participants. The pilot participants were 39 female and 28 male introductory

psychology students from the University of Kansas. Participants were predominantly European American, and most were first year students at the university. Their participation was solicited through posted sign-up sheets that did not mention the topic of the study. Each respondent received credit toward a course research requirement.

Questionnaire. Participants were asked to indicate whether they had ever had sexual intercourse. If they had never had sexual intercourse, they were asked to answer the questionnaire the way they thought they would if they had experienced sexual intercourse. The responses of participants who had never had sexual intercourse were eliminated from the analyses, leaving a total of 22 women and 22 men.

Participants were asked a series of open-ended questions regarding how they and their most recent sexual partner communicated consent for sexual intercourse (see Appendix A). For example, participants were asked the following question: "Have you ever been in a situation in which you definitely wanted to have sexual intercourse with someone, and they wanted to have sexual intercourse with you? If so: (a) How, if at all, did your partner communicate his or her consent verbally?' (b) How, if at all, did your partner communicate his or her sexual consent nonverbally?" They were also asked how they communicated consent to their partners. The intent was to identify the ways in which people communicate their sexual consent.

Procedure. The pilot questionnaires were administered to the participants in single-sex groups by a female graduate student researcher. After signing consent forms, participants completed the questionnaires anonymously, seated in alternate seats to protect their privacy. When they were finished, they were debriefed and given information about the purpose of the study as well the phone numbers of the researchers in case they had any questions regarding the study.

Results. Participants' responses to the pilot questions regarding how they and their partners communicate consent to sexual intercourse were compiled into a list of

behaviors. These lists were used to construct the questionnaire for the second part of the study.

Participants

The participants for the second phase of the study were 214 female and 210 male introductory psychology students at the University of Kansas. Participation was solicited in the same manner as was described above, and respondents received research credit for participating. The demographics of the participants were as follows: 84.7% European American, 3.1% African American, 3.1% Asian American, 1.7% Hispanic American, 1.4% biracial, 0.7% Native American/Alaskan, 3.1% International Students, and 2.4% other. Their mean age was 19. A total of 46 participants were dropped from the analyses for the following reasons: 29 failed validity checks, to be described later, and 9 had missing data that made analysis of their data impossible. Of these 9 participants, 5 skipped questions about whether they could imagine the scenarios depicted, 3 skipped one or more sections of the questionnaire, and 1 skipped questions about previous experience with sexual intercourse. International students ($n = 13$) were dropped in order to maintain the focus of the study on cultural norms in the United States. Similarly, the focus of this study was consent in heterosexual situations; therefore, one participant who reported being homosexual was dropped from the study. Finally, participants older than 26 ($n = 3$) were excluded to allow for an examination of sexual consent in traditional-aged college students. The sum of those in the exclusionary groups is greater than 46 because several participants were in more than one exclusionary category. This left a final sample of 378 participants.

Measures

Cover sheet. Participants were asked to complete a set of demographic questions as well as questions regarding their sexual experience history. These included questions about their sexual orientation, whether they had ever engaged in sexual

intercourse, and the number of partners with whom they had engaged in sexual intercourse (see Appendices B and C). For the purposes of this study, sexual intercourse was defined exclusively as penile-vaginal intercourse. Participants were asked to use this definition and were reminded of it throughout the questionnaire in order to ensure they were all thinking of the same kind of sexual behaviors when answering the questions.

Consent questionnaire. There were parallel versions of this questionnaire: one depicting verbal heterosexual initiations and one depicting nonverbal heterosexual initiations (see Appendices B and C). Each participant was randomly assigned to complete one of the two versions. Women and men received gender-appropriate forms. Each participant was asked to read and imagine being in two scenarios: two verbal initiation scenarios in the verbal version or two nonverbal initiation scenarios in the nonverbal version. In one scenario, they were asked to imagine themselves making a sexual advance. The scenarios read as follows:

Verbal Self-Initiation Scenario

You are very attracted to your date and would like to have sexual intercourse with her/him. You have been out several times, but the two of you have not had sexual intercourse (penile-vaginal intercourse) together before. The two of you are finally alone in a private place. You start to kiss her/him, and you decide to make a sexual advance by asking her/him directly, "Will you have sex with me?"

Nonverbal Self-Initiation Scenario

You are very attracted to your date and would like to have sexual intercourse with her/him. You have been out several times, but the two of you have not had sexual intercourse (penile-vaginal intercourse) together before. The two of you are finally alone in a private place. You make a sexual advance by sitting close to her/him, kissing her/him, and then starting to undress her/him.

After reading the scenario, participants were asked to indicate whether they could imagine themselves in the scenario. If so, they were asked to rate whether each of 34 behaviors would indicate that their date was giving sexual consent, using a scale ranging from 0 (does not show his/her consent to sexual intercourse) to 6 (definitely shows his/her consent to sexual intercourse). Most of the items on this list came from the pilot study, although a few (e.g., "she says 'no'") were added so that not all the behaviors would be positive. One item was later eliminated from analysis due inconsistent wording across forms, leaving a total of 33 behaviors. If participants were unable to imagine themselves in the scenario, they were asked to respond as if they were an outside observer of the situation. The responses of those who were unable to imagine themselves in the scenarios were dropped from the analyses related to this part of the questionnaire. Validity checks were included in which participants were asked to respond to an item with a specific number. Participants who failed these validity checks were eliminated from the analyses.

Participants were also asked to imagine that their date has made either a verbal or nonverbal sexual advance. The order of the self-initiation and date-initiation scenarios was counterbalanced across participants. The date-initiation scenarios read as follows:

Verbal Date-Initiation Scenario

You and your date have been out several times, but the two of you have not had sexual intercourse (penile-vaginal intercourse) together before. The two of you are finally alone in a private place. She/He starts to kiss you and then asks you directly, "Will you have sex with me?"

Nonverbal Date-Initiation Scenario

You and your date have been out several times, but the two of you have not had sexual intercourse (penile-vaginal intercourse) together before. The two of you are finally alone in a private place. She/He sits close to you, kisses you,

and starts to undress you.

After reading the scenario, they were asked to indicate whether they were able to imagine themselves in the scenario. If so, they were asked to rate whether each of 34 behaviors, parallel to those in the previous section, would show they were giving sexual consent in response to the described sexual advance on a scale ranging from 0 (does not show your consent to sexual intercourse) to 6 (definitely shows your consent to sexual intercourse). If they were unable to imagine themselves in the scenario, they were asked to respond as if they were an outside observer of the situation. The responses of those who were unable to imagine themselves in this scenario were eliminated from the analyses related to this scenario. Validity checks were also included in this section. As was discussed previously, one item was eliminated from the analysis due to inconsistent wording across forms, leaving a total of 33 behaviors.

Self-report of sexual consent signals. Both versions of this questionnaire also included a section in which participants were asked how frequently they engaged in each of the 34 behaviors, parallel to those in the two previous sections, in order to indicate sexual consent. They were asked to rate each item on a scale ranging from 0 (never do this to show consent) to 6 (always do this to show consent). They were reminded that the researchers were interested in how often they did the behavior in order to indicate sexual consent, not just how often they did each of the behaviors. Participants who had never had penile-vaginal sexual intercourse were asked to imagine what they thought they would do to consent to penile-vaginal intercourse when answering the questions in this section. Their responses were eliminated from the analyses of this section.

Procedure

The questionnaires were administered to the participants in single-sex groups by a female graduate student researcher. Participants completed the questionnaires anonymously and were seated in alternate desks to protect their privacy. They were first

asked to read and sign an informed consent sheet (see Appendix D) that included information about the topic of the study. The graduate student researcher then read aloud a script that included information about how to complete the questionnaire (see Appendix E). Participants were then given the materials in a manila envelope and were instructed to complete the packet starting with the cover sheet. They were asked to write any comments about or reactions to the topic and questions at the end questionnaire (see Appendix G for subject comments). When all of the participants had completed the questionnaires, they were asked to place their questionnaire in the manila envelope provided. The researcher then read the debriefing script and distributed a debriefing statement that included educational information about the purpose of the study and phone numbers of the researchers in the event that the participants had any questions (see Appendices E and F) .

Results

Descriptive Data

Of the 378 participants in the final sample, 364 (96.3%) identified themselves as heterosexual and 14 (3.7%) identified themselves as bisexual. Questions regarding their previous sexual experience revealed that 93 (24.6%) of the participants had never engaged in penile-vaginal intercourse and 285 (75.4%) of the participants had engaged in penile-vaginal intercourse with a mean number of 5.16 partners. The modal number of partners was one.

Participants had indicated whether they were able to imagine themselves in the scenarios depicted. A question of interest was whether their ability to imagine these scenarios varied as a function of participant gender and type of initiation (verbal or nonverbal). In order to answer this question, two 2-way analyses of variance (ANOVAs) were conducted. The ability to imagine themselves in the scenario was coded as 1 if they could imagine and to 2 if they could not imagine. In the first ANOVA, the dependent

variable was the ability to imagine their dates initiating sexual intercourse, and the independent variables were gender of the participant (female or male) and type of initiation (verbal or nonverbal). There were no significant differences in women's and men's ability to imagine their dates initiating sexual intercourse, $F(1, 373) = 1.64$, $p = .2012$, or in participants' ability to imagine their dates initiating verbally or nonverbally, $F(1, 373) = 1.58$, $p = .2089$ (see Table 1). There was no Gender x Type of Initiation interaction.

In the second 2-way ANOVA, the dependent variable was participants' ability to imagine themselves initiating sexual intercourse, and the independent variables were gender of the participant (female or male) and type of initiation (verbal or nonverbal). Significantly more men than women were able to imagine themselves initiating sexual intercourse, $F(1, 374) = 38.93$, $p < .0001$, and significantly more participants were able to imagine themselves initiating sex nonverbally than verbally, $F(1, 374) = 23.42$, $p < .0001$ (see Table 1). There was no Gender x Type of Initiation interaction.

Factor Analyses

Prior to comparing women's and men's ratings of different sexual consent behaviors, participants' ratings were factor analyzed. There were two purposes for conducting the factor analysis: investigating how items related to each other, and then using these results to create groups of items to be used in subsequent analyses. This analysis addressed Research Question 1. The analysis included only the ratings of participants who were able to imagine themselves in the depicted scenarios.

Each of the 33 consent behaviors had been rated on a 7-point Likert scale ranging from 0 (does not show consent to sexual intercourse) to 6 (definitely shows consent to sexual intercourse). Participants had rated the consent behaviors twice: once to indicate how representative each behavior would be of their own consent (self-consent ratings), and once to indicate how representative each behavior would be of their date's consent

Table 1

Ability to Imagine Scenarios By Participant Gender, Type of Initiation, and Initiator

Type of initiation	Gender of participants	
	Women ^a	Men ^b
Date-initiation scenarios		
Verbal	93.26%	90.59%
Nonverbal	97.00%	93.20%
Self-initiation scenarios		
Verbal	48.24%	73.03%
Nonverbal	66.99%	96.04%

^a_n = 188. ^b_n = 190.

(date-consent ratings).

For the factor analysis, female and male participants' responses were combined, and participants were randomly assigned to two groups. The self-consent ratings from one group and the date-consent ratings from the other group were used in the factor analysis. A principal-components factor analysis with a varimax rotation was conducted on these data, resulting in one factor pattern that described both self-consent ratings and date-consent ratings. This was done rather than conducting two separate factor analyses, one for self-consent ratings and one for date-consent ratings, in order to facilitate later comparisons. Six factors emerged from the factor analysis (see Table 2).

Items that loaded at least .50 on each factor were considered representative of that factor, with the following exceptions: Four items were eliminated because they cross loaded on more than one factor, and two were eliminated to facilitate conceptual clarity. The six factors, respectively, involved indirect nonverbal behaviors, indirect verbal statements, statements concerning alcohol intoxication, direct verbal statements, a direct refusal, and a direct nonverbal behavior.

Calculating factor ratings. For each of the factors that emerged, factor ratings were calculated for each participant. These were computed separately for the self-consent ratings and the date-consent ratings. Each participant's factor rating equaled the mean of his or her responses to the items on that factor. These factor ratings were used as dependent variables in subsequent analyses.

Self-Reported Use of Consent Signals

Only participants who had experience with penile-vaginal intercourse were included in the following analyses of self-reported use of consent signals. To answer Research Question 2, means were calculated in order to determine which consent signals participants used most frequently. On a scale ranging from 0 (never do this to show consent) to 6 (always do this to show consent) participants reported that they sometimes use indirect nonverbal

Table 2

Factor Analysis of Self-Consent Ratings and Date-Consent RatingsIndirect Nonverbal Signals (.94; .95)^a

She/He touches and kisses you in return; You touch and kiss her/him in return

She/He helps you undress her/him; You help her/him undress you

She/He undresses you; You undress him/her

She/He puts her/his hands down your pants; You put your hands down her/his pants

She/He rubs, fondles, and touches you sexually; You rub, fondle, and touch her/him sexually

She/He starts having dry sex with you (humping with clothes on); You start having dry sex with her/him (humping with clothes on)

She/He smiles; You smile

She/He kisses you in return; You kiss her/him in return

She/He doesn't stop you from kissing her/him and touching him/her sexually; You don't stop her/him from kissing you and touching you sexually

She/He does not resist your sexual advances; You do not resist her/his sexual advances

She/He lets you take her/his clothes off; You let her/him take your clothes off

She/He hugs and caresses you; You hug and caress her/him

She/He gets physically closer to you; You get physically closer to her/him

Indirect Verbal Signals (.81; .78)^a

She/He asks, "Do you want to have sex?"; You ask, "Do you want to have sex?"

She/He talks about the importance of using birth control if you do have sex; You talk about the importance of using birth control if you do have sex

She/He suggests you should get a condom out; You suggest she/he get a condom out

(table continues)

Table 2 (continued)

She/He talks about her/his positive feelings about having sex with you; You talk about your positive feelings about having sex with her/him

She/He asks if you have a condom; You ask if she/he has a condom

Intoxication Signals (.95; .95)^a

She/He says, "I'm feeling a little drunk"; You say "I'm feeling a little drunk"

She/He says "I'm really drunk"; You say "I'm really drunk"

Direct Verbal Signals (.66; .79)^a

She/He says, "I want you"; You say "I want you"

She/He says, "Yes"; You say "Yes"

She/He says, "I want to have sex with you"; You say "I want to have sex with you"

She/He says, "I would like to sleep with you"; You say "I would like to sleep with you"

She/He says, "I consent to sexual intercourse"; You say "I consent to sexual intercourse"

Refusal Signals

She/He says, "No"; You say "No"

Direct Nonverbal Signals

She/He doesn't say anything--she/he just starts having intercourse with you; You don't say anything--you just start having intercourse with her/him

Note. Date-consent signals in response to the participant's initiation are presented to the left of the semicolon, and self-consent signals given in response to the date's initiation are presented to the right of the semicolon.

^a These numbers represent the coefficient alphas for date-consent and self-consent ratings, respectively.

($M = 3.79$; $SD = 1.34$), indirect verbal ($M = 3.22$; $SD = 1.38$), direct verbal ($M = 3.21$; $SD = 1.52$) and direct nonverbal ($M = 3.12$; $SD = 2.20$) signals to show sexual consent.

Participants reported that they seldom use statements about intoxication ($M = 0.44$; $SD = 1.04$) or a direct refusal ($M = 0.50$; $SD = 1.33$) to show consent.

Self-reported behaviors and ratings of sexual consent signals. In order to address Research Question 3, Pearson's correlations were performed to assess the relationship between participants' ratings of how often they use different behaviors to indicate sexual consent and their ratings of how representative each behavior is of their own sexual consent. This allowed us to assess whether people actually use the signals they rate as hypothetically representing their own consent to sexual intercourse. Overall, participants' self-reported use of different signals correlated positively and significantly with their ratings of how representative these behaviors are of their own sexual consent: for indirect nonverbal signals, $r = .592$, $p < .0001$; for indirect verbal signals, $r = .277$, $p < .0001$; for statements about intoxication, $r = .432$, $p < .0001$; for direct verbal signals, $r = .174$, $p = .0032$; for a direct refusal, $r = .158$, $p = .0077$; and for direct nonverbal signals, $r = .202$, $p = .0006$.

Gender differences in the use of consent signals. In order to address Research Question 4, a between-subjects multivariate analyses of variance (MANOVA) was conducted with gender of the participant as the independent variable and ratings of self-reported use of consent signals as the dependent variable. There was a significant gender difference, $F(6, 275) = 10.03$, $p < .0001$. Follow-up ANOVAs showed that men reported using indirect nonverbal signals and statements about intoxication to signal consent more frequently than did women. Women reported using indirect verbal signals to show consent more frequently than did men. Women and men reported using direct verbal signals and direct nonverbal signals to show consent with similar frequency, and both reported they did not use direct refusals to show consent (see Table 3).

Table 3

Women's and Men's Self-Reported Use of Consent Signals

Factor	Gender of participants		F	p
	Women ^a	Men ^b		
Indirect Nonverbal	3.46 (1.38)	4.13 (1.21)	18.65	.0001
Indirect Verbal	3.50 (1.30)	2.92 (1.41)	12.73	.0004
Intoxication	0.25 (0.85)	0.65 (1.19)	10.29	.0015
Direct Verbal	3.21 (1.56)	3.19 (1.49)	0.01	.9249
Refusal	0.60 (1.57)	0.40 (1.01)	1.69	.1947
Direct Nonverbal	3.06 (2.21)	3.21 (2.21)	0.33	.5653

Note. Scale ranged from 0 (never do this to show consent) to 6 (always do this to show consent). Table entries are means with standard deviations shown in parentheses.

^a $n = 146$. ^b $n = 136$.

Women's and Men's Ratings of the Meaning of Consent Signals

Type of initiation and gender differences. To answer Research Questions 5 and 6, two 2 x 2 between-subjects MANOVAs were performed on female and male participants' factor ratings of consent signals. For the first MANOVA, the independent variables were the gender of the participants (female or male) and the type of initiation (verbal or nonverbal), and the dependent variables were the six self-consent factor ratings. For the second MANOVA, the independent variables were participant gender and type of initiation, and the dependent variables were the six date-consent factor ratings. There were no significant interactions between gender and type of initiation in either MANOVA, so these variables will be discussed separately.

Type of initiation. The MANOVA revealed that type of initiation (verbal or nonverbal) significantly affected self-consent ratings, $F(6, 344) = 11.06, p < .0001$, as well as date-consent ratings, $F(6, 263) = 8.05, p < .0001$. Follow-up ANOVAs showed that participants indicated that *indirect nonverbal signals* were more representative of their consent and of their dates' consent in response to verbal initiations than in response to nonverbal initiations (see Table 4). However, they indicated that *indirect verbal signals* were more representative of their consent and of their dates' consent in response to nonverbal initiations than in response to verbal initiations. Participants also rated a direct refusal as less representative of their own consent in response to verbal initiations than in response to nonverbal initiations, although in both cases these ratings were low. There was a *similar but nonsignificant trend* for date-consent ratings. The type of initiation had no significant impact on the ratings of intoxication signals, direct verbal signals, or direct nonverbal signals.

Participant gender. The MANOVA revealed that gender of the participant significantly affected self-consent ratings, $F(6, 344) = 13.36, p < .0001$, but not date-consent ratings, $F(6, 263) = 1.38, p = .2214$. Follow-up ANOVAs revealed that men rated their own direct

Table 4

Mean Self-Consent Ratings and Date-Consent Ratings of Sexual Consent Signals in Verbal and Nonverbal Initiation Scenarios

Factor	Type of initiation		F	p
	Verbal	Nonverbal		
Ratings of one's own consent signals^a				
Indirect Nonverbal	3.88 (1.25)	3.55 (1.35)	5.50	.0196
Indirect Verbal	3.99 (1.21)	4.59 (0.99)	30.37	.0001
Intoxication	1.02 (1.57)	1.10 (1.55)	0.40	.5278
Direct Verbal	5.28 (1.01)	5.26 (0.90)	0.01	.9297
Refusal	0.11 (0.59)	0.30 (1.01)	4.08	.0442
Direct Nonverbal	5.34 (1.45)	5.36 (1.44)	0.01	.9140
Ratings of dates' consent signals^b				
Indirect Nonverbal	3.86 (1.15)	3.44 (1.23)	8.49	.0039
Indirect Verbal	3.99 (1.08)	4.52 (0.97)	13.45	.0003
Intoxication	1.08 (1.52)	1.10 (1.54)	0.01	.9116
Direct Verbal	5.50 (0.48)	5.43 (0.54)	0.73	.3927
Refusal	0.06 (0.33)	0.23 (0.91)	43.44	.0646
Direct Nonverbal	5.66 (1.03)	5.61 (0.99)	0.27	.6041

Note. Table entries are means with standard deviations shown in parentheses.

^aScale ranged from 0 (does not show your consent to sexual intercourse) to 6 (definitely shows your consent to sexual intercourse). $n = 353$. ^bScale ranged from 0 (does not show her/his consent to sexual intercourse) to 6 (definitely shows her/his consent to sexual intercourse). $n = 272$.

verbal, direct nonverbal, indirect verbal, and indirect nonverbal signals as more representative of their sexual consent than did women (see Table 5). Men also rated statements about their level of intoxication as more representative of their consent than did women. Both women and men rated a direct refusal similarly as not indicative of sexual consent.

Assessing the potential for miscommunication. To answer Research Question 7, two between-subjects MANOVAs were performed. The first compared men's self-consent ratings and women's date-consent ratings to assess possible gender miscommunications about sexual consent. This analysis compared how men rated their own consent signals and how women rated their male dates' signals to see if women and men have similar understandings of how men consent to sexual intercourse. A significant gender difference was found, suggesting that women and men have different understandings of how men signal consent to sexual intercourse, $F(6, 281) = 3.86, p = .0010$. Follow-up ANOVAs revealed that men rated indirect nonverbal signals, indirect verbal signals, and intoxication signals as more representative of their own sexual consent than women rated these signals as representative of their male dates' consent (see Table 6). Direct verbal signals were rated as similarly representative of a man's sexual consent by both women and men, as were a direct refusal and direct nonverbal signals.

Similarly, a between-subjects MANOVA was performed on women's self-consent ratings and men's date-consent ratings. Again, a significant gender difference was found, suggesting that women and men have different understandings of how women signal consent to sexual intercourse, $F(6, 325) = 7.51, p < .0001$. Follow-up ANOVAs revealed that for all signals except a direct refusal, women rated their own signals as less representative of sexual consent than men rated their female dates' signals (see Table 7). There was no significant difference between women's and men's ratings of a direct refusal, and these

Table 5

Women's and Men's Mean Self-Consent Ratings and Date-Consent Ratings

Factor	Gender of participants		F	p
	Women	Men		
Rating's of one's own consent signals ^a				
Indirect Nonverbal	3.31 (1.25)	4.07 (1.27)	32.34	.0001
Indirect Verbal	3.95 (1.13)	4.68 (1.01)	45.15	.0001
Intoxication	0.55 (1.06)	1.55 (1.80)	40.48	.0001
Direct Verbal	5.05 (1.13)	5.48 (0.69)	19.73	.0001
Refusal	0.16 (0.73)	0.28 (0.95)	1.67	.1969
Direct Nonverbal	5.11 (1.69)	5.58 (1.12)	8.85	.0031
Ratings of dates' consent signals ^b				
Indirect Nonverbal	3.15 (1.18)	3.67 (1.23)	0.55	.4577
Indirect Verbal	4.28 (1.06)	4.34 (1.04)	0.02	.9025
Intoxication	0.77 (1.33)	1.30 (1.62)	7.12	.0081
Direct Verbal	5.44 (0.53)	5.47 (0.51)	0.42	.5168
Refusal	0.14 (0.66)	0.18 (0.80)	0.27	.6063
Direct Nonverbal	5.59 (1.12)	5.65 (0.92)	0.11	.7352

Note. Table entries are means with standard deviations shown in parentheses.

^a Scale ranged from 0 (does not show your consent to sexual intercourse) to 6 (definitely shows your consent to sexual intercourse). $n = 353$. ^b Scale ranged from 0 (does not show her/his consent to sexual intercourse) to 6 (definitely shows her/his consent to sexual intercourse). $n = 272$.

Table 6

Women's Mean Ratings of Their Male Dates' Consent Signals Compared With Men's Ratings of Their Own Sexual Consent Signals

Factor	Gender of participants		F	p
	Women ^a	Men ^b		
Indirect Nonverbal	3.51 (1.18)	4.07 (1.27)	10.85	.0011
Indirect Verbal	4.28 (1.06)	4.68 (1.01)	10.60	.0013
Intoxication	0.77 (1.33)	1.55 (1.80)	14.44	.0002
Direct Verbal	5.44 (0.53)	5.48 (0.69)	0.36	.5486
Refusal	0.14 (0.66)	0.28 (0.95)	2.17	.1416
Direct Nonverbal	5.59 (1.12)	5.58 (1.12)	0.07	.7987

Note. Table entries are means with standard deviations shown in parentheses. Scale ranged from 0 (does not show his/your consent to sexual intercourse) to 6 (definitely shows his/your consent to sexual intercourse).

^an = 110. ^bn = 180.

Table 7

Men's Mean Ratings of Their Female Dates' Consent Signals Compared With Women's Ratings of Their Own Sexual Consent Signals

Factor	Gender of participants		F	p
	Women ^a	Men ^b		
Indirect Nonverbal	3.31 (1.25)	3.67 (1.23)	7.54	.0063
Indirect Verbal	3.95 (1.13)	4.33 (1.04)	9.23	.0026
Intoxication	0.55 (1.06)	1.30 (1.62)	24.68	.0001
Direct Verbal	5.05 (1.13)	5.47 (0.51)	19.91	.0001
Refusal	0.16 (0.73)	0.18 (0.80)	0.02	.8818
Direct Nonverbal	5.11 (1.69)	5.65 (0.92)	12.10	.0006

Note. Table entries are means with standard deviations shown in parentheses. Scale ranged from 0 (does not show her/your consent to sexual intercourse) to 6 (definitely shows her/your consent to sexual intercourse).

^an = 173. ^bn = 161.

ratings were low, suggesting that women and men agree that a direct refusal does not indicate sexual consent.

Discussion

Sexual Consent Signals

The results of this study suggest that the communication of sexual consent is far more complex than simply saying "yes" to a sexual initiation. The young women and men in this study indicated that they used a variety of signals to indicate their consent and that they viewed a wide variety of signals as representative of sexual consent in heterosexual situations. These ranged from signals as vague as smiling to more straightforward statements such as "I want to have sex with you." Most of the sexual consent signals in this study fell into identifiable categories of direct and indirect, verbal and nonverbal consent signals.

Reported use of consent signals. Participants who had previously engaged in sexual intercourse reported that they used a variety of signals to indicate their sexual consent in actual situations. Although they did not indicate that they used one type of signal all the time, they did report sometimes using indirect verbal signals, indirect nonverbal signals, direct verbal signals, and direct nonverbal signals. This suggests that participants use a wide repertoire of behaviors to signal consent. Participants reported that they virtually never used statements about their level of intoxication or direct refusals to signal their sexual consent, suggesting that these behaviors are not "consent" signals.

Self-reported use of consent signals was moderately related to ratings of how representative the signals were of sexual consent. This indicates that the participants who had experience with sexual intercourse were more likely to use consent signals they viewed as representative of sexual consent than signals they viewed as unrepresentative of sexual consent. However, the use of consent signals and the degree to which different consent signals were rated as representative of sexual consent were, in many cases, dependent on other factors such as gender and the way in which sex was initiated.

Gender and Sexual Consent

Gender and the self-reported use of consent signals. Closer examination of the self-reported use of consent signals revealed that there were small differences between women and men in the kinds of consent signals they reported using. Women were more likely than men to use indirect verbal signals, whereas men were more likely than women to use indirect nonverbal signals and statements about their level of intoxication to indicate sexual consent (though the use of intoxication statements was relatively rare). These differences are important for they suggest the possibility of gender-based misunderstandings. Women and men may expect that their date would consent in the same way they would consent. Therefore, if their date does or says something that they themselves would use to signal consent, they may mistakenly assume the date is signaling consent. However, it is important to note that the actual numerical differences between women's and men's self-reported use of these consent signals were quite small--less than 1 point on a 7-point scale. Additionally, both women and men were equally likely to use direct verbal and direct nonverbal signals, and equally unlikely to use refusals to signal consent. Though there were differences that could contribute to gender-based miscommunication, there were far more similarities than differences in women's and men's self-reported use of consent signals.

Gender and perceptions of sexual consent. There were also gender differences in ratings of how representative signals would be of one's own sexual consent in response to a date's sexual initiation. Men rated direct verbal signals, indirect verbal signals, direct nonverbal signals, indirect nonverbal signals, and statements about intoxication as more representative of their own sexual consent than did women. This is not surprising, given that numerous studies have found that men rate women, other men, and even themselves more sexually than women do (Abbey, 1982; Abbey et al., 1987; Abbey & Harnish, 1995; Abbey & Melby, 1986; Botswick & DeLucia, 1992; DeSouza et al., 1992; Johnson et al., 1991; Muehlenhard, 1988; Saal et al., 1989; Shea, 1993; Shotland & Craig, 1988). It seems that men's tendency

to see things in more sexual terms than women also affects men's perceptions of how representative their own signals are of consent. The one exception is saying "no" to signal consent. Women and men rated a direct refusal of "no" as being equally unrepresentative of their sexual consent, suggesting this is one signal that is unambiguous and unaffected by gender.

Interestingly, women and men were in agreement about the meaning of their dates' sexual consent signals. Analyses revealed that there were no significant gender differences on this variable, suggesting that women and men have similar ideas of how representative their dates' signals are of sexual consent. Though women and men have similar ideas about whether their dates' signals represent consent, they mean different things when they themselves use these signals. That is, women interpret their male dates' signals the same way that men interpret their female dates' signals, but paradoxically, as discussed in the previous paragraph, men's signals represent a *greater level of sexual consent* than do the same signals given by women. This sets up the potential for sexual miscommunications.

Assessing the possibility of gender based miscommunication. Further exploration of the potential for miscommunication between women and men revealed that men rated their female dates' signals as more *representative of consent* than women rated their own consent signals. Men rated their female dates' indirect nonverbal signals, indirect verbal signals, intoxication statements, verbal direct signals, and nonverbal direct signals as more representative of their female dates' sexual consent than women rated their own sexual consent signals. Likewise, men rated their own indirect nonverbal signals, indirect verbal signals, and statements about intoxication as more representative of their own sexual consent than women rated their male dates' signals. Here, too, it seems that men's tendency to view things more sexually than women affects how men interpret sexual consent signals. This, taken in combination with the differences between women and men in what they mean by different consent signals, suggests the potential for gender-based sexual miscommunication.

However, it is important not to exaggerate these gender differences. Although there were significant gender differences in the expected direction, the actual ratings of signals were quite similar. In all cases in which significant gender differences were found in perceptions of consent signals, the differences between women's and men's ratings for each kind of signal were always less than 1 point on a 7-point scale, just as they were in ratings of the use of consent signals. Women and men did not have diametrically opposed views of what constituted sexual consent. Although men exhibited a tendency to view things in a slightly more sexualized fashion than women, the differences between women's and men's perceptions of sexual consent signals were small. Additionally, there was agreement on an important issue: Both men and women rated direct refusals as equally unrepresentative of sexual consent, suggesting direct refusals are unambiguous signals.

Gender and sexual initiations. There were also significant gender differences in ability to imagine oneself initiating sexual intercourse. More men than women were able to imagine themselves initiating sexual intercourse both verbally and nonverbally. This fits with the traditional sexual script, in which men are the sexual aggressors who initiate sexual intercourse and women are the recipients of these initiations (Gagnon & Simon, 1973; Peplau et al., 1977; Perper & Weis, 1987; Safilios-Rothschild, 1977; Sprecher & McKinney, 1993). This has implications for sexual consent. Given that men will most often be initiating sexual intercourse, men will be interpreting women's consent signals more often than women will be interpreting men's consent signals. Thus, women's misinterpretations of men's consent signals are less relevant to most sexual situations than men's misinterpretations of women's sexual signals. As was discussed previously, men are slightly more likely than women to interpret women's signals as representative of sexual consent. Therefore, men's misunderstandings of women's signals are more likely to lead to sexual assault than are women's misunderstandings of men's signals.

Verbal and Nonverbal Initiations

Type of initiation and sexual consent. The way in which sexual intercourse is initiated does influence what behaviors are seen as representing consent. Women and men rated indirect verbal signals as more representative of their and their dates' sexual consent in response to nonverbal initiations than in response to verbal initiations. However, their dates' indirect nonverbal signals were rated as more representative of sexual consent in response to verbal initiations than in response to nonverbal initiations. Interestingly, the effect of the type of initiation on perceptions of sexual consent was limited to indirect signals: The type of initiation did not affect how participants rated direct verbal signals, direct nonverbal signals, intoxication statements, or refusal signals. Direct verbal and nonverbal signals were rated as most representative of sexual consent in response to both verbal and nonverbal initiations, whereas intoxication statements and refusal statements were rated as most unrepresentative of consent in response to both verbal and nonverbal initiations.

It seems that the meanings of indirect verbal and nonverbal signals are more situationally specific than are direct verbal and nonverbal signals. It may be that the unclear nature of indirect signals forces the initiator to look to the situation for cues as to whether the respondent has actually consented. For example, if sex is initiated verbally with "Will you have sex with me?" and the date responds with an indirect verbal response such as "Do you want to have sex?", this may seem questioning and uncertain. If sex is initiated nonverbally and this same indirect verbal response is given, it might be seen as clarifying the situation. Conversely, if sex is initiated nonverbally (e.g., you make a sexual advance by sitting close to her/him, kissing her/him, and then starting to undress her/him) and the date gives an indirect nonverbal response (e.g., letting you take her or his clothes off), it is not clear what is going on. The initiator is not certain if their date has consented to anything, let alone to sexual intercourse. But if sex is initiated nonverbally and a person responds with an indirect verbal response (e.g., suggests you get a condom out) this might clarify the direction of the encounter. It may be that when both people use on indirect signals, consent is less obvious

when both people are verbal or nonverbal than when one person is verbal and the other is nonverbal. Further research is needed to clarify the role of the type of initiation on perceptions of sexual consent and explore the situational specificity of consent signals.

Implications

Miscommunication and acquaintance rape. Many researchers have discussed the possibility that sexual miscommunication between women and men contributes to acquaintance rape (Abbey, 1982; Abbey, 1987; Bart & O'Brien, 1985; Warshaw, 1994). Women have been advised to clearly communicate their sexual intentions to prevent being raped. This "prevention strategy" is problematic, for it suggests that it is women's responsibility to ensure that men understand their sexual intentions, not men's responsibility to listen to their partner or date and communicate their sexual intentions (Crawford, 1995). Additionally, it encourages victim blaming, for women are held responsible when their communication efforts "fail" and they are raped (Crawford, 1995; Warshaw, 1994).

Although this study found evidence that women and men do have different ideas about how representative signals are of sexual consent, the differences between women and men were small. It is unlikely, given the similarity in women's and men's perceptions and reported self-use of consent signals, that miscommunication about consent is major contributing factor to acquaintance rape. Although there are probably situations in which men misunderstand women's sexual wishes and rape them as a result (e.g., Bart & O'Brien, 1992; Warshaw, 1994), the data from this study suggest this is unlikely. It is more likely that sexually aggressive men selectively ignore or reinterpret what women say to fit what they want to hear, using miscommunication as an excuse for raping (Warshaw, 1994).

Token resistance. "Token resistance" is a term used to describe situations in which a person feigns reluctance to engage in a sexual activity despite willingness and intentions to engage in the activity (O'Sullivan & Allgeier, 1994). In other words, it is when someone says "no" to sexual advances but means "yes" (Muehlenhard & Hollabaugh, 1988). Token

resistance is viewed by many to be a typical dating behavior (Edgar & Fitzpatrick, 1993; Sandberg, Jackson, & Petretic-Jackson, 1987). Both women and men have reported using token resistance for a variety of reasons, ranging from religious concerns to a desire to be in control (Muehlenhard & Hollabaugh, 1988; O'Sullivan & Allgeier, 1994). However, the women and men in this study consistently rated "saying no" as unrepresentative of both their consent and their dates' consent. Furthermore, women and men who had previously engaged in sexual intercourse reported almost never using a direct refusal as a consent signal.

The discrepancy between the findings of the current study and previous research on token resistance may be related to previously unrecognized problems in research on token resistance. In a recent study, researchers attempted to ascertain women's and men's understandings of the concept of token resistance (Muehlenhard & Rogers, 1996). Participants were provided with a commonly used definition of token resistance and were asked to write narratives describing incidents in which they had engaged in token resistance meeting that definition. Although both men (82.5%) and women (67.7%) reported engaging in token resistance, their narratives revealed that they had misunderstood the definition, casting doubt on the self-reported percentages. It is likely that women and men in previous studies on token resistance also misunderstood the definition of token resistance, and that the percentages reported are inflated due to this misunderstanding. Therefore, it is not surprising that the women and men in this study generally believed that "no" means "no."

Educational. The data from this study could be useful both in rape prevention education and in sex education. Women and men can now be provided factual information about what signals are generally considered representative and unrepresentative of sexual consent in heterosexual situations. For example, statements about intoxication were rated quite low by women and men, suggesting they are not considered to be representative of sexual consent, despite previous research that has found that the observed use of alcohol increases perceptions of sexual intent (Abbey & Harnish, 1995; Corcoran & Thomas, 1991;

George, Gournic, & McAfee, 1988). Similarly, direct refusals were rated low by both women and men, suggesting that women and men agree that saying "no" is not representative of sexual consent.

Additionally, this study is consistent with previous studies findings that men have a tendency to view things in a more sexualized fashion than women. Both women and men need to be aware that they may mean slightly different things when they use the same consent signals. This creates the possibility of gender-based miscommunications, but women and men need to be taught that "misunderstanding" someone's consent signals is not an acceptable excuse or reason for committing rape. Women who are raped are not responsible for being raped because they "communicated poorly": sexually aggressive men are responsible for forcing sex on women who have not consented.

This information about consent can only be helpful in preventing rape if it is heard by both women and men; therefore, men need to be included in rape prevention efforts, both as educators and as audience-participants (Warshaw, 1994). Additionally, we need to challenge the stereotype that women and men speak completely different languages in sexual situations. This stereotype perpetuates rape by assuming gender-based miscommunication is inevitable and unavoidable, opening the door for men to use miscommunication as an excuse for raping.

Directions for Future Research

Consent in long-term relationships. Numerous participants wrote comments on the questionnaire that they felt being in a relationship affected how they signaled consent. One female participant stated that "a smile does not mean consent in a bar to a guy I hardly know, but it does with my boyfriend" (subject #137). It may be that couples develop more idiosyncratic rules for interpreting each other's behavior and sexual signals as the relationship develops (Peplau et al., 1977). There may also be a sense of entitlement that encourages people to presume sexual consent in relationships (Shotland & Goodstein, 1992). Further

research is needed in this area.

Different populations. The current study was designed to assess how young women and men perceive and communicate consent in heterosexual situations. Although the information from this study might be useful as a starting point for future research, it is probably unwise to attempt to generalize this information to other populations. Further research is needed to examine how people of different ages, socio-economic groups, ethnic groups, and sexual orientations infer and convey consent. Additionally, it is possible that the gender of the researcher (female) affected some participant's responses. In the future, the gender of the researcher should be counterbalanced across male and female participants to control for the possible effects of this variable.

Conclusion

When the students and administrators at Antioch College developed the mutual consent guidelines, they unintentionally created an international controversy, generating discussion about a previously ignored topic: sexual consent. Unfortunately, at the time there was little empirical data about how people conceptualize and communicate consent to help inform the discussion. The results of this study clearly indicate that consent is complex and can take many forms. Simply requiring that people verbally communicate consent by saying, "I consent to sexual intercourse," as the Antioch College mutual consent guidelines did, is probably unrealistic for most people. We need to generate a new dialogue about the nature of consent and encourage young women and men to talk about consent, both in sexual situations and in the classroom. Such discussions would minimize the possibility of gender-based miscommunications about sexual consent and help eliminate harmful stereotypes that perpetuate rape.

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Appendix A

Pilot Study Questions

- (1) Have you ever been in a situation in which someone wanted to have sexual intercourse with you, and you wanted to have sexual intercourse with them, and you had sexual intercourse? If so: (a) How, if at all, did you communicate sexual consent verbally? (b) How, if at all, did you communicate sexual consent nonverbally?
- (2) Have you ever been in a situation in which someone wanted to have sexual intercourse with you and you did not really want to have sexual intercourse with them, but you agreed to anyway? If so: (a) How, if at all, did you communicate your consent verbally? (b) How, if at all, did you communicate your consent nonverbally?
- (3) Have you ever been in a situation in which you definitely wanted to have sexual intercourse with someone, and they wanted to have sexual intercourse with you? If so: (a) How, if at all, did your partner communicate their sexual consent verbally? (b) How, if at all, did your partner communicate their sexual consent nonverbally?
- (4) Have you ever been in a situation in which you definitely wanted to have sexual intercourse with someone, and they did not really want to but agreed anyway? If so: (a) How, if at all did your partner communicate their sexual consent verbally? (b) How, if at all, did your partner communicate their sexual consent nonverbally?
- (5) Have you ever been in a situation in which you talked about whether to have sexual intercourse with your partner and then you consented verbally? If so, what did you say? How did you feel about that? How did your partner respond (verbally and/or nonverbally)?
- (6) Have you ever been in a situation in which you talked about whether to have sexual intercourse with your partner and decided not to have sexual intercourse? If so, what did you say? How did you feel about that? How did your partner respond (verbally and/or nonverbally)?
- 7) Is there anything you do (or have done in the past) that you think others might take to mean sexual consent when you don't meant it to?
- 8) Are there any other ways you have communicated sexual consent with past partners? Please describe.

Appendix B

Female Version of Questionnaire With Verbal Initiation Scenarios

This questionnaire is completely anonymous. Do NOT put your name anywhere on this questionnaire!

Part 1

Below are some questions about yourself. Some questions are a bit more personal than others. Please read each questions carefully and answer honestly. Remember, your answers are anonymous.

1. Age: _____

2. Sex: _____

3. Race/Ethnicity:

African American Native American/Alaskan
 Asian American Hispanic American
 European American/White Biracial
 International Student (specify country) _____
 Other (please specify) _____

4. What year are you in school?

First Year Second Year Third Year
 Fourth Year Fifth Year and Beyond Special Student

5. What is your sexual orientation?

Heterosexual (only sexually interested in members of the other sex)
 Homosexual (only sexually interested in members of the same sex as yourself)
 Bisexual (sexually interested in both men and women)

6. Have you ever had sexual intercourse (by that we mean penile-vaginal intercourse?) (circle one)

a) yes b) no

7. If yes, with how many partners have you had penile-vaginal sexual intercourse?

_____ partners

(over)

Part 2

We are interested in finding out how people communicate sexual consent--how they let each other know they want to have sexual intercourse (penile-vaginal intercourse). Please read the following scenario twice and imagine yourself in this scenario as you answer the questions that follow.

You and your date have been out several times, but the two of you have not had sexual intercourse (penile-vaginal intercourse) together before. The two of you are finally alone in a private place. He starts to kiss you and then asks you directly, "Will you have sex with me?"

Try to imagine yourself in this situation.

Yes, I can imagine myself in this situation.

Please answer the following questions and rate the degree to which each behavior would show YOU have consented to sexual intercourse in response to your date's sexual advance. We are interested in what you really think. **There are no right or wrong answers.**

No, I can't imagine myself in this situation.

Please answer the following questions as you would if you were an outside observer of the situation. Rate the degree to which each behavior would show the woman in the scenario has consented to sexual intercourse in response to the sexual advance described above. We are interested in what you really think. **There are no right or wrong answers.**

0	1	2	3	4	5	6
does not show your consent to sexual intercourse						definitely shows your consent to sexual intercourse

In response to his sexual advance of asking you directly "Will you have sex with me?"...

you say, "I want you."

you say, "Yes."

you say, "I want to have sex with you."

you say, "I would like to sleep with you."

you ask, "Do you want to have sex?"

you say, "No."

you say, "I want to feel you."

you talk about the importance of using birth control if you do have sex.

you suggest he should get a condom out.

0	1	2	3	4	5	6
does not show your consent to sexual intercourse						definitely shows your consent to sexual intercourse

In response to his sexual advance of asking you directly "Will you have sex with me?"...

- you tell him that you love him.
 you talk about your mixed feelings about having sex with him.
 you talk about your positive feelings about having sex with him.

 you ask if he has a condom.
 you don't say anything--you just start having intercourse with him.
 you touch and kiss him in return.

 you help him undress you.
 you undress him.
 you put your hands down his pants.

 you rub, fondle, and touch him sexually.
 you start having dry sex with him (humping with clothes on).
 you scratch your arm--answer this question with an eight.

 you pull a condom out.
 you smile.
 you kiss him in return.

 you don't stop him from kissing you and touching you sexually.
 you do not say no.
 you do not resist his sexual advances.

 you let him take your clothes off.
 you hug and caress him.
 you get physically closer to him.

 you say, "I'm feeling a little drunk."
 you say, "I'm really drunk."
 you slide your hand over the leg of your tight jeans.

 you suggest that two of you should go into the bedroom.
 you say, "I consent to sexual intercourse."

(over)

Part 3

Please read the following scenario twice and imagine yourself in this scenario as you answer the questions that follow.

You are very attracted to your date and would like to have sexual intercourse with him. You have been out several times, but the two of you have not had sexual intercourse (penile-vaginal intercourse) together before. The two of you are finally alone in a private place. You start to kiss him and you decide to make a sexual advance by asking him directly, "Will you have sex with me?"

Try to imagine yourself in this situation.

___ **Yes**, I can imagine myself in this situation.

Please answer the following questions and rate the degree to which each behavior would show your DATE has consented to sexual intercourse in response to your sexual advance. We are interested in what you really think. **There are no right or wrong answers.**

___ **No**, I can't imagine myself in this situation.

Please answer the following questions as you would if you were an outside observer of the situation. Rate the degree to which each behavior would show the man in the scenario has consented to sexual intercourse in response to the sexual advance described above. We are interested in what you really think. **There are no right or wrong answers.**

0	1	2	3	4	5	6
does not show his consent to sexual intercourse						definitely shows his consent to sexual intercourse

In response to your sexual advance, asking him directly "will you have sex with me"...

___ he says, "I want you."

___ he says, "Yes."

___ he says, "I want to have sex with you."

___ he says, "I would like to sleep with you."

___ he asks, "Do you want to have sex?"

___ he says, "No."

___ he says, "I want to feel you."

___ he talks about the importance of using birth control if you do have sex.

___ he suggests you should get a condom out.

0	1	2	3	4	5	6
does not show his consent to sexual intercourse						definitely shows his consent to sexual intercourse

In response to your sexual advance, asking him directly "will you have sex with me"...

- he tells you that he loves you.
 he talks about his mixed feelings about having sex with you.
 he talks about his positive feelings about having sex with you.
- he asks if you have a condom.
 he doesn't say anything--he just starts having intercourse with you.
 he touches and kisses you in return.
- he helps you undress him.
 he undresses you.
 he yawns--answer this question with a nine.
- he puts his hands down your pants.
 he rubs, fondles, and touches you sexually.
 he starts having dry sex with you (humping with clothes on).
- he pulls a condom out.
 he smiles.
 he kisses you in return.
- he doesn't stop you from kissing him and touching him sexually.
 he does not say no.
 he does not resist your sexual advances.
- he lets you take his clothes off.
 he hugs and caresses you.
 he gets physically closer to you.
- he says, "I'm feeling a little drunk."
 he says "I'm really drunk."
 he slides his hand over the leg of his tight jeans.
- he suggests that you go into the bedroom.
 he says, "I consent to sexual intercourse."

(over)

Part 4

Please use the scale below to rate how frequently you actually do each of the following behaviors to indicate your consent to sexual intercourse (penile-vaginal intercourse). **We are interested in what you really do, not what you think you should do. There are no right or wrong answers.**

If you have never had sexual intercourse, please answer the following questions the way you think someone who has had sexual intercourse would answer them.

NOTE: We are NOT asking how often you do these behaviors; we are interested in how often you do them TO SHOW YOUR CONSENT to sexual intercourse (penile-vaginal intercourse).

0	1	2	3	4	5	6
never			sometimes			always
do this to			do this to			do this to
show consent			show consent			show consent

When I want to show my consent to sexual intercourse...

_____ I say, "I want you."

_____ I say, "Yes."

_____ I say, "I want to have sex with you."

_____ I say, "I would like to sleep with you."

_____ I ask, "Do you want to have sex?"

_____ I say, "No."

_____ I say, "I want to feel you."

_____ I talk about the importance of using birth control if we do have sex.

_____ I suggest he should get a condom out.

_____ I tell him that I love him.

_____ I talk about my mixed feelings about having sex with him.

_____ I talk about my positive feelings about having sex with him.

_____ I ask if he has a condom.

_____ I don't say anything--I just start having intercourse with him.

_____ I touch and kiss him in return.

_____ I touch my toes--answer this question with a nine.

_____ I help him undress me.

_____ I undress him.

_____ I put my hands down his pants.

_____ I rub, fondle, and touch him sexually.

_____ I start having dry sex with him (humping with clothes on).

_____ I pull a condom out.

_____ I smile.

_____ I kiss him in return.

0	1	2	3	4	5	6
never			sometimes			always
do this to			do this to			do this to
show consent			show consent			show consent

When I want to show my consent to sexual intercourse...

_____ I don't stop him from kissing me and touching me sexually.

_____ I do not say no.

_____ I do not resist his sexual advances.

_____ I let him take my clothes off.

_____ I hug and caress him.

_____ I get physically closer to him.

_____ I say, "I'm feeling a little drunk."

_____ I say "I'm really drunk."

_____ I slide my hand over the leg of my tight jeans.

_____ I suggest that we should go into the bedroom.

_____ I say, "I consent to sexual intercourse."

We are interested in your thoughts, feelings, and reactions to this questionnaire. Please use this space to write any comments you may have.

Appendix C

Male Version With Nonverbal Initiation Scenarios

This questionnaire is completely anonymous. Do NOT put your name anywhere on this questionnaire!

Part 1

Below are some questions about yourself. Some questions are a bit more personal than others. Please read each questions carefully and answer honestly. Remember, your answers are anonymous.

1. Age: _____

2. Sex: _____

3. Race/Ethnicity:

_____ African American	_____ Native American/Alaskan
_____ Asian American	_____ Hispanic American
_____ European American/White	_____ Biracial
_____ International Student (specify country) _____	
_____ Other (please specify) _____	

4. What year are you in school?

_____ First Year _____ Second Year _____ Third Year
 _____ Fourth Year _____ Fifth Year and Beyond _____ Special Student

5. What is your sexual orientation?

___ Heterosexual (only sexually interested in members of the other sex)
 ___ Homosexual (only sexually interested in members of the same sex as yourself)
 ___ Bisexual (sexually interested in both men and women)

6. Have you ever had sexual intercourse (by that we mean penile-vaginal intercourse?) (circle one)

a) yes b) no

7. If yes, with how many partners have you had penile-vaginal sexual intercourse?

_____ partners

(over)

Part 2

We are interested in finding out how people communicate sexual consent--how they let each other know they want to have sexual intercourse (penile-vaginal intercourse). Please read the following scenario twice and imagine yourself in this scenario as you answer the questions that follow.

You are very attracted to your date and would like to have sexual intercourse with her. You have been out several times but the two of you have not had sexual intercourse (penile-vaginal intercourse) together before. The two of you are finally alone in a private place. You make a sexual advance by sitting close to her, kissing her, and then starting to undress her.

Try to imagine yourself in this situation.

___ **Yes**, I can imagine myself in this situation.

Please answer the following questions and rate the degree to which each behavior would show YOU have consented to sexual intercourse in response to your date's sexual advance. We are interested in what you really think. **There are no right or wrong answers.**

___ **No**, I can't imagine myself in this situation.

Please answer the following questions as you would if you were an outside observer of the situation. Rate the degree to which each behavior would show the woman in the scenario has consented to sexual intercourse in response to the sexual advance described above. We are interested in what you really think. **There are no right or wrong answers.**

0	1	2	3	4	5	6
does not show her consent to sexual intercourse						definitely shows her consent to sexual intercourse

In response to your sexual advance in which sit close to her, kiss her, and then start to undress her...

_____ she says, "I want you."

_____ she says, "Yes."

_____ she says, "I want to have sex with you."

_____ she says, "I would like to sleep with you."

_____ she asks, "Do you want to have sex?"

_____ she says, "No."

0
does not show
her consent
to sexual
intercourse

6
definitely shows
her consent
to sexual
intercourse

**In response to your sexual advance in which you sit close to her,
kiss her, and then start to undress her...**

_____ she says, "I want to feel you."
_____ she talks about the importance of using birth control if you do have sex.
_____ she suggests you should get a condom out.

_____ she tells you that she loves you.
_____ she talks about her mixed feelings about having sex with you.
_____ she talks about her positive feelings about having sex with you.

_____ she asks you if you have a condom.
_____ she doesn't say anything--she just starts having intercourse with you.
_____ she touches and kisses you in return.

_____ she helps you undress her.
_____ she undresses you.
_____ she yawns--answer this question with a nine.

_____ she puts her hands down your pants.
_____ she rubs, fondles, and touches you sexually.
_____ she starts having dry sex with you (humping with clothes on).

_____ she pulls a condom out.
_____ she smiles.
_____ she kisses you in return.

_____ she doesn't stop you from kissing her and touching her sexually.
_____ she does not say no.
_____ she does not resist your sexual advances.

_____ she lets you take her clothes off.
_____ she hugs and caresses you.
_____ she gets physically closer to you.

_____ she says, "I'm feeling a little drunk."
_____ she says, "I'm really drunk."
_____ she slides her hand over the leg of her tight jeans.

_____ she suggests that you go into the bedroom.
_____ she says, "I consent to sexual intercourse."

(over)

Part 3

Please read the following scenario twice and imagine yourself in this scenario as you answer the questions that follow.

You and your date have been out several times but the two of you have not had sexual intercourse (penile-vaginal intercourse) together before. The two of you are finally alone in a private place. She sits close to you, kisses you, and then starts to undress you.

Try to imagine yourself in this situation.

Check one of the following.

Yes, I can imagine myself in this situation.

Please answer the following questions and rate the degree to which each behavior would show YOU have consented to sexual intercourse in response to your date's sexual advance. We are interested in what you really think. **There are no right or wrong answers.**

No, I can't imagine myself in this situation.

Please answer the following questions as you would if you were an outside observer of the situation. Rate the degree to which each behavior would show the man in the scenario has consented to sexual intercourse in response to the sexual advance described above. We are interested in what you really think. **There are no right or wrong answers.**

0	1	2	3	4	5	6
does not show your consent to sexual intercourse					definitely shows your consent to sexual intercourse	

In response to her sitting close, kissing you, and then starting to undress you...

you say, "I want you."

you say, "Yes."

you say, "I want to have sex with you."

you say, "No."

you say, "I would like to sleep with you."

you ask, "Do you want to have sex?"

you say, "I want to feel you."

you talk about the importance of using birth control if you do have sex.

you suggest she should get a condom out.

0	1	2	3	4	5	6
does not show your consent to sexual intercourse					definitely shows your consent to sexual intercourse	

In response to her sitting close, kissing you, and then starting to undress you...

- you tell her that you love her.
 you talk about your mixed feelings about having sex with her.
 you talk about your positive feelings about having sex with her.
- you don't say anything--you just start having intercourse with her.
 you ask if she has a condom.
 you touch and kiss her in return.
- you help her undress you.
 you undress her.
 you put your hands down her pants.
- you rub, fondle, and touch her sexually.
 you start having dry sex with her (humping with clothes on).
 you scratch your arm--answer this question with an eight.
- you pull a condom out.
 you smile.
 you kiss her in return.
- you don't stop her from kissing you and touching you sexually.
 you do not say no.
 you do not resist her sexual advances.
- you let her take your clothes off.
 you hug and caress her.
 you get physically closer to her.
- you say, "I'm feeling a little drunk."
 you say, "I'm really drunk."
 you slide your hand over the leg of your tight jeans.
- you suggest that two of you should go into the bedroom.
 you say, "I consent to sexual intercourse."

(over)

Part 4

Please use the scale below to rate how frequently you actually do each of the following behaviors to indicate your consent to sexual intercourse (penile-vaginal intercourse). **We are interested in what you really do, not what you think you should do. There are no right or wrong answers.**

If you have never had sexual intercourse, please answer the following questions the way you think someone who has had sexual intercourse would answer them.

NOTE: We are NOT asking how often you do these behaviors; we are asking but how often you do them TO SHOW YOUR CONSENT to sexual intercourse (penile-vaginal intercourse).

0	1	2	3	4	5	6
never			sometimes			always
do this to			do this to			do this to
show consent			show consent			show consent

When I want to show my consent to sexual intercourse...

_____ I say, "I want you."

_____ I say, "Yes."

_____ I say, "I want to have sex with you."

_____ I say, "I would like to sleep with you."

_____ I ask, "Do you want to have sex?"

_____ I say, "No."

_____ I say, "I want to feel you."

_____ I talk about the importance of using birth control if we do have sex.

_____ I suggest she should get a condom out.

_____ I tell her that I love her.

_____ I talk about my mixed feelings about having sex with her.

_____ I talk about my positive feelings about having sex with her.

_____ I ask if she has a condom.

_____ I don't say anything--I just start having intercourse with her.

_____ I touch and kiss her in return.

_____ I touch my toes--answer this question with a nine.

_____ I help her undress me.

_____ I undress her.

_____ I puts my hands down her pants.

_____ I rub, fondle, and touch her sexually.

_____ I start having dry sex with her (humping with clothes on).

_____ I pull a condom out.

_____ I smile.

_____ I kiss her in return.

0	1	2	3	4	5	6
never do this to show consent			sometimes do this to show consent			always do this to show consent

When I want to show my consent to sexual intercourse...

_____ I don't stop her from kissing me and touching me sexually.

_____ I do not say no.

_____ I do not resist her sexual advances.

_____ I let her take my clothes off.

_____ I hug and caress her.

_____ I get physically closer to her.

_____ I say, "I'm feeling a little drunk."

_____ I say, "I'm really drunk."

_____ I slide my hand over the leg of my tight jeans.

_____ I suggest that we should go into the bedroom.

_____ I say, "I consent to sexual intercourse."

We are interested in your thoughts, feelings, and reactions to this questionnaire. Please use this space to write any comments you may have.

Appendix D
Consent Form

The Department of Psychology at the University of Kansas supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the present study. You should be aware that even if you agree to participate, you are free to withdraw at any time without penalty.

We are interested in studying what people think sexual consent is and how people communicate sexual consent. If you decide to participate in this study, we will ask you to fill out a questionnaire that contains questions about how you communicate sexual consent. When you are finished we would like you place it into a manila folder to ensure your anonymity. This process should take *not longer* than an hour. Although participation may not directly benefit you, we believe the information you provide us with will be useful to both educators and therapists in the future.

Your participation is solicited although strictly voluntary. We assure you that your name will not be associated in any way with the research findings. To ensure your anonymity, do not place your name anywhere on the questionnaire. If you would like additional information concerning this study before or after it is completed, please feel free to contact me either by phone or mail.

Sincerely,

Susan E. Hickman, M.A.
Principal Investigator
315 Fraser Hall
864-4121

Charlene Muehlenhard, Ph.D.
Faculty Advisor
406 Fraser Hall
864-4121

Signature of subject agreeing to participate

With my signature I affirm that I am at least 18 years of age and have received a copy of the consent form to keep.

Appendix E

Script

(The following was read aloud to participants at the beginning and end of the study)

My name is Susan Hickman. I appreciate you being here and would like to thank you for taking part in this study.

Is everyone sure you have not participated in this study before? You'll want to leave if you have already participated in this study, because you will not receive credit for participating in it a second time. If the information on the overhead, you've probably already participated in this study. If you're not sure, come up before I pass out the questionnaire packets and I'll check your name against my list.

It takes most people under a half-hour to finish answering all the questions in the first questionnaire packet. When you finish, please remain in your seat because I have a short 3-minute presentation I would like to give.

Has everyone gotten a consent form and had a chance to read it? Are there any questions about the consent form? If you have decided to participate in this study, sign one copy and pass it forward, and keep one copy for yourself.

Before I pass out the first questionnaire packets, I would like to tell you about three very important things. First, for this study to be valid and useful, it's essential that you feel safe enough to be totally honest with yourself when answering these questions. I am doing several things to help encourage this.

- *I want you to know that I'm doing everything possible to ensure anonymity. That's why I'm asking you NOT to put your name or ID anywhere.

- *That's also why I'm giving you envelopes in which you will put your completed questionnaire. At the end of the session, you will place them in a large manila envelope at the front of the room.

- * That's also why I have seated you in every other seat, so you will have privacy in answering the questions honestly.

Second, this study consists of a set of questionnaires, with instructions that you can read as you go along, following the set of instructions for each individual section. It is extremely important for you to read the directions carefully, for each section is different. If you come across anything that is confusing, please don't hesitate to come ask me to explain it. There are different forms for men and women. If you are concerned that you may have received a form inappropriate for your sex, please let me know.

Thirdly, it is also very important that you read every question carefully. Sometimes, to be sure you are reading each question, you are asked to answer a question with a specific number. For example, the question might read "answer this one with a fifty." You would then put the number fifty in the space provided. Now, while you should take time to read each item carefully, once you have read and understood an item, it's best to answer it quickly with your first impulse.

In order to help you better understand what we are asking you to do, I will give you a brief example. In two parts of this study, you will be presented with a scenario depicting you on a

date. For example the scenario might read: [following information in italics shown on overhead projector]

You and your date are sitting on the sofa. You make a move.

0	1	2	3	4	5	6
<i>does not show his/her consent to sexual intercourse</i>				<i>definitely shows his /her consent to sexual intercourse</i>		

In response to your sexual advance...

___ *he /she sneezes.*

___ *he/she winks.*

(Show scenario on overhead and read aloud.) If possible, you are to imagine yourself in that scenario. You are then asked a series of questions about possible behaviors that might happen next in the scenario. You are asked to rate on a scale of 0 to 6 how representative of sexual consent each behavior would be to you in that situation. For example, here you are being asked to rate how representative each behavior is of your partner's consent to sexual intercourse. The first behavior is "sneezing". Now, you are probably thinking that sneezing has nothing to do with signaling consent. If this is what you are thinking, you would put "0-- does not show her/his consent to sexual intercourse" on this line. If you thought that sneezing showed your date's consent to sexual intercourse, then you would put "6-- definitely shows his/her consent to sexual intercourse." [Repeat for second item.] When you are finished, you will have numbers in each of these spaces representing your ratings of each behavior.

You will also be presented with slightly different scenarios. In these scenarios, you will be asked to rate if different behaviors are representative of your OWN sexual consent. For example, the scenario might read: [following scenario projected on overhead]

You and your date are sitting on the sofa. Your date makes a move.

0	1	2	3	4	5	6
<i>does not show your consent to sexual intercourse</i>				<i>definitely shows your consent to sexual intercourse</i>		

In response to her /his sexual advance...

___ *you sneeze.*

___ *you wink.*

[Go through example in a manner similar to the previous example, stressing that the participant is rating what their own behaviors would mean in the scenario.]

Is that clear? Are there any questions? Each of you will have different answers to these questions. There is not trick here, and there are no right or wrong answers--I am simply

interested in what you think!

I am also asking you to place comments about the questionnaires on the bottom of the last page. Please write down any typos you see, any questions you have, and tell me about the things you find confusing. I would also love to get any reactions you might have to the questionnaire. I would GREATLY appreciate your comments!

Thank you for your participation. Are there any questions before you begin? Okay, I will pass out your envelope and you can start. Once you are finished, please place the questionnaire back in the envelope and wait quietly for everyone else to finish.

[At end of the session when everyone has completed the questionnaire and placed in an envelope, read the following.]

Thank you for participating in my study. I would like to tell you a little bit about the purpose of this study before you leave.

The purpose of this study was to examine how people communicate sexual consent. Recently, the issue of sexual consent has become a topic of public discussion. For example, you may be aware of the controversy regarding the sexual consent guidelines at Antioch College in Ohio. In 1991, students and administrators got together to figure out a way to promote sexual communications between men and women, and to decrease the incidence of sexual assault. They developed guidelines that required students to ask each other for explicit consent for each level of sexual intimacy, whether it be kissing or sexual intercourse. When the international press first broke the story of the Antioch Rules in 1993, it generated a lot of discussion. Many people made fun of the mutual consent guidelines, and questioned how realistic it was to expect people to ask for explicit consent.

Unfortunately, there is very little research examining how people consent to sexual intercourse to help us determine how practical such expectations are. There is actually a great deal of research about how people initiate sex and refuse sex, but little about how people consent to sex. Given that most sex is consensual, we are missing an important piece of information about human sexuality. One reason people are so concerned about sexual consent is that it is the central issue in cases of rape. People often debate whether certain behaviors are representative of consent. Men and women often seem to have different opinions about what constitutes sexual consent, which can lead to confusion and misunderstanding in sexual situation.

I hope the information you provided today will help me to learn how people communicate sexual consent and what factors affect the ways in which people communicate consent. I also hope the information you provided will enable me to determine whether there are gender differences in perceptions of sexual consent. This information could be very useful to therapists, legal experts, sexuality educators, and rape prevention educators.

If you would like to talk about this topic or would like more information about my study, please feel free to contact either of me or my advisor by phone or by mail. I would also be happy to take your name and address if you are interested in receiving a copy of the results of this study. Thank you for your participation.

Are there any questions? I will now give you a handout with a statement similar to the one I just read.

Appendix F

Subject Comments

We are interested in your thoughts, feelings, and reactions to this questionnaire. Please use this space to write any comments you may have.

(102: male) There were alot [sic] of things that I personally would not do to consent sex [sic], but that does not mean that they don't consent sex [sic].

(103: male) I was a little confused by the "answer this with an eight" or "nine" if I was supposed to do literally what it said sorry...but I just put down what I thought about the question.

(105: male) This was an unusual and very direct experiment. This is not something I talk about a whole lot, but I seemed to feel comfortable answering these questions. Hats off for getting an experiment like this together. It was very interesting.

(112: male) Page 3 #12--need space between arm and answer
 --are those questions thrown into [sic] make sure person [sic] is actually reading--they are annoying
 --I am somewhat confused about the response "I consent to sex." I put as [sic]"5" and "6" even though those words are not spoken by me or a partner I have been with
 --if I were conservative in regard to sex I might not like some of graphic language in the questionnaire.

(113: male) On part 2 I was a little confused on the layout.

(119: male) I do not know how the other person can show her consent to sexual intercourse. People is [sic] so different today that it is hard to tell. What I said about myself is o.k. Women are so hard to understand. They can say yes today and no tomorrow and they will still get away with it. I just hope something good came out of this questionnaire.

(123: male) Some questions seem a bit confusing and repetitive.

(124: female) The questions were a bit personal, but I don't mind answering them even though I had to rethink some situations.

(126: female) Part 4 is sort of confusing as to what exactly you are asking and is difficult not answer [sic] how often you do it.

(128: female) In my opinion, to get better feedback the survey should be more specific on how serious the relationship is. If it's a boyfriend answers would be different than a couple dates. I treated the survey [sic] as if it were my boyfriend.

(129: female) I've been with the same guy for 3 years and we live together, it's hard to think about consent because we rarely ask or think about asking. If people are just dating, they should be careful in how they show consent some matters may turn into date rape.

(131: female) The only comment I have is that I would never consent to having sex with someone after just a couple of dates.

(134: female) I honnestly [sic] don't think I would ever say "I consent to having sex with you." I [sic] just sounds weird.

(137: female) I have been with the same person for 2 yrs, so on the first part of the survey I probably answered differently than I would about casual dates. For example, a smile does not mean consent in a bar to a guy I hardly know, but it does with my boyfriend.

(139: female) The questions sometimes become confusing. I found the first one to be the most confusing, as in the way I should answer them because of that fact that I could imagine myself in that situation but I would not consent [sic] to sex unless I was married to that person.

(140: female) I like this experiment, even as I was answering the questions it made me think about the sexual activities I allow myself to be [sic]. This is a concept I don't think about. By rating the scenarios I have a different understanding of how I should conduct myself when I am w/a member of the opp. sex. Thanks my outlook on sexual consent is totally different!

(143: female) I hope this questionnaire helps your research, however some of the questions on page 3 were hard to understand. The questions where you say "you hug and caress [sic] her and you get closer to her" (don't you mean him instead of her?) (NOTE: Questionnaires were corrected on FNOS version after this to say him instead of her)

(152: female) It might just be me but some of the statements seemed slightly ambiguous. For instance, saying something like "I love you" may not mean consent one way or other--it may mean "I love you, but..."

(156: female) I thought this questionnaire was very well done and thought out.

(158: female) I really don't understand the questions such as: "I touch my toes--answer this question with a nine. So I just marked a 0 next to it. Those questions should make more sense.

(159: female) I think its [sic] interesting. I think the 3rd part should come before the first two because it made more sense to me after I did that part.

(162: female) I'm glad I took this test because some of the questions you have asked--I have also been thinking about. This has really helped me decide how I feel about certain issues.

(166: male) I didn't really mind the questionnaire. Maybe this will show that women many times show several signs of consent to men, even if they deny it the day after.

(167: male) I'm a little unsure what sexual consent is after this survey.

(169: male) I find it interesting that what I consider strong signs of sexual consent from myself I did not rate as high if my girlfriend did the same. I suppose it's a fear of being accused of rape so men want to be totally sure of their partner's consent.

(170: female) The questions were very personal, but I felt safe answering them honestly b/c the experimenter made us feel safe w/the envelopes and sitting every other seat.

(172: male) I would really have sex with my partner (girlfriend) if we really love each other. I don't really like to have sex with a lot of girls--it makes me boring [sic].

(173: male) It is difficult to narrow sexual consent down to one response...usually there would be several signs in each area...that made it difficult to decide how strong a motivator each of the examples would be.

(177: male) I thought it was very straight forward for the most part but a few questions could

be more explicit.

(178: male) Some people don't drink and it's hard to imagine these things when they abhor you and seem very disgusting. I don't drink and found it hard to answer when I've never drank alcohol.

(180: female) This questionnaire was sort of fun. It made me think about what I do in these scenarios. Hopefully my answers will help you with your experiment.

(181: female) I thought the questions were straight forward and clear. I feel like guys always want to have sex so the survey opened my eyes a little to what a guy may mean or want.

(183: female) A few of the questions were confusing. Also, I found that the questionnaire does not take into consideration or asks [sic] if you are in a long term relationship. I think this would make some of the questions easier to answer.

(185: male) This questionnaire forced me to think about consent in a way that I hadn't before.

(187: male) Some of the questions on pgs. 7 and 8 are confusing.

(188: female) I think that it is totally human to want to get crazy w/sex. People should be able to have sex with anyone they want, and with no limitations. As long as protection is used. We are another type of animals, there should be no boundaries in our sexual experience.

(191: male) I doubt I am very helpful. I **do not think** most stuff is weird, but I also don't believe in premarital sex. It would **be interesting** to see how much higher guys numbers are on this than girls, though. Have a nice day. Oh, and I figure since I will be married before I have sex, I don't need to worry about condoms too much.

(192: male) I'm waiting until marriage to have sex.

(194: female) I think this is a little to [sic] personal. *It's almost as if the reader is getting off by reading our answers.*

(196: female) Part 4 is confusing because the question has 2 meanings.

(198: female) This questionnaire helped me realize that, even though I'm open to new experiences, I'm kind of old-fashioned. I'd rather just have me and my boyfriend for a long-time or nothing at all. This gives us a chance to look into our sexual life.

(199: female) This survey is interesting and fun to fill out.

(201: male) I think these questions are a good idea to get people's opinions but I believe that the questions should cover a larger variety of situations because some people think little advances and certain situations are actually advances.

(202: male) This is a cool study. Too bad we can't try some of [sic] things in class.

(209: female) --good study, but it seems like there are questions that are repetitive

(207: female) Question #5 in Part 5 = should make into 2 questions = If a close male friend and If a close female friend....I feel differently towards lesbians than gays.

(210: female) I've been w/my current partner for one year. We'll be getting married eventually so our "mating-rituals" are understood. The phrase "I consent..." is no longer necessary.

(211: female) I thought the questionnaire [sic] was good and showed my points and aspects a person may have.

(212: female) This experiment was interesting it [sic] was weird because I have never really thought about some of these questions and this stuff happens but is never talked about!

(214: male) I think is great to have this questionnaires [sic] and it would be very interesting to see the results.

(215: female) I thinkg this was an interesting questionnaire [sic]. I don't feel embarassed at all, sharing my sexual feelings/experiences (to an extent) w/people. The way I look at sex is that it is different for everyone and it is an intimate experience for 2 people, only, not anyone else. Personally, I can't or couldn't have sex w/anyone I didn't love.

(216: female) I thought the questions were written well; easy to understand and straight-forward. They didn't leave much room for any misinterpretation of what was being asked, which made it easier to give an concrete, truthful answer to the question.

(217: male) This was explained well.

(218 : male) I intent [sic] to become a psych major and my interest lie [sic] in sex psychology--for lack of a better term. I would like to find out more about this research.

(219: male) Some of the responses were hard to figure out. If you would actually do that in a situation. For the most part, this was very straight forward, and a good servey [sic].

(220: male) The nature of your proposed criteria for sexual consent is often overly simplistic. It seems that rather than giving an adequate illustration of one's views towards sexual consent they circumnavigate essential characteristics of personality; of both parties.

(224: female) --It may also be beneficial to have us write other ways that people conceive or have dealt with consent.

--dealing with the same situations just a reversal of roles=Maybe you should have 2 situations and reverse roles both times. Consent, in my opinion has a lot to do with the person and the situation. Long term? One date? A month? each offer different levels of intimacy.

(228: male) I feel that this survey allows people to realize how they feel about sexual relationships, that they probably wouldn't think about on their own.

(229: male) It seems to me that our society has trained males to see sex as glamorous and acceptable, and men should go out and actively pursue sex. Whereas women are taught to be prudish even though I'm sure that they feel the same way as men. Also, it can be terribly difficult to pick up on the signals that a woman is giving, however as soon as I puck up anything that is remotely negative I will stop.

(231: female) Basically is [sic] made for people more experienced with sexual intercourse--never had it so consent to sex has never happened.

(235: female) I think it was very well handled by the experimenter. The study itself I think will also be useful. At times the scales get confusing.

(236: female) It would be interesting to see how honest most people are when filling out this

questionnaire...

(239: female) For the record, I believe erotic materials and experiences are great in a monogamous, long-term relationship with a consenting partner, but experimentation with many partners is dangerous in this era. I hope this questionnaire can emphasize that not all who engage in these activities are at risk for STDs, etc., because there is not always a correlation between exciting sex and promiscuity. (these comments only relate to the latter part of form).

(240: female) This is I'm sure a good study, and I am glad you really do not go into our personal life--cause that would be upsetting or at least I think.

(241: female) I thought that this survey was very interesting. I think that the questions could have been explained a little bit differently!

(243: male) How do I manipulate my genitals. It sounds exciting.

(246: male) Some of the questions are not very clear.

(251: male) I have had sex with only one girlfriend, but many of the consents you have listed have come up before. I have found that even when a girl asks me if I want to have sex with her, it takes an awful lot of questions to find out what she really wants. Girls are just plain confusing.

(253: female) *Sexual consent is when both partners agree verbally to have sex and have prepared themselves for it.* Taking a guy or girl home with you from a bar or party drunk is not a consent to have sex. I don't really understand what the questionnaire is trying to test, but these are good questions, although a lot of people wouldn't answer them honestly. I did!

(255: female) The word "humping" seems awkward and too slangy for this sort of survey.

(257: female) Made me horny!

(258: female) *Although this has nothing, really, to do w/the survey, I just wanted to say that you were very good at presenting it...you are a very good speaker.*

(260: female) It is interesting to compare what I do to consent to sex and what you think someone else does to consent to it.

(262: female) This was interesting, especially to me because I'm French. We do not have problems such as date rape in France because everybody is extremely open about sex and nobody is ashamed of it (even if you never had [sic] intercourse). Personally, I think that if you always are straightforward and honest about what you want to do with a person you will not get "date raped" and will enjoy your sexual life.

(265: male) Part IV may conflict with Parts II & III. I have been in situations in which consent was an issue but have never given it. Therefore part IV becomes conflicting. I had to switch to a mode of figuring out what others might do. I would say that I'm on the verge of having sex for the first time, but I am also engaged. The two or three date scenario of having sex has never happened to me.

(267: male) This questionnaire is most likely disturbing to close [sic] minded individuals. I think it's going to help in your studies.

(270: female) I felt that some of the questions were difficult to answer because although I

have had sexual intercourse it's only been a few times and the person I am with I will be with for the rest of my life.

(271: female) These question [sic] were personal. I'm glad no one can see my answers.

(272: female) Since I haven't had sex, it's a lot harder to know what I'd do to show sexual consent.

(273: female) I find this subject interesting and enjoy answering questions of this nature. However, a little more variation in choices on the 1st 3 sections would have been nice.

(274: female) Some ways to consent (common ones) are not listed such as saying "Do you want to make love?" "I want to make love" "I want to be inside of you" etc. And some of the ways to consent are too vague like "yes" "no" "smile" etc.

(275: male) Interesting connection between my personal forms of showing consent and my view of others forms of showing consent. Fairly similar but I feel that to get a womens consent she must be more specific than when I give my consent to them.

(276: male) I think this is a good study for people my age. In a day with no hard and fast rules about sexual relations, sexual communications is very important.

(277: male) When it comes to consent no means no, even in the act.

(278: male) Need to highlight more of what you are looking for. Some of the questions I tended to answer for another questions (like would I do this or is this how I would react in the situation). When the question was this is how I would show my consent.

Some of the questions have to many different scenarios that my tell or not tell that you or her consents to sexual intercourse. Sometimes you don't even know if you consent or are you just doing it.

(279: male) It might help to give a situation where one partner says "yes" then changes his/her mind with a response of "no". It might give a better view as to how people would react in a situation.

(281: male) #21 on this page: answered as if "more than one...at the same time..." There are important differences between "consent" and "sexual interest." I don't know how well these questions can discriminate between the two.

(283: male) I like the use of the questions to see if people are actually reading the questionnaire.

(297: male) It was very interesting questionnaire. I hope it was useful, I answered as honestly as I could.

(300: female) nope [sic]. sorry. This was good.

(303: male) There should be an exact definition of what the researcher believes the word "consent" to mean. Promisquity and sexual "reputation" of date should be an issue in here.

(304: male) Honesty and openness is what counts sexually. It won't guarantee that feelins won't be hurt but it will ensure that your partner is as ready and willing as you.

(306: male) Thanks for taking into account the possibility of same-sex relationships!!

(307: male) Some of the questions could have been both agreement and disagreement. It all depends on the setting. I think that a scenario is needed. [Referring to SOS? Only scale in packet that had a scale ranging from agree to disagree.]

(310: female) I have answered these questions as honestly as possible. However, I think it's important to note that I am sexually involved with my boyfriend of several years. If I were placed in a different situation (e.g.--just dating the person) then my answers would likely be different. In future surveys, it might be helpful for you if you included a question regarding your affiliation with the partner described.

(312: female) I think you should word the questions differently.

(313: female) I haven't had sexual intercourse yet; however, I am involved in a relationship for 9 months now and we have discussed sex a lot in the last few months. Anyway, my point being that Part 4 should not be to think about others, but still to put yourself in your own shoes and imagine these things with you partner.

(315: female) I think in today's society, people are much more open to sexual diversity than most people are aware of. Sex is so commonly exploited in film and print now that it has just become "normal" to see, think about, and do. People are more open to it now. The good part of this is people can now more freely express their sexual orientations and desires, but AIDS has also become more widespread.

(316: male) I think the last 2 pages of this survey is [sic] sick --what would you want to find out from this part of the survey? I am annoyed that I wasted my time doing this filthy survey! [Male participant accidently received female version. However, comments seem to refer to SOS scale.]

(501: male) The questionnaire covers most of the [sic] aspects about the sexual consent between male [sic] and female [sic]. The questions are appropriate and explicit.

(503: male) Some of the questions about consent were situations that most people have never been in, therefore some questions were out of place.

(506: male) Interesting, Hard [sic] to answer, though--so often you talk or joke about something totally irrelevant so you don't have to say any of these real things at all.

(507: male) This paper does not cover the dangers of AIDS which always keeps my desire for sex down. When I hear of the [sic] sex, immediately I think of AIDS which induces a fear in me. I always think that five minutes pleasure [sic] is not worth my life which is precious.

(508: male) This questionnaire is well-laid out and designed. It did not offend me in any such way.

(510: male) I think this was interesting, [sic] and a little entertaining. I'd be interested in seeing the results.

(511: male) This is a good study. However, do you really think that people will be honest in the response [sic] that they give?

(512: male) Some of these questions were worded in a way that made it hard to understand like #11 on this page. (referring to SOS item)

(514: male) have [sic] "7" as agree and "1" as disagree. A little more detailed questions

customized for males and those for females.

(515: male) This was interesting--almost entertaining. The questions were well-worded and the questionnaire was conducted in an admirable manner.

(516: male) As I wrote down on the first part I am a bisexual leaning toward homosexuality. Yes, I feel that this is unpure of me, but it is what I feel. In the past when I have seen porn, it does very little for me. I don't see myself as being sexually vulgar. I see it as a love thing. As more of an emotional experience and not a means of masturbation.

(517: male) Kind of strange dealing w/this [sic] subject--a little uncomfortable.

(519: male) I answered this questionnaire as honestly as I could. I've never been in these situations before, but I answered them as best I could.

(522: male) I love to explore new sexual ideas w/opposite [sic] sex.

(524: male) I think this was a fair survey. It asked good questions and was not an uncomfortable questionnaire to answer. I hope this helps in whatever you are researching.

(525: male) I was in another experiment where they asked the same questions on homosexuality.

(527: male) Interested to see results.

(528: female) --What is the deal with the question "answer this question with a nine" I don't get it.

--It was hard for me to answer the questions in Part 4.

(529: female) I know that I have had sex with a lot of Guys [sic] but when I was answering question [sic] and "putting myself in the situation" I didn't really think of those guys. It was more like a daydream of someone I didn't know.

(532: female) It is hard to rate my feelings on a scale. It would be easier if there were choices between more definite answers. I didn't understand the questions that said answer this with a nine! It was hard to imagine myself in some of the situations.

(534: female) Maybe it is just me, but I don't find these situations very realistic--not too many people ask me first they [sic] just try it and see my reaction (*subject in verbal condition*)

(535: female) This questionnaire was quite interesting.

(538: female) Some of the questions were a little hard to answer like 10 and 11 above on this page because I am a heterosexual so I don't have these feelings at all. Also [sic] I have only had sex with my boyfriend. So I really never have to "consent" in the ways listed on this questionnaire. He knows me well enough and I know him well enough to know when the other wants sex. And if he starts making advances or I start making advances and the other doesn't want sex we just say no!

(539: female) It was hard to answer some parts of this questionnaire because I am engaged and have been in this relationship for almost 2 yrs [sic]. Therefore we take things like sex. cons. [sic] for granted & [sic] if we aren't in the mood we just say so.

(540: female) I've had a boyfriend for a year now, so I'm pretty open sexually with him.

(541: female) Some of the questions were weird only because I've only had one sexual partner. It was a good questionnaire for the topic.

(544: female) I found it interesting, a little long though.

(545: female) I feel very secure that my answers are confidential. Thank you.

(548: female) I couldn't help but laugh at this questionnaire. When can I do another?

(554: female) This was a very interesting study, because I didn't ever think of all the different ways someone can lead another person into a sexual encounter [sic]!

(555: female) The questions were interesting in a way for individuals to look closely at their behaviors, when it comes to having sexual intercourse.

(557: male) The phrases "I consent..." and "I would like to..." are much too deliberate considering that you are undressing someone or being undressed. Try "I want to sleep with you..."

(558: male) I like it a lot better when a female makes the first move. If I do and she is not interested, I would very much not [sic] like to offend her.

(559: male) I feel that it is better to talk about sexual intercourse before it happens; however, intercourse is something that usually happens during a time of passion with no questions asked. Simple clues as [sic] pulling out a condom or physical identities [sic] are enough to start into [sic] intercourse.

(561: male) A few of the examples I had to answer to [sic] seemed fake. [sic] and stiff. Like the one that goes "I consent to ~~having~~ [sic] sexual intercourse." It seemed unreal so I was unsure as how [sic] to answer it. Some of the other one's [sic], like how drunk she is, to me [sic] and if [sic] she smiles or not, to me don't seem to be the issue to me [sic] so I answered them more negatively but I guess that's what the whole survey is for anyway. Sorry, My [sic] comments may not be that great but I hope they help.

(562: female) These questions are very good, because these things really do happen when your [sic] messing around w/someone [sic]. I think that they are very true to the situations that a lot of young girls are in today.

(563: female) It would be interesting to find out how I define consent. I think I may see my partner's consent as different than my own. I'm sure men in this study, depending on their backgrounds, have very different ideas of sexual consent. I would like to see the results of this study.

(564: female) Even though the questionnaire [sic] did a good job of conveying the opinions from both sides of each group, I found that I have a different idea [sic] of what men think in these situations and [sic] what women think.

(565: female) The questions are detailed and personal but I don't mind if my identity is secret.

(567: male) I didn't find this questionnaire offensive, but I didn't see the purpose of this questionnaire.

(569: female) Brought up many interesting questions concerning consent that I never really

sat and thought about before.

(570: female) I found this questionnaire to be very well done, from a heterosexual standpoint. I understand that most women are heterosexual, but you have done nothing to accommodate for gay or bisexual women. *(from a subject who described herself as bisexual.)*

(573: male) I thought it was weird how all of a sudden we would write down a 9 or 8.

(574: male) I am curious as to what this survey is supposed to do. Is it just supposed to show how people react in different situations or is it showing how males think. I think the situations could be changed around somewhat. I also feel that maybe some different questions could be asked in that section. I found it hard to answer them mainly because I have yet to have intercourse though I have been in situations like that before.

(575: female) I think most of the questions in the beginning sections were obviously redundant. Maybe this was purposely done to check consistency?

(576: female) This is very personal and I think that it helps people to understand the dangers of consent and the importance of it.

(577: female) I feel the first part was a little confusing, but I was able to get through it.

(578: female) This questionnaire asks some good questions which relate to situations we really do deal with.

(579: male) Question #11 is confusing.

(581: male) Many of the possible responses to the situations seem ambiguous.

(583: female) I thought it was very interesting. I never thought about some of the questions until today.

(585: male) I personally have trouble believing *that* the woman is consenting. I have been having sex with 1 woman for 18 months and I still ask her every time if she wants to. She says it annoys her because I'll ask 3 - 4 times if she is ready. She says I shouldn't worry so much and I've missed out on opportunities for sex because I didn't think the girl wanted to when in fact she did. (I found out later)

(586: female) I think it is an interesting questionnaire. In today's society everyone has their own definition of what sexual consent is. I am happy to participate in this experiment. It would be interesting to see the result of this study.

(587: female) I feel I answered these questions according to being w/my [sic] boyfriend. But I realized during this experimnt that NOT once have I ever said "I consent to having intercourse"--which is kind of a weird thought, because I think everyone should have the opportunity to say that but not many people do.

(588: male) To [sic] general...like I have talked thoroughly about sex with my girlfriend so that she is totally comfortable in what ever [sic] we do. Masturbating with the opposite sex can be interesting...but to try it it has to be with someone you care about and ?????? [illegible]. Not with just anybody for what most of this survey asks. I disagree...or don't feel clear with my answers on this questionnaire.

(589: female) I am glad to be a part of it. I was practicing abstinence [sic] for 2 years and a year ago have [sic] had 3 partners, all very safe. I'm afraid people have too much sex and that the

last part of this questionnaire helps people look at themselves closely and observe their patterns. As you can see, not having sex promotes more acceptance of erotic films and masturbation. Although I feel it's depressing, it's safer and so practical. I prefer not to have sex but I become very weak when I am aroused sexually.

(591: male) I felt the previous questions were very similar to some of the sexual practices that I participate in, and my heterosexual friends participate in.

(593: male) Interesting study. I'd like to see the results. I'd imagine that almost all men answer the consent questions with at least a 4 on almost anything. I'd really be interested in seeing how the results would look if a female took a similar test.

(597: female) That last question just confused me. Nevermind [sic]--I understand it now. I thought that it was very interesting to see the difference between what are sexual advances for males and for females. Males tend to want to have intercourse more easily than females, and I could see that in the responses I gave.

(598: female) This is a very interesting survey, that [sic] makes you think.

(599: female) Interesting questions--It would be interesting to see how people who are involved in long-term relations answers would differ from people engaging in casual sex.

(600: male) I think if you really want to know how people feel you should have a short list such as she asked if I had a condom and things of that nature with an area for an essay reply. This way you can [sic] see how people really feel rather than try to guess a numbers.

(601: female) It has been an interesting questionnaire. Kind of exciting. Some of the options (questions) are not very likely to occur, but I do think that over-all, this questionnaire and ones like it could be extremely important for research and, or [sic] rape situations. I had fun with this!!

(602: female) I think it is interesting to realize how different interpretations of actions can impact sexual experience. It makes me consider how situations could get out of hand quickly because of mixed messages. I think it makes it apparent that clear statements of intent are the only true "signals".

(603: female) I would be very interested in knowing what you find from this survey. In college especially, signals about sex are taken differently by people. Because I have a serious boyfriend I don't worry about whether or not actions indicate sex [sic] because we are open about whether [sic] or not the other is interested in having sex. But for my friends male and female I do worry because I have seen way to [sic] many of them get involved in situations where their actions or words were taken the wrong way by both males and females.

(604: female) It was good because it covered alot [sic] of material, but in response to the last section 10 & 11 I am not attracted to nor ever have been the same sex. However I don't detest anyone who choses that way of living because of this I found those two questions hard to answer, I put 4 because I have no reaction.

(606: male) Make it more specific

(609: male) maybe have [illegible]? or filled out latter [sic] (double standards)

(610: male) This questionnaire seems ot have the type of questions that reveal a persons [sic] sexual beliefs.

(612: female) This was very interesting. I had just come to this experiment from a situation very similar to the second scenario you presented us with. I didn't want to come right out and tell him that I didn't want to have sex, so instead, I told him that I was a virgin. He said that that was very special and stopped making any sexual advances. I know this wouldn't have worked with some guys-but I knew he'd understand what I meant.

(613: female) Sexual consent is something that I am glad you are researching. Information such as this should be released. People should be more aware of what others see as consent [sic]. I am sure that many people have very different views about what constitutes consent. This is a good format to find how others feel.

(615: female) This was a very neat questionnaire, [sic] it really made me think about certain situations that I've been in and if he or I really gave consent.

(618: male) I think it's good to leave all names out in order to get a honest answer.

(619: male) To me, the act of a one-night stand is very disturbing. I have had them before, but I always feel so bad. All but one of my sexual encounters have been w/women [sic] that I am in a serious relationship with, so consent is always given. I also would never have sex, even w/one [sic] of my relationship partners, if alcohol was involved. Sex is much more meaningful than that. I value sex as being worthwhile and constructive in building a strong relationship and think of it as more than physical.

(621: male) This questionnaire placed the participant in an unusual place. Some of the instances were highly unlikely to occur, but they brought out the truth.

(623: male) Although this questionnaire is very personal, I think that it can benefit different studies between men and women, and I'm happy to be of help.

(625: female) Pretty Good survey.

(626: female) I'm not really sure what is meant by manipulating genitals.

(628: female) I am a very shy person and don't consent to sex like the ways I answered on the few [sic] times. However I have been in a relationship for over 2 yrs and everything is something I pretty much consent too [sic].

(629: female) Is marital status taken into consideration?

(631: female) It is an interesting questionnaire.

(632: female) Some of the terminology used in this questionnaire are not things that people today would say when consenting or not consenting to sex. I think it would be easier to answer if the "lingo" was a little more accurate.

(633: female) It was very interesting to see what my thoughts were on what guys consider sexual consent and what I actual [sic] consider to be sexual consent (for myself). Obviously, the fact that guys see more actions as consent is a major problem. This is why I make sure in my relationships that the guy ALWAYS knows where I stand regarding what I'm willing to do. (no mixed signals)

(634: female) Questionares [sic] like this bother me because they seem to suggest that humanity is simply a breeding ground. The reality is that sexual relations are meaningless if

you are not involved with someone that you are committed to. They joy of sex is the interchange of 'giving' and taking from someone who you love.

(637: female) Except for a couple isolated (drunk) incidents, (a long time ago) I have always been in a serious relationship with my partner before we began having sex. It is hard for me to imagine trying to decide in the heat of the moment if your partner is willing to consent. I have always discussed the topic calmly, not in a passionate moment. I think this is the way to go. No misunderstandings. You have hashed it all out ahead of time. But I am not your typical coed dating [sic] on the prowl type.

(638: female) You may be more detailed about some of the questions and scenarios.

(639: female) This was an interesting questionnaire. It was not too difficult and I had an easy time answering the questions.

(642: female) Some of my answers are extremely cut a [sic] dry. This is probably due to the fact I would like to wait until I got [sic] married before I have sex.

(643: female) Some of the questions are worded funny, the agree/disagree especially.

(644: male) The comments of consent were very realistic.

(646: male) Some questions seemed hard to answer--not specific enough--situations are too vague.

(648: female) This is kind of hard to answer when you have never had sex. I think you should also ask why a person has decided not to engage in sex. It would give you a better idea [sic] about the person and it would give you more data.

(651: female) --This experiment sounds interesting--I wonder what it's about.
--A lot of the questions were repetitious [sic].

(655: male) The most interesting study I have participated in.

(659: male) Very interesting and thought provoking survey. I would think that the person answering the questionnaire would be much more specific about their consenting remarks, and much more liberal and general about what the opposite sex feels. It is obvious though, that what one person does to show consent will probably be thought of as consent of their opposite sex partner if it is shown by the opposite sex partner as well.

(660: female) Because I might always do some of these things like telling him that I love him that doesn't necessarily show consent so it is confusing to [sic] if I'm strongly agreeing because I want to have sex or if it is just something I do with no implying going on at all. If I tell my boyfriend I love him that doesn't mean I want to jump in bed. I think these questions are too [sic] cut and dry. One doesn't imply the other but depending on how you are thinking it could so it is always different.

(661: female) Answers can differ because some may just have sex because they are dating someone older and have been dating for a while. If the mate says it's necessary than almost any slight movement encouraging sex will lead to sex so the female doesn't lose her mate. It's wrong, but it's the case.

(662: female) I thought that it was a good questionnaire and made me look at the way I would or have reacted more closely. I have to say though that some of the questions were confusing (10 & 11) on this page. [referring to SOS survey]

(663: female) I've had time to look over these questions, I found that I was more strict on what actually meant yes or consent for me and what I think means consent for guys. I'm not quite sure why. If anything this experiment is going to make me think.

(665: male) This study seems to have been much more fair than some of the other sex related studies I have done. It did not make me feel uncomfortable, as some have in the past.

(666: male) I don't know why you asked sexual preference in part 1 because all the questions were geared toward heterosexuals like myself.

(668: male) Interesting experiment. The experimenter was quite pleasant and very professional. BTW, I also found her attractive before I took the questionnaire! :)

(669: male) This survey is pretty accurate with ideas, but some was redundant!

(671: female) When your [sic] in love, the sex is very different from the information in the questions. I really don't need consent to have sex w/ my [sic] boyfriend of 2 years.

(673: male) Although I know it is difficult to make standardized tests of this nature no matter how hard I think about being in the situation I do not get the same mental patterns as I would with a woman. There are too many nuances of movement as well as personality of the woman that interfere with these questions. I do not think it is all that valid of a representation.

(674: male) Question 18, I'm not sure what you mean by manipulating my genitals.

(676: male) I feel like I'm a pathetic horn dog from the way I answered these questions. Also, from my own personal experience (it didn't lead up to sex) I think a good question would be "you are making out, both of you are completely topless, you attempt to slide your hand down her pants. She says no. You try it later and she doesn't say anything or attempt to stop you. God, that reads so corny.

(677: female) I think pencils or pens should be handed out to further enhance the anonymity. Also, I think the instructor should sit in the back of the room. The questions in the beginning are very personal and I'm not certain if they're all necessary.

(678: female) The explanation and use of the question [sic] were well presented.

(680: female) The questionnaire disturbed me kind of because it reminded me of someone I had sexual relations w/a while [sic] ago that I cared about very much.

(681: female) This is very personal and I would try and have people spread out more.

(682: female) This questionnaire was interesting and entertaining.

(683: male) In the first sections the questions and situations seemed more real or believable to me than these questions from the last section. These questions seemed somewhat weird and even though it is anonymous I still felt funny answering them. [last section contained SOS]

(685: male) This questionnaire was very interesting and entertaining!

(687: male) I think that the connection between porn and rape is tiny, personally. I do however think that porn is made more for couples than it is for a lonely person who just likes to masturbate.

(689: male) Makes me Horny.

(691: male) Interesting. I would like to see the results of this questionnaire.

(695: female) The part four directions were kind of confusing. It seemed almost the same as the two before it.

(699:female) I hope all the "subjects" are honest because it is an interesting topic. I do think, however, that sexual consent is a "time to time" action and cannot really be described on paper...but a very interesting idea.

(700: female) I am pretty open minded about sex. I enjoy sex and trying new things. I am very concerned about AIDS etc. so it is important to me to be careful. I much prefer sex with a boyfriend rather than a one-night stand. Cheap sex doesn't thrill me.

(705: male) Some of this stuff like the 1st two sections were hard for me to answer because I do not [sic] what I would do. I have been sexually active with the same person for over two years and she is the only one I have ever had sex with. It is hard for me to answer some of these questions because when we have sex, we just kind of look @ [sic] each other and then it happens. I don't need put "put the moves" on her.

(712: female) I felt like some of answers on pages 4 & 5 maybe [sic] a little incorrect. Because I have the right to say no whenever I feel uncomfortable. So I pretty much have to say "yes to sex" before I really consent to sex with a first time partner.

(713: male) This study was interesting and some of the questions made me laugh because I could never do them.

(714: female) The last questions with the "notes" may give strange answers for the careless reader

(715: male) The questions are good, it is very obvious that the questions are to find the difference between male and female responses. Perhaps the set of questions should be divided over 2 sessions. (Also, I am a male, but the questions were for a female.) [note: subject eliminated from good data because received wrong from of questionnaire]

Appendix G
Debriefing Form

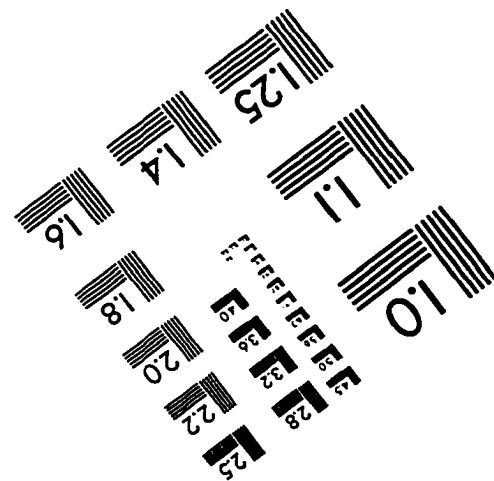
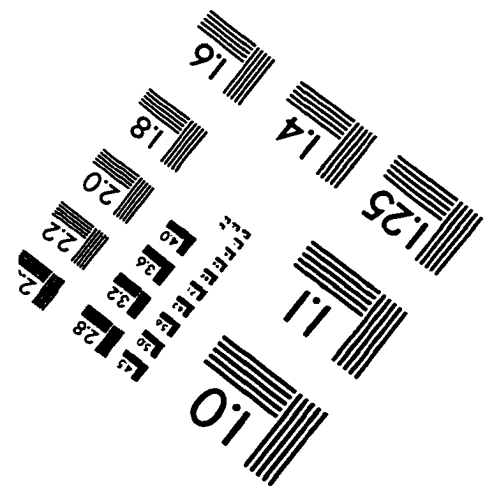
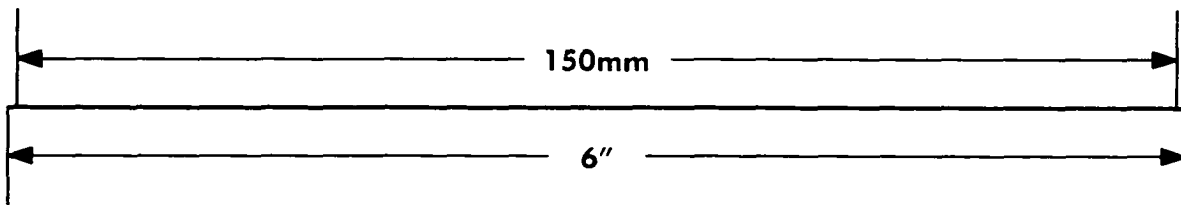
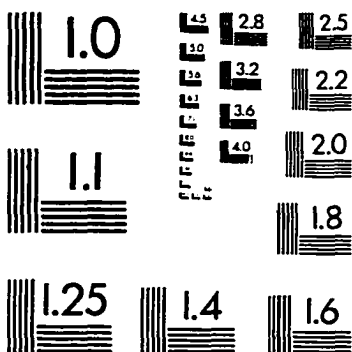
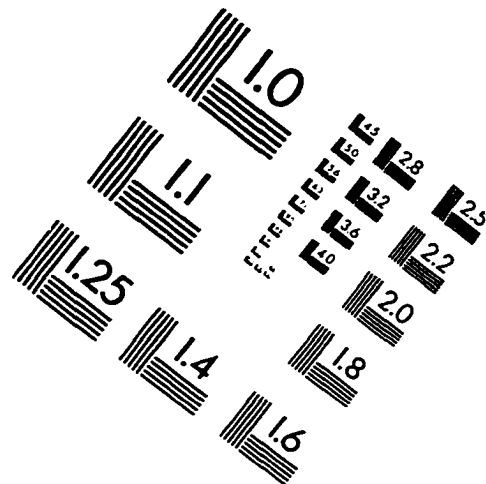
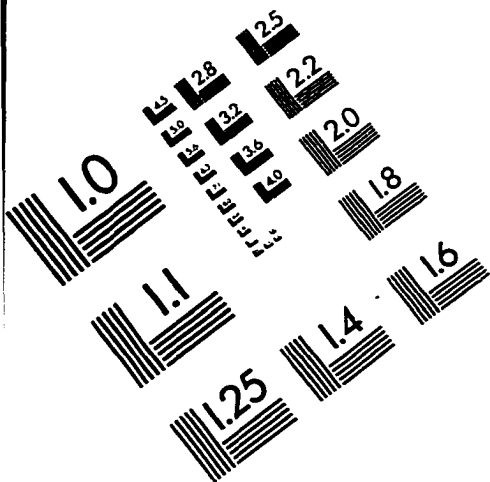
The purpose of this study was to examine how people communicate sexual consent. Recently, the issue of sexual consent has become a topic of public discussion. For example, you may be aware of the controversy regarding the sexual consent guidelines at Antioch College in Ohio. One reason people are so concerned about sexual consent is that it is the central issue in cases of rape. We hope the information you provide us will help us to learn how people communicate sexual consent and what factors affect the ways in which people communicate consent. This information could be very useful to therapists, legal experts, sexuality educators, and rape prevention educators.

If you would like to talk about this topic or would like more information about our study, please feel free to contact either of us by phone or by mail. Thank you for your participation.

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IMAGE EVALUATION TEST TARGET (QA-3)



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