

A STUDY OF THE EFFECT OF RAIL WALKING
ON IMPROVEMENT OF ROD AND FRAME
PERFORMANCE OF ALCOHOLICS

by

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CHAPTER I

INTRODUCTION

Interest in perception has occupied a place in man's thinking for centuries. Perception has been approached philosophically and experimentally, and at present still occupies a prominent place in man's investigation of himself. Witkin, Lewis, Hertzman, Machover, Meissner, and Wapner (1954) point out that within the last few decades one prominent approach to its study has come from the recognition that the process of perception must be studied in the context of the overall psychological organization of the individual perceiver; that it is necessary to consider how his perception is related to his own motivation, emotions, and so on. Prior to this time, the explanation of perceptual experiences had been sought primarily in the structure of the prevailing field or stimulus patterns; what is perceived was thought to be determined to an important degree by the nature of the outer world. Emphasis had been placed on the nature of the stimuli giving rise to the perceptual experience, and also on specific operations of the sense organs and associated neural structures mediating the stimuli.

Advantages derived from the present day approach, as pointed out by Witkin et al., are twofold: it leads to a broadening of the current theories of perception, and it provides the possibility of using perceptual techniques as a means of understanding and diagnosing general personality.

The more traditional methods for evaluating personality through perception have been techniques such as the Rorschach and Thematic Apperception Tests. Techniques such as these assume that personality factors operate in a large degree in determining the perception reported. Witkin et al. felt that field conditions must be considered in conjunction with these personality factors and attempted with various body orientation tests to explore the possible relationships of these factors. One of these tests is the Rod and Frame Test (RFT). In this test, the individual is in a dark room and presented a square, luminous frame inside of which is a rod independent of the frame. Both rod and frame can be tilted independently to produce various angles of variance to the true vertical. The individual himself, seated in a supportive chair, can also be tilted from the true upright. These conditions are set in different combinations, and the individual is asked to adjust the rod to the true vertical. Witkin et al. found a continuum of perceiving which they designated as field dependent (greater

rod deviation) and field independent. Although most normal individuals showed some dependence on the field (i.e. they lined the rod up more with the frame than the true vertical), there were some who were more influenced by this surrounding field in making adjustments of the rod to the true vertical. For successful performance on the test, the subject must separate the rod from the tilted frame and adjust it in relation to his felt body position.

Witkin et al. studied the relationship between the dimensions of field dependence-field independence and personality variables through autobiographies, clinical interviews, sentence completion test, figure drawing, word association, the Rorschach and Thematic Apperception Tests. The field dependent person was thus characterized as coping passively with his environment; requiring environmental support, and accepting authority; having a higher level of anxiety through lacking awareness of his inner life, fearing his own impulses and poor control over his feelings and impulses; and revealing low self esteem and difficulty in accepting his own self and body. The authors felt that an individual who behaves in a dependent manner in the perceptual tests is relatively more dependent in his general relationships to his environment, including relationships to other people. Field independent persons were

characterized as coping actively with their environment, having less need of environmental support for decisions; showing higher mastery and understanding in regard to motivational and emotional processes; and having higher self esteem. The study also investigated possible developmental trends and sex differences. Developmentally, field independence increases with age, and is more predominant among males than females at the adult level. Further work, as cited by Witkin, Dyk, Faterson, Goodenough, and Karp (1962) found drugs, stress, hypnosis and other variables not to affect performance. The authors suggested that the mode of field approach is resistant to change by experimental means, and thus it appears to be a stable characteristic of a person.

In 1959, Witkin, Karp, and Goodenough applied the concept of field dependence to the study of alcoholics. They took note of the inconclusiveness of results of studies investigating alcoholism and personality types. They felt that their tests had relevance in terms of dependence and thus the study of dependence in alcoholics, a characterization often ascribed to alcoholics but with no clear research evidence. The results of their study showed that male alcoholics compared to nonalcoholics were significantly more field dependent. Thus they felt that alcoholics tend to be markedly field dependent.

Karp, Poster, and Goodman (1963) extended the work using alcoholic women. Again they found alcoholic subjects to be more field dependent than nonalcoholic women. Also the difference between the alcoholic women and the alcoholic men of the previous study was significant. Thus, sex differences are still evident despite the extreme dependence of alcoholics.

From these investigations the question arises as to whether this type of perceptual performance exists prior to the alcoholism or is in some way a result of the alcoholism. The Witkin investigators acknowledge this question (Karp, Witkin, & Goodenough, 1965) but favor the predisposition hypothesis. They further recognize the need for a longitudinal study and offer studies in support of the feasibility of such a study. Karp et al. felt stability of field dependent performance was shown by finding no difference between remitted and unremitted alcoholics. In this report, they also cited the finding that alcoholics tested while sober and once after ingestion of controlled doses of alcohol showed no difference to acute effects of alcohol. Karp and Konstadt (1965) found that older alcoholics compared to younger alcoholics displayed no greater field dependence other than that attributable to age. These results suggest stability of field dependence over long

periods of heavy drinking. Although offering that these results should not be viewed as implying such stability where other types of disease or malfunction are concerned, they do feel such evidence is sparse. However, they point out that further investigations between physiological functions and field dependence would be desirable.

In summary, it has been reported that alcoholics perform significantly more field dependently on the RFT than nonalcoholics. That is, alcoholics set the rod further from the upright than nonalcoholics. Further, ingestion of alcohol (Karp, Witkin, & Goodenough, 1965), cessation of alcohol consumption, and length of drinking (Karp & Konstadt, 1965) appear to have no effect on performance suggesting a dependent mode of perceiving prior to becoming alcoholic.

The original studies of Witkin et al. have been criticized in the literature as well as the studies dealing with the characterization of dependency and a personality as they relate to alcoholism. The question of whether the field dependent mode of perception precedes or is subsequent to alcoholism has also been raised. In the next section these points will be examined, and a proposal for a different understanding of this mode of perception for alcoholics will be put forth.

In addition to what will follow there are also pragmatic considerations. Personality characterizations such as the above are available to persons interested in alcoholism. Interest in alcoholism can be seen to stem from the following. Chafetz and Demone (1962) stated that there are an estimated 70 million users of alcohol in the United States of which five million are estimated to be alcoholics. It is estimated that 12 thousand persons die each year from chronic alcoholism, and that five out of six alcoholics are men between the ages of 35 and 55, the most productive years (Noyes & Kolb, 1959). The crime of drunkenness as reported by the Federal Bureau of Investigation in its Uniform Crime Report, represents more than 40% of all arrests (Chafetz & Demone, 1962). Employed problem drinkers in business and industry are estimated to be 2 million by the National Council on Alcoholism (Rouse, 1965). In dollar cost, a company rarely knows the full extent, but 2 billion dollars is widely quoted and regarded as a reasonable estimate of the waste incurred (Rouse, 1965a). Blakeslee (1964) pointed out that no one really knows the full cost of alcoholism. It includes potential wages lost, crime, accidents, hospitalization and medical care, and jail maintenance as well as intangible loss to family and friends of the alcoholic. Noyes and Kolb see alcoholism as a major health

problem, and Chafetz and Demone noted that it ranks third only to heart disease and cancer in incidence. As can be seen, the psychological as well as the sociological and physiological functioning of the alcoholic is affected. As such, interest in the understanding, the treatment and evaluation of treatment, and the prevention of alcoholism exist. Thus the usefulness of the characterization of alcoholics in any way needs total exploration.

CHAPTER II

BACKGROUND OF THE PROBLEM

Criticisms of Witkin's Work

Zigler's skepticism of the work of Witkin et al. is strikingly met in the title of his review (1963), A Measure in Search of a Theory? In regard to Personality Through Perception (1954), he felt the interpretations of the relationships between the perceptual and personality tests are questionable because of the authors' failure to deal adequately with the issue of validity of the projective tests used. He felt that the theoretical superstructure built on these relationships left much to be desired. Again, with Psychological Differentiation (1962), he felt the reported empirical relationships remain questionable and interpretations unconvincing. Validity presented, he stated, is based on clinical folklore. He questions, for example, whether a photograph of a standing child is a valid measure of the child's relative activity and passivity. He suspects contamination in scores, for example from interviews, because of the experimenter's previous familiarity with previously discovered relationships between dependency and other behaviors.

Zigler's own view is that the relationships found are due to general intelligence. He is critical of Witkin's categorization of WISC subtest scores, Block Design, Picture Completion, and Object Assembly into a combined measure as "intellectual index" and tests not positively correlated into a verbal index, thus making nonintellective measures unrelated to his field dependence measures. He pointed out that in one of the groups studied, a highly significant correlation is found between an index of the field dependence measure and the Stanford-Binet Vocabulary score which is left unexplained.

Gruen (1957), a few years after working with Witkin, offers criticism of the work also. He pointed out that Witkin et al. proceed on the assumption that the tests reflect a unitary dimension of functioning. The assumption proceeds, he feels, as if field dependence could be demonstrated as a psychological quality rather than as a way in which behavior is characterized by the experimenter. He disagrees with the proposal that personality determinants of this process have been identified because this function correlated highly with personality items. He feels that the personality score based on a few selected items, the presence or absence of which gives the score, is inadequate. For him, it is questionable when one adds discontinuous

variables and correlates them with a continuous function. From the percentage breakdown of the personality score used, all that is found is that more similar kinds of people are more likely to be found at one end of the perceptual scale than at the other. For example, for the score associated with the interview variables of dependency, the breakdown is: 17% field independent, 40% intermediate performance, and 48% field dependent. What makes similar kinds of people choose different kinds of perception is thus not established.

In regard to intercorrelations of the various perceptual tasks, Gruen found a different intercorrelation pattern in his study (1955). Not only were the intercorrelations often lower and less significant, but at times were reversed. Gruen, therefore, feels that these perceptual tests do not have the unitary meaning conceptualized for them as this meaning is, in part, based on these intercorrelations.

Gruen found fault with the test situation itself. For example, in a situation where the subject and frame are tilted in the same direction and the rod must be adjusted to the upright, he feels it is possible that the subject can take his own body as a frame of reference and line up the rod with it rather than with what Witkin assumes to be the faulty acceptance of the frame. He feels that this factor is obscured by the present scoring method which

takes only degrees of deviation from the upright into account. Further, there may be the possibility that the subject does not understand what is expected of him, e.g. what is meant by vertical, and that the situation may be stressful for certain subjects.

Concerning the scoring further, Gruen noted the omission of dealing with intra-individual variability within a test series because of the averaging of trials. He maintains that the presentation of Witkin's data as possessing the kind of self consistency which would permit the deduction that he is getting at some consistent perceptual function is not supported by Gruen's own finding of field dependent and field independent scores on trials within a given series for a given individual.

Holtzman (1955) in his review of Personality Through Perception, although somewhat more accepting of the overall work than the above writers, is critical of methodological weaknesses and speculative inferences.

League and Jackson (1961) did a specific study of one of the concepts put forth by the Witkin group. Their study did not find consistent intercorrelations of personality tests, e.g. Rorschach, Incomplete Sentence Test of Passivity, and the Embedded Figures Test to support the activity-passivity hypothesis which has to do with the individual's susceptibility to perceptual field force.

Considerations Regarding the Alcoholic Personality
and Dependency

The characterization of alcoholics as dependent or as having an alcoholic personality appears to be an open issue. There are a number of articles on alcoholism which discuss alcoholics in terms of dependence, including the following papers: Bacon, 1965; Bell, 1954; Bell, 1956a; Force, 1958; Jones, 1963; McCord & McCord, 1962; Munt, 1960; Lisansky, 1960; Lolli, 1956. With regard to the alcoholic personality, Armstrong (1958) concluded, after reviewing the literature on the subject, that "it would seem...premature to abandon the search because of failure to date to determine adequate methods or to discover the appropriate investigative tools. Thus we feel that the quest for an alcoholic personality or constellation of frequently predominant characteristics in alcoholism has barely begun."

On the other hand, many writers feel disenchanted. Smith (1957) noted that, "Psychiatrically, it is possible to find just about what is sought in a group of alcoholics." Lemere (1956) stated, "In spite of many attempts to delineate the alcoholic personality, there remains only one characteristic that is common to all alcoholics and that

is that they drink too much." Goldstein and Chotlos (1965), after finding an absence of differences between alcoholics and controls on most of the tests which they felt dealt with, in one way or another, the area of dependency, suggested that alcoholics may be viewed as a group consisting of many different kinds of people all of whom share certain knowledge, i.e. they can control the way they feel at the moment.

Sutherland, Schroeder, and Tordella (1950) reviewed studies attempting to identify the alcoholic personality and concluded that there was no satisfactory evidence which justifies a belief that persons of one type are more likely to become alcoholics than persons of another type.

Syme (1957) extended the review of Sutherland et al. through 1956 on studies using projective and nonprojective personality tests on alcoholics. He concluded that Rorschach studies yield little or no specific information agreed upon, and that no typical alcoholic Rorschach pattern may be discerned or inferred from the available literature. He felt that studies using nonprojective tests which are often more methodologically rigorous and precise, failed to provide data allowing the inference of a consistent theme relative to the alcoholic personality.

Dahlstrom and Welsh (1960) saw both these reviews raising a serious question about the utility of the concept of an alcoholic personality. The common criticism appeared to them to lie within design used. Large groups of persons have not been tested prior to the development of alcoholic dependence nor followed for sufficient time to observe the differential patterns that various personalities show. Further, existing patient populations are the source of available findings. Interpretations of these data are difficult; sampling biases make inferences confusing because of the selective effects of institutions, organizations, self labels, and social stigmata, as well as the personal difficulties stemming from long range effects of the disorder itself. They further noted that present findings suggest several clusters of personality reactions within the heterogeneous group called alcoholics.

Kaldegg (1956) noted inconsistencies between investigators of Rorschach protocols and summarized his own findings on alcoholics by stating that no single personality emerged and that his group presented a great variety of personalities. He felt there were signs of emotional difficulties throughout his group, but that underlying conflicts appeared to vary greatly.

Lisansky (1960) saw investigators viewing the concept of alcoholic personality as if they meant that all alcoholics have a total personality structure in common. This she feels ignores known and accepted ideas about human variability, individual differences, and the uniqueness of each personality. She questioned whether it can be assumed that certain behavior observed in those who have been drinking and getting into difficulties for many years is a causative factor in their alcoholism. She feels it is reasonable to assume that as alcoholism begins and progresses, personality changes of some sort take place. In this regard she noted that frequent clinical observations have reported that the personality becomes more or less impoverished as the alcoholism plays itself out.

She is critical of investigators of alcoholism who choose a psychoanalytic approach, e.g. oral frustration and dependency. She feels that they must face the challenge that analytic theory on alcoholism, e.g. Abraham in 1908, needs revision and modification to take into account increasing information about the physiology and sociology of alcoholism, and the changing ideas within psychoanalysis. Further, analytic and other theorizers of the psychodynamics of alcoholism see only very limited segments of the population of alcoholics. Besides socio-economic differences in

a particular country which need to be taken into account, alcoholism is seen among primitive as well as more civilized peoples of the world.

Lisansky also pointed to a heterogeneity amongst alcoholics. In her study (1957) of alcoholic women in outpatient clinics and those in a state farm, she felt that the drinking problem of the state farm inmates to be a concomitant of many severe social and psychological problems while for the outpatients it tended to be the focal and primary problem. Strauss (1955) also reported that Skid Row residents, homeless men, and chronic drunkenness offenders are more likely to fit into a different group of alcoholics than those that are seen at outpatient clinics. Lisansky cited other authors who propose various classification systems for alcoholics.

Of concern in her paper is her examination of the predisposition hypothesis and dependency and the role of early life experience which is often offered as supportive evidence. She felt that this is often generated from theory or clinical observation only, and the view that "specific oral frustrations" in early childhood are of primary significance etiologically is not supported by research. For example, Child (1954) reported that, "There is little doubt that variations in treatment of the infant's oral

behavior have important immediate effects on his behavior. With respect to more lasting effects of oral socialization either before or at the time of weaning, no such definite conclusion is possible."

Lisansky found no support for the oft referred to family pattern of a domineering-possessive mother and a passive-dependent father. She felt that although this pairing may be seen in an alcoholic's parents, other types exist as well. An achieving, demanding father and docile, passive mother is often seen in parental pairs of high socio-economic alcoholics. She contrasted Knight (1937) who found as typical an overindulgent, overprotective mother and an authoritarian, inconsistent father of alcoholics in a private sanitarium, with Wahl (1956). Wahl found rejection to be more the common parental attitude than overprotection. Thirty-nine percent of the fathers, 27% of the mothers, and 13% of both parents were found to be rejecting. Eighteen percent of the mothers, seven percent of both parents, and two percent of the fathers were severely overprotective.

Perceptual Performance: Alcoholics and
Brain Damaged Subjects

Bailey, Hustmyer, and Kristofferson (1961) noting the common but experimentally unsupported clinical obser-

vation that alcoholics are dependent especially in their dealings with other individuals, replicated the work of Witkin et al. They essentially found the same results that alcoholics perform in a field dependent manner. However, they also studied patients diagnosed as having chronic brain syndrome. They found that these patients were also significantly field dependent in performance. Further, the brain damaged subjects differed significantly from alcoholics not diagnosed as organically involved, suggesting that the association between brain damage and rod and frame dependence may be greater than that between alcoholism and rod and frame dependence. They concluded that alcoholism is associated with dependence not because alcoholics are dependent perceivers prior to becoming alcoholics, but that dependence may result from organic impairment produced by alcoholism.

Elliot (1961) also does not feel it is known yet whether field dependence is accounted for by the psychodynamic dependence said to be involved in the etiology of alcoholism, or by diffuse brain damage resulting from alcoholism. From his review of the literature, he felt that the field dependent person does not always act dependently. Rather, it may be more accurate to state that he reacts with disruption and ineffectiveness in the

face of strange or unstructured stimulus configurations, such disruption leading to conforming behavior only when there is available to him something obvious to conform to like a luminous frame. His own investigation showed a relationship between poor, initial maze performance and dependence which he felt supported the above view of the effect of unstructured situations. Other performance test measures of behavioral dependence were unrelated to rod and frame performance. Of note was the finding of significantly lower correlations between the Embedded Figures Test and the RFT than previously reported by Witkin et al.

Teuber and Mishkin (1954) investigated whether frontal lobe lesions might produce abnormal interactions between vision and posture. They used the conditions: setting a luminous line to the vertical with body upright and with body tilted; setting a line to the vertical with the line against an obliquely striped background; and setting the body upright, vision excluded. Their subjects were veterans who had received penetrating gunshot wounds with proven loss of brain substance and veterans with wounds of peripheral nerves only. The first group were divided into anterior and posterior involved subjects.

The authors found no differences in setting a luminous line while upright, but found all groups to have larger

errors when they were tilted. The difference between anteriors and posteriors and controls was found to be significant. The differences between posteriors and controls, although in a direction indicating greater errors for the posteriors, did not attain significance. In setting the line against the stripes, a consistent tendency for all groups to err in the direction of the stripes was found. Although no significant differences in errors were found, here the posterior group erred the greatest. No significant differences were found in the adjustment of the body situation, although all groups fell short of the true vertical.

The lack of neurological symptoms in many cases showing deficit on the second task, led the authors to suggest prefrontal cortical damage might be sufficient to produce the result. They also felt that this performance might represent a more stable residual of an initially more generalized disturbance, as other studies done during the war found large errors in the upright position also. As their interest is on brain functioning, they feel that elucidation of frontal lobe functions is more likely to be obtained by exploring these postural-vertical related tasks than searching for supposed disturbances in higher intellectual processes. Other symptoms reviewed following frontal damage, such as forced circling, hypermotility, and pseudo-

kemanopsia in monkeys, and impaired visual searching in man were felt to be related to a disorganization of postural and exteroceptive mechanisms.

Alexander and Gudeman (1965) found over-all correlations between perceptual and behavior rated field dependence scores to be significant for several groups of people, e.g. alcoholics, community volunteers, and psychiatric patients. However, sub-group analysis produced only two significant correlations for only two of the four groups of alcoholics. The authors felt that further exploration in this area was necessary and suggested that the inconsistencies in sub-group correlational results reflect a more subtle and complex perceptual-interpersonal dependence relationship than assumed by Witkin et al.

Nervous System Damage and Alcoholism

Several investigators have suggested the possible association between nervous system damage and field dependent performance of alcoholics. The fact that alcoholism does have an effect on the nervous system appears to be commonly recognized. This effect is also seen as being direct and indirect. Courville (1955) in autopsy studies over several years and several hundred alcoholic subjects reported as noteworthy and a common effect of repeated

intake of alcohol, the progressive atrophy of the cortex of the frontal lobes. In chronic alcoholism, chronic gastritis sometimes develops and it is presumed that the late changes in the spinal cord are somehow related to chronic gastritis and the associated anemia. He noted that a complication of chronic alcoholism is peripheral nerve involvement. This is felt to be a result of vitamin B deficiency which yields to appropriate treatment. The cranial nerves have received relatively little attention, but the optic nerve is reported to be most sensitive to alcohol. Symptoms referable to the labyrinth and middle ear suggest these structures are also subject to chronic alcoholism. In animals, atrophic and degenerative alterations have been found in the cells of the organ of Corti and cochlear fibers in the nervus acusticus. Indirectly, poor nutrition resulting in a weakened resistance to disease must be considered. Courville noted that in a study of 16,054 cases of acute alcoholism admitted to a Boston hospital over a 15-year period, 10,494 (71.5%) involved injury to the head.

Of particular note in his report is the discussion of the Purkinje cells of the cerebellar cortex. These are extremely sensitive to almost all noxious agents including alcohol, and this sensitivity is reflected in marked ataxia and also by acute swelling with tigrolysis, the disappear-

ance and dissolution of the stainable substance of a nerve cell. Chronic changes in the form of cerebellar cortical atrophy is seldom found, and where this does occur alteration in the structure of the cells appears to be selective. Although the Purkinje cells are highly sensitive, they are not readily altered permanently. Skillicorn (1955) presented six cases with cerebellar atrophy and progressive ataxia. He suggests that chronic alcoholism is implicated as a possible factor in the development of cerebellar atrophy.

Of last note of Courville are the findings that alterations in the nervous system may be either temporary and reversible, or progressive and pathogenic, leading to permanent damage in the nervous system.

Lemere (1956a) stated that while repeated and excessive drinking can and often does produce permanent brain damage, the extent of such damage among alcoholics is unknown. He feels that since cerebral cortical atrophy is the end product of gradual dissolution of large numbers of cells, there must be thousands of alcoholics with intermediate stages of such damage, which, however, current methods are insufficient to demonstrate cellular loss. Along the same line, Bennett, Mowery, and Fort (1960) reported on the presence of a syndrome of an intermediate stage of alcoholic brain disease, midway between the acute and chronic stages.

Nervous system damage is not limited, as one might expect, to the relatively old individual. Tumarkin, Wilson, and Snyder (1955) studied the effects of alcohol on several enlisted men with a mean age of 32 and with a mean period of excessive drinking of 11 years. Although they reported finding no gross pathological signs on clinical, neurological or psychiatric examinations, electroencephalograms disclosed abnormalities in frontal regions and in some of the parieto-occipital areas as well. Diffuse cortical and subcortical atrophy, particularly in the parietal region, was found on pneumoencephalography.

CHAPTER III

PRIMARY CONSIDERATIONS FOR A STUDY

Alcoholics have been found to perform in a field dependent manner on the RFT more than nonalcoholics. It is commonly held that this perceptual mode reflects a personality function of psychological dependence. This type of performance has been reported to be stable in regard to length of alcoholism, remission of alcoholism, ingestion of alcohol, etc., thus favoring a predisposition hypothesis, i.e. alcoholics perform this way prior to becoming alcoholics, and further, as pointed out by Karp and Konstadt (1965), this may be a contributing factor to alcoholism.

Alcoholism is a major health and socio-economic problem, costing billions of dollars. It manifests psychological dysfunctioning of the individual as well as affects the psychological life of other individuals. Alcoholism, therefore, necessitates treatment, measures of effectiveness of treatment, means of prevention, and understanding of the effects of alcoholism on the individual. Understanding of the psychological functioning of these individuals is, therefore, important to this work and careful scrutiny of work related to this problem is important.

Measures of Witkin's perceptual tests are not available on people prior to becoming alcoholics. Several writers are critical of Witkin's original work and inferences drawn from it. Several investigators view field dependent performance of alcoholics to be related to organic involvement as a result of alcoholism and not to personality functioning. Alcoholics are recognized to have nervous system damage, temporary and/or permanent, as a direct or indirect result of alcoholic intake.

The stability studies of Witkin et al. used to support the predisposition hypothesis can also serve to support the causative hypothesis. That is, if organic damage results in field dependent performance, organic damage is producing continued effects. However, a recent study by Goldstein and Chotlos (1966) reported finding significant improvement on RFT performance of chronic alcoholics following an 8 to 10 week psychiatric treatment program. Whether this change is related to temporary physical factors, e.g., drying out and recovery of function, or psychological factors, e.g., decreased dependency related to treatment, is ambiguous.

The organic hypothesis of field dependent performance is favored by Goldstein and Chotlos. They suggest the possible role of defective lower center systems such as brain stem-cerebellar-vestibular systems. They feel that ade-

quate RFT performance assumes intact vestibular, kinesi-
thetic and cerebellar functioning. From this can be said
that Witkin et al. make the improper assumption that
alcoholics and nonalcoholics are equated in all respects
except personality factors. This ignores the relationship
between nervous system damage and alcoholism, and thus
possible temporary damage to structures involved in recep-
tion, transmission, and integration of information necessary
to make judgments in regard to felt body position.

In the RFT situation, the body is put in situations
where there is an unequal distribution of weight in regard
to the body's center of gravity. In a situation where the
center of gravity is displaced, the organism is aware of
this and can take appropriate action to right itself and
restore balance, or bring other muscle systems into play
to maintain this new posture for circumscribed periods,
being aware, however, of the unbalanced situation in order
to maintain the position. Various sources of information
are available for these conditions to arise such as infor-
mation from pressures on the body, proprioceptive informa-
tion from muscles and joints, and information from lower
brain stem systems.

Taylor's (1963) view of the adjustment the organism
makes to gravity is that it is a learned process and he

outlines its development. The organism is made up of subsystems of head, trunk, etc. which develop to gravity in a sequential manner. It is only after the reflex action of the antigravitational muscles has been established that upright system positions can be maintained.

In regard to the rod and frame situation, Weiner (1952) used one hour of body training in an adapted version of the RFT test. The experimental group had body cues such as pressure and tension changes in their muscles pointed out to them. They were also exposed to a situation in which the rod was tilted the same amount as their body while the cube remained upright. The rod was then covered and they had to adjust the cube, each time being told the error. Weiner felt that a body conscious attitude was stressed as opposed to an intellectual attitude. Significant differences in performance were reported between groups in the cube and the rod in cube adjustment situation in the tilted positions, but not for the seated upright position.

White and Gaier (1965) studied the relationship between the length of sobriety and concern with bodily functions and self concept. They found a curvilinear relationship between the interval of sobriety and the variables. From the initial stages of sobriety to about one year, a gradual increase in emphasis on body function was

seen. After this time, concern for the body occupied lesser importance. It is of interest to consider here what might happen during intoxication in the light of this study.

Commonly, intoxication is marked by a loss of coordination and balance as seen in the stumbling, staggering gait of the individual as he attempts to maneuver about the world of objects, vertical walls, and horizontal floors. Is it possible that during this time, and on repeated occasions, the individual comes to feel a "distrust" of or rely less on his body because it is not functioning properly and he has little control over it? Commonly, he can be observed to attempt to ambulate in terms of a fixed object outside of himself which, it appears, he may "trust" more than himself. This raises the possibility of his learning to use other cues, for example, exteroceptive ones, more, in order to live in an orderly world. This is further compounded by the possible neurological damage.

In regard to balance, Graybiel and Fregly (1965) employed a rail method of testing to assess equilibrium-disequilibrium under unusual conditions and stresses. The rail test involves walking several rails of various widths, e.g. $3/4$ inch wide. High reliability, including test-retest reliability, was found. Correlations with height and weight were low or zero order and were found to have

negligible effect upon performance. Validity was shown by comparing normal individuals with a labyrinth defective group, streptomycin-treated Meniere patients and clinical patients which included those showing postural vertigo and positional nystagmus. The auricular involved subjects were significantly poorer in performance. With practice on the test, normals plateaued at nine percent improvement on the fourth day. The labyrinthine defective group improved 70% over seven daily retest periods.

Performance under several conditions were compared. Alcohol had an immediate effect on decreasing performance of the normal subject. Labyrinth defective subjects did not show decrements suggesting that the vestibular apparatus is an essential component of ataxia due to alcoholic stimulation. Here lies a possible explanation of the study concerned with the effect of alcohol on RFT performance. If rail performance, balance, correlates with RFT performance and if alcoholic subjects are auricularly involved or show such performance on the rails, then alcohol should have no effect on their RFT performance. The defective subjects also showed little effect of a 25 hour boat ride in moderate to severe sea conditions, while high scoring normals showed significant decreases.

Heath (1942) used a rail test to ascertain quantifiable differences in endogenous and exogenous mentally retarded. Endogenous retardation refers to simple familial transmission, and exogenous refers to retardation attributable to developmental anomalies, accidents, or diseases which adversely affect the healthy maturation of normal genetic endowment. In this study the relevance to the problem is in terms of alcoholism and brain damage as developmental "accidents". Heath found performance to be far superior for the endogenous type. Further application and study of his rail test was in the army where he studied the awkward soldier (1944). Reliability was on the order of $r = .94$. Validity was based on a comparison between men referred to him because of defective locomotor coordination and a random selection of men judged by their superiors to have normal coordination. Heath also examined intellectual functioning and found rail walking correlated highly with so-called fluid abilities, e.g. that involved in Block Design. Note here is made to the finding of Goodenough and Karp (1961) that Block Design was highly loaded on a factor containing the test of field dependence. Heath extended the exogenous and endogenous typologies to include individuals of normal intelligence. Of note is his "exogenous normal" who is characterized by marginal or low rail walking, relatively

lower fluid ability, and normal crystalized ability, e.g. Vocabulary and Information indices. Psychometric patterns usually revealed a superiority of verbal over performance materials. Heath felt an emotional problem of insecurity or inferiority is often a result of poor motor control and slow reaction time, which Elliot and Goldstein and Chotlos found on their tasks. Socially, participation seemed to be difficult for this individual, and often the "lone wolf" was found here. Behaviorally, he was described as erratic, but usually maintaining insight to compensate. The above description is very similar to that seen in clinical reports of alcoholics. Heath's dynamic interpretation of the rail test was that both sensory and motor pathways are involved in maintaining balance. The vestibular apparatus, vision, kinesthetic sense are all involved in equilibrium and assist in rail walking.

In pilot work by the present writer, alcoholics were compared to nonalcoholics on rails as described by Heath. The rail scores of the alcoholic group was significantly, $p < .005$, lower than that of the nonalcoholic group. Test-retest reliability after four weeks of hospitalization for the alcoholics was significant, $p < .01$. The correlation between RFT scores and rails scores was not significant, but the expected direction was obtained.

The Present Study

The present study was an attempt to explore whether or not RFT improvement, found after several weeks of a psychiatric treatment program, would be augmented during a similar period. The direction taken to explore this problem was through balance exploration and training. Training consisted of having alcoholics walk rails while attempting to maintain their balance. Part of the consideration for such study, arose from previous studies which suggested that because alcoholics and some nonalcoholics perceive similarly what underlies or is related to the perception is the same for both groups. This implication appeared to stem in part from the simple assumption that if balance does not appear to be a variable in RFT performance of nonalcoholics, then it should not be with alcoholics. However, from the above review, the structures which are in part involved in balance are effected by substantial alcoholic intake and thus balance may become more of a central and influencing variable in RFT performance. Thus, improvement in the state of these structures might be reflected in better balance and thus RFT performance. In addition if learning can play a part in the development of balance, then recovery of functioning may be aided by specific training.

The rationale for the training procedure, and thus more rapid improvement, was that the ability to judge one's position in space might be enhanced by having the subject experience shifts in his body position from the center of gravity coupled with experiencing his body in an upright position. It was felt that by such experience the subject would become better adept at judging when he was not upright or was deviating from it slightly, which would reflect itself in better rail walking. The study attempted to explore whether or not such a relationship existed and if it generalized to the RFT situation, reflecting itself in improved adjustment of the rod to the upright.

In part, the above was contingent upon significant differences between alcoholics' and nonalcoholics' performance on the rail walking test and a relationship between rail walking and RFT performance for the tilted positions.

In summary, the study explored the following questions. Do alcoholics do poorer on the Heath Rails than nonalcoholics? Do daily, repeated trials on the rails improve rail scores? Does a relationship exist between rail performance and rod and frame performance in the tilted positions such that a low score on the rails is indicative of a high score on the RFT? Does training on the rails improve RFT performance, i.e., make RFT scores lower?

CHAPTER IV

METHOD

The Heath Rails Test was individually administered to a group of nonalcoholic subjects and to a group of hospitalized alcoholic subjects. In addition, the Rod and Frame Test was administered to the alcoholic subjects. On the basis of their RFT scores and age, the alcoholic subjects were divided into two groups. One group received a daily trial on the rails for four weeks. At the end of this time, both groups of alcoholics were retested on the rails and the RFT.

Apparatus

The standard Witkin rod and frame apparatus (Witkin et al., 1954) was used in the experiment.

The apparatus consists of a square frame, its sides 1 inch wide and 42 inches long, within which is mounted a rod, 1 inch wide and 39 inches long. The frame and rod are pivoted at their centers, but mounted on separate shafts, so that they may be tilted from side to side independently of each other. A protractor, mounted on the frame shaft, moves with the frame against a stationary pointer, permitting direct reading of the position of the frame in degrees (that is, its angle with the perpendicular). A similar arrangement shows the position of the rod. Frame and rod are coated with luminous paint, and during the test are the only objects visible in the completely darkened room.

A wooden chair for the subject is placed seven feet in front of the rod-and-frame apparatus. It has a high back support, an adjustable headrest, and a footrest. This chair may be placed in any one of three positions: upright, tilted 28 degrees left, or tilted 28 degrees right.

The Heath Rails consist of three smooth pieces of wooden board. The first two rails are nine feet long and the third is six feet long. Rail 1 is four inches wide, rail 2 is two inches wide, and rail 3 is one inch wide. The three boards are $3/4$ inch thick. To prevent the subject's feet from overlapping and using the floor as a support, and to steady the board, crosspieces are attached to the bottom of the boards. The crosspieces are six, four and three inches long respectively, and all are one inch wide and $1/2$ inch thick. The rails are marked on the side every six inches to facilitate scoring. A rubber pad was placed under rail 3 to prevent slipping.

Subjects

Consecutive, voluntary admissions to an alcoholic treatment program at Topeka Veterans Administration Hospital were used in the study as the alcoholic population. These patients were investigated in groups as the psychiatric treatment program is carried on in a closed group manner for 60 days. All subjects carried the diagnosis of chronic alcoholism. No subjects were included in the

study who carried the diagnosis of chronic brain syndrome or who, in the opinion of the medical staff, were not medically able to perform the required tasks.

The nonalcoholic population was made up of 30 residents of a small, midwestern community who were free of known medical problems which would prohibit or interfere with rail walking, and who stated that alcohol is or had not been a problem. They were not total abstainers. Only one subject refused to be tested and this was after attempting the first rail. He stated he was just getting over the flu and felt weak.

Procedure

Nonalcoholics were tested on the Heath Rails in various settings with as near standard conditions as possible. All testing was private, and after the testing the purpose was explained to the subjects. In the test, the subject is asked to walk each rail barefooted in a heel to toe fashion at a moderate pace without falling off. The examiner demonstrates the method, and then the subject begins with the widest rail. He walks each rail three times before going on to the next, smaller rail. An attempt is recorded when S falls off the rail before the full body weight is thrown on the second foot, i.e. when just start-

ing. Beyond the placement of the second foot, a trial is recorded. Five attempts are counted as one trial. When S fails to adhere to the heel to toe rule or runs along the rail, he is credited with an attempt and reminded of the correct procedure. A score of nine points on a given rail is necessary in order to go on to the next rail.

Measurement is in terms of distance walked. Distance is measured from the beginning of the rail to the toe of the last successfully placed foot, in terms of the nearest one half of a foot measurement. The total number of feet for the three trials of a given rail are added and weighted. That is, the total number of feet walked for the one inch rail is multiplied by four, the two inch rail by two, and the four inch rail by one and then these weighted scores are added together for the grand total Heath Rail score. Comparatively, a higher score indicates better performance.

All alcoholics were tested on the rails and the rod and frame one week after admission to the treatment program. In the rod and frame test, the subject sits in the supportive chair in a dark room with only the rod and frame visible to him. His task is to indicate to the examiner if the rod is vertical, i.e., straight up and down with the walls of the room, or in what direction the rod needs to

be moved to make it vertical. (Prior to the task, the subject is read the instructions during which time he wears opaque goggles to hasten dark adaptation.) The test is divided into three situations: chair tilted 28 degrees left from the vertical, chair tilted 28 degrees right, and chair vertical. Within each of these chair positions the rod and the frame are tilted as follows: rod and frame 28 degrees left; frame 28 degrees left and rod 28 degrees right; rod and frame 28 degrees right; rod 28 degrees left and frame 28 degrees right. These rod and frame variations are judged twice by S during a given chair position, for a total of eight rod adjustments to be made per chair position. After each rod adjustment, the examiner notes the number of degrees that the rod deviates from the true upright as indicated by the protractor attached to the rod and frame apparatus. The mean of the degrees of deviation for the eight trials of a given chair position is then taken as the subject's score. Thus, at the end of the test he has three mean scores: tilted left, tilted right, and upright. In terms of comparison, a high score indicates greater error in terms of degrees of deviation from the true upright and greater field dependence.

Two groups of alcoholics were formed by matching on the basis of their RFT scores and age. For the next four

weeks, one group was retested on the rails as a training procedure once a day. The whole group of alcoholics was told that this was part of a research program for which time was available for only about half of them selected at random, and that previous groups had participated in order to help find ways of understanding and helping people who drink too much.

After four weeks of training, all subjects were retested on the rails and the RFT and then again, one week later, on the RFT.

Analysis of the data

The main analysis of the data was in terms of the difference between alcoholic and nonalcoholic performance on the rails; the effect of training on alcoholics' rail performance in terms of initial and retest scores; the relationship between rail performance and rod and frame performance of alcoholics; and the effect of rail training on rod and frame performance.

In addition to the above, the RFT scores, i.e., initial versus retest scores, of the untrained group of alcoholics were examined in terms of improvement for a four week interval between test and retest, in order to extend and/or confirm the improvement finding of Goldstein and

Chotlos, i.e., 6 to 8 week interval between test and retest. Also, as the present study is part of an ongoing research project which was carried out at the same setting, comparisons were made between a previous nonalcoholic sample and the present alcoholic sample in order to attempt reduplication of the finding of field dependent performance of alcoholics on the rod and frame as compared to nonalcoholics.

CHAPTER V

RESULTS

Initial rail performance of alcoholics was lower than nonalcoholics, and improved with or without training, but significantly more with training. Correlations were found between rail and RFT scores for the tilted positions. Training on the rails did not appear to have an accelerating effect on RFT improvement. RFT improvement was found for the three RFT positions for the untrained group and in the tilted right position for the trained group when comparison was made between initial and retest scores for a particular group only.

Rail scores of alcoholics and nonalcoholics

The initial performance of alcoholics on the Heath Rails was found to be significantly different (lower) from nonalcoholic subjects (Table 1). The correlations between age and rails for the alcoholics ($r = .13$) and nonalcoholics ($r = .20$) were not significant.

Training and nontraining conditions on rail scores

The initial (i.e., before training) score of the alcoholics who received training on the Heath Rails was

found not to differ from the initial score of the untrained group. Both groups did differ from the nonalcoholic group (Table 2).

Table 1. Mean Heath Rail scores of alcoholic and nonalcoholic subjects

	<u>Mean</u>	<u>S.D.</u>	<u>t</u>	<u>p</u>	<u>df</u>
Alcoholic	76.9	(34.6)	5.25	.0001	73
Nonalcoholic	116.3	(25.5)			

Table 2. Comparisons of initial rail scores: trained; untrained; nonalcoholics

	<u>Mean</u>	<u>S.D.</u>	<u>t</u>	<u>p</u>	<u>df</u>
Trained	78.4	(33.4)			
Untrained	75.5	(35.8)	.28	NS	43
Trained	78.4	(33.4)			
Nonalcoholic	116.3	(25.5)	4.58	.0005	51
Untrained	75.5	(35.8)			
Nonalcoholic	116.3	(25.5)	4.70	.0005	50

Alcoholics who had training on the Heath Rails showed rapid improvement (Fig. 1) in their rail scores. For example, trial 5 represents a 40% improvement. At the end of training, the trained alcoholic mean rail score surpassed the mean score of the nonalcoholics, but was found not to differ from the nonalcoholic mean score. The untrained group remained significantly different from the nonalcoholics (Table 3).

The improvement of the trained group compared to the improvement of the untrained group was found to be greater. In comparison to themselves, both the trained and untrained groups' retest scores differed significantly from their initial scores (Table 4, Fig. 2).

Table 3. Nonalcoholic rail scores vs.
alcoholic retest scores

	<u>Mean</u>	<u>S.D.</u>	<u>t</u>	<u>p</u>	<u>df</u>
Trained	120.5	(24.4)			
Nonalcoholic	116.3	(25.5)	.56	NS	51
Untrained	96.3	(36.4)	2.27	.025	50

Test-retest reliabilities for the trained group ($r = .52$) and the untrained group ($r = .69$) were found to be significant ($p = .025$ and $.001$ respectively).

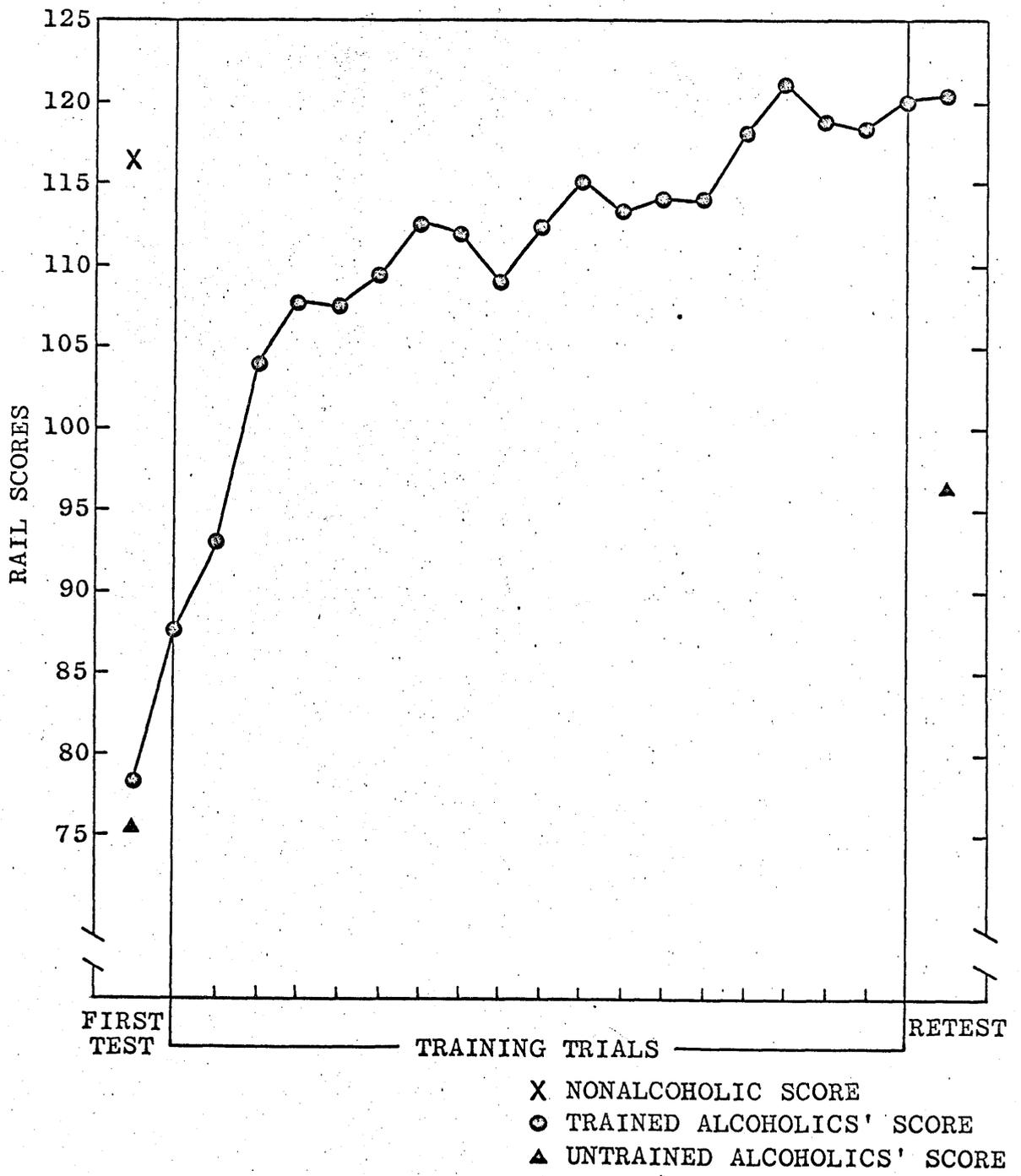


Figure 1. Rail scores by training trials

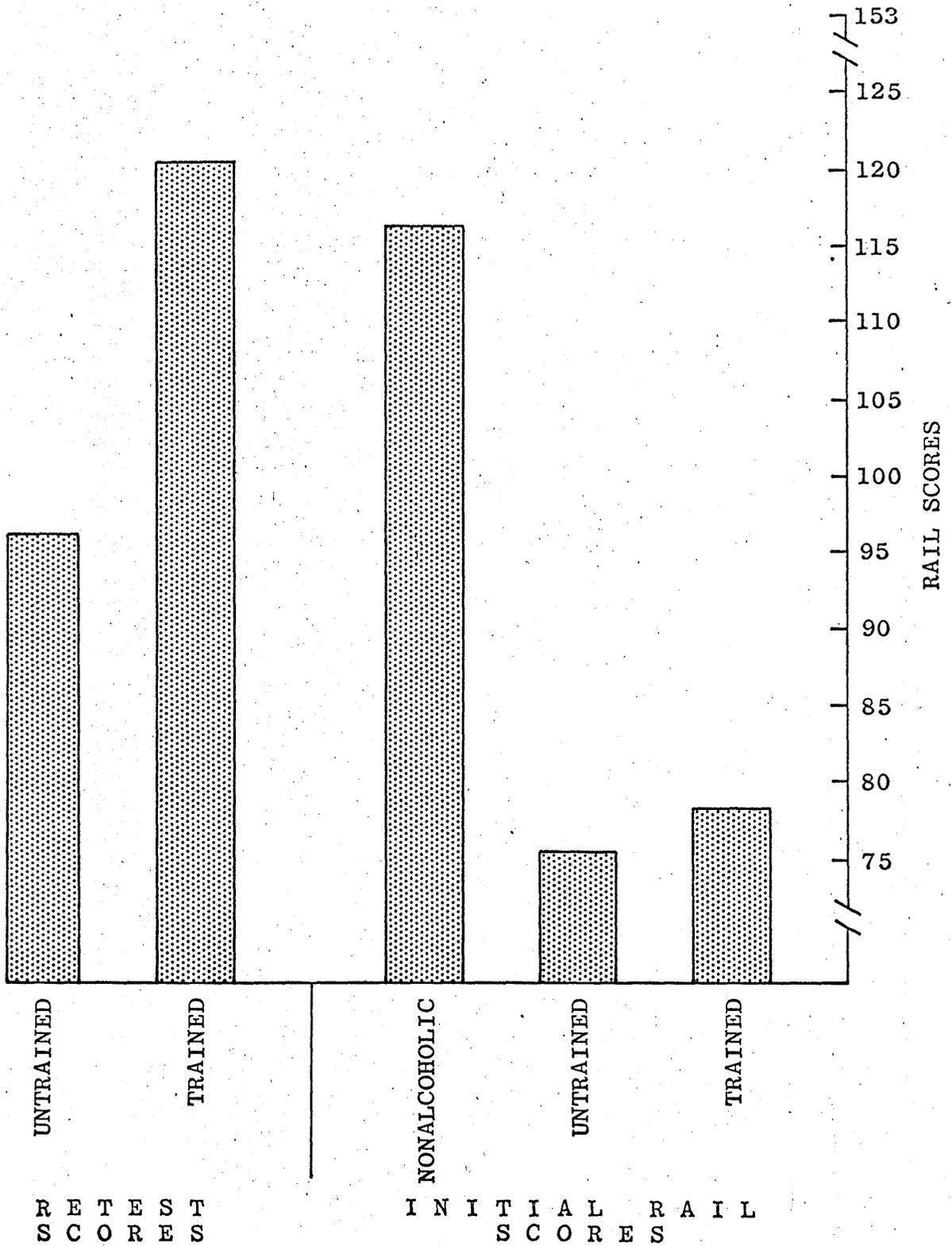


Figure 2. Rail score comparisons

Table 4. Initial rail scores vs. retest scores:
 trained vs. trained; trained vs. untrained;
 untrained vs. untrained

	<u>Initial</u> <u>Mean</u>	<u>Retest</u> <u>Mean</u>	<u>Mean of</u> <u>Difference</u>	<u>t</u>	<u>p</u>	<u>df</u>
Trained	78.4	120.5	42.2	6.83	.0005	22
				2.43	.01	43
Untrained	75.5	96.3	20.8	3.37	.005	21

The correlation ($r = .07$) between years of heavy drinking and rail scores was found not to differ significantly from zero.

Effect of training on the rod and frame test

The correlations between initial rail performance and initial rod and frame performance are presented in Table 5. In both the situations where the individual is tilted right

Table 5. Correlations between RFT and Rails

	<u>Rails</u>	<u>p</u>	<u>df</u>
RFT (LEFT)	r -.24	.025	70
RFT (RIGHT)	r -.32	.005	70
RFT (UPRIGHT)	r -.15	NS	70

or left from the true upright, low, but significant correlations were found, i.e. poorer performance on the rails correlated with greater rod deviation from the upright on the rod and frame. Where the individual is not tilted the correlation which was found was not significantly different from zero.

The difference in age of the trained and untrained group was found not to be significant (Table 6).

The initial and retest RFT mean scores for the three positions are presented in Table 7 and Figure 3. The main focus was on the effect of training on RFT scores which is statistically designated as the interaction effect, group by test, in an analysis of variance. Analysis was made of a 2 (group) x 3 (test) factorial design with repeated measures. The RFT positions of left, right, and upright were analyzed separately. For the tilted left position, no significant difference was found between groups across

Table 6. Comparison of age:
trained vs. untrained

	<u>Mean</u>	<u>S.D.</u>	<u>t</u>	<u>p</u>	<u>df</u>
Trained	46.3	(6.7)			
Untrained	44.9	(5.4)	.78	NS	43

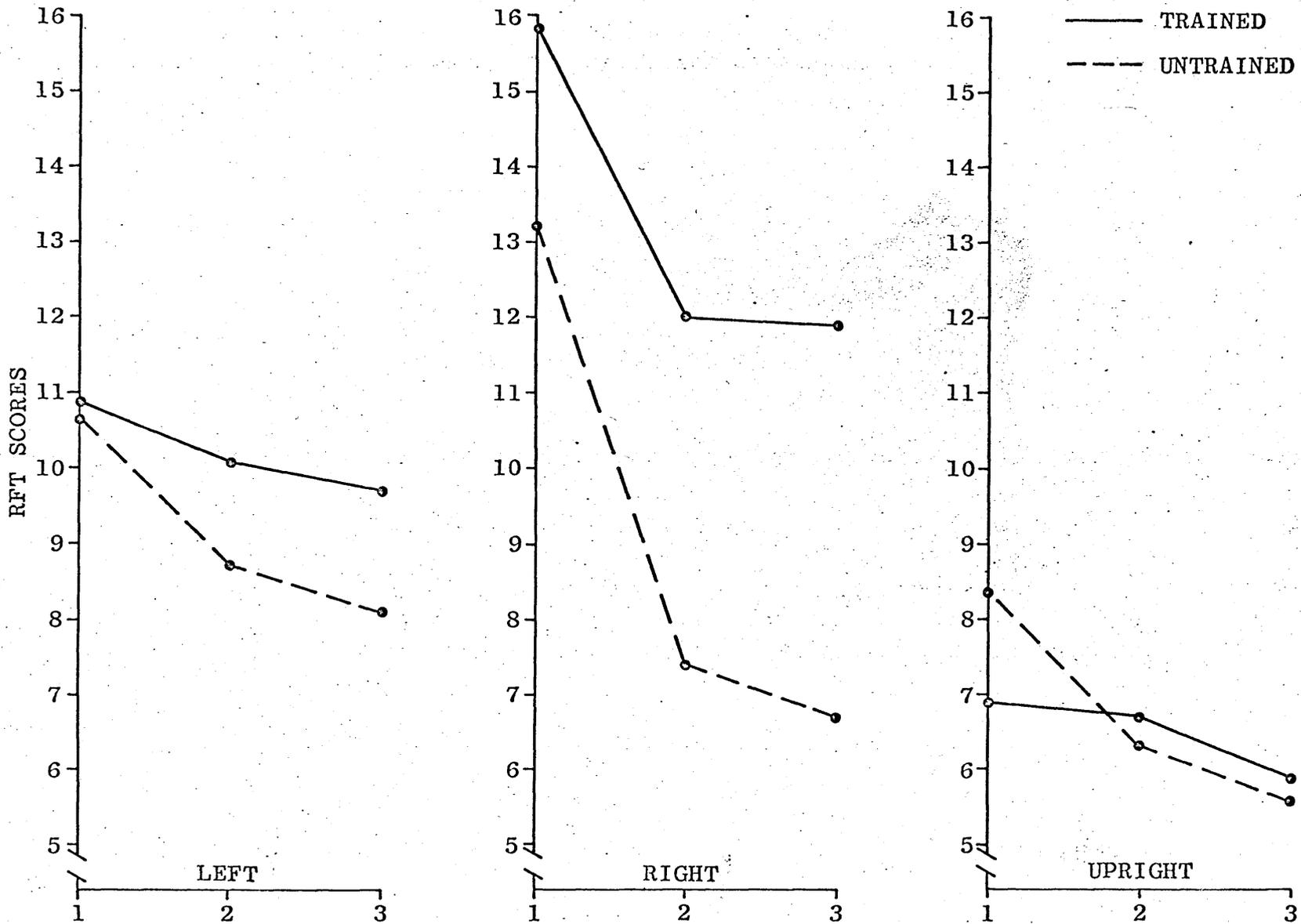


Figure 3. RFT intra-position comparison over trails

Table 7. Means and standard deviations
of initial and retest RFT of trained
and untrained alcoholics

	<u>Initial</u>		<u>Retest</u>		<u>Second retest</u>	
	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>
	<u>RFT Left</u>					
Trained	10.9	(5.5)	10.1	(5.1)	9.7	(5.5)
Untrained	10.7	(4.9)	8.7	(4.5)	8.1	(4.5)
	<u>RFT Right</u>					
Trained	15.9	(8.6)	12.0	(7.1)	11.9	(7.2)
Untrained	13.2	(6.1)	7.4	(3.7)	6.7	(4.2)
	<u>RFT Upright</u>					
Trained	6.9	(3.8)	6.7	(3.8)	5.9	(3.4)
Untrained	8.4	(5.9)	6.3	(3.8)	5.6	(3.6)

tests; a significant difference was found for tests across groups; and no significant interaction effect was found, groups by tests (Table 8).

Analysis of the tilted right condition found significant difference between groups across tests and significant difference among tests across groups. The interaction

Table 8. Analysis of variance of tilted left RFT scores (test-retest) of trained and untrained alcoholics

Source of variation	<u>df</u>	<u>MS</u>	<u>F</u>
<u>Between subjects</u>	42		
Groups	1	47.67	
<u>Ss within groups</u>	41	60.20	
<u>Within subjects</u>	86		
Tests	2	37.69	3.69*
Tests x groups	2	5.56	
Tests x <u>Ss</u> within groups	82	10.19	

*p < .05

between groups and tests was found not to be significant (Table 9).

For the upright position no significant difference was found between groups across tests; a significant difference was found for tests across groups; and no significant interaction was found, groups by tests (Table 10).

Table 2. Analysis of variance of tilted right RFT scores
(test-retest) of trained and untrained alcoholics

Source of variation	<u>df</u>	<u>MS</u>	<u>F</u>
<u>Between subjects</u>	42		
Groups	1	614.46	6.36**
<u>Ss</u> within groups	41	96.55	
<u>Within subjects</u>	86		
Tests	2	355.22	19.49***
Tests x groups	2	16.59	
Tests x <u>Ss</u> within groups	82	18.22	

**p < .01

***p < .001

Analysis of the significant factors was next carried out. Comparisons were made between the trained and untrained groups for the tilted right position using the t test (Table 11). Significant differences were found between the two groups under retest.

When each group was compared to itself several differences were found between initial scores and retest scores. The trained group showed significant improvement

Table 10. Analysis of variance of upright RFT scores
(test-retest) of trained and untrained alcoholics

Source of variation	<u>df</u>	<u>MS</u>	<u>F</u>
<u>Between subjects</u>	42		
Groups	1	1.26	
<u>SS</u> within groups	41	45.48	
<u>Within subjects</u>	86		
Tests	2	41.58	9.26**
Tests x groups	2	10.19	
Tests x <u>SS</u> within groups	82	4.49	

**p < .001

Table 11. Tilted right: trained vs. untrained

	<u>Trained</u>		<u>Untrained</u>		<u>t</u>	<u>p</u>	<u>df</u>
	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>			
Initial test	15.9	(8.6)	13.2	(6.1)	1.22	NS	43
Retest	12.0	(7.1)	7.4	(3.7)	2.83	.01	43
Second retest	11.9	(7.2)	6.7	(4.2)	2.87	.01	41

in the tilted right position. The untrained group showed significant improvement in all three positions (Table 12). This finding of differences for the untrained group offers confirmation of Goldstein and Chotlos' findings of improvement following a period of hospitalization, but not for the effects of training.

Table 12. Initial RFT scores vs. retest scores:
trained vs. trained; untrained vs. untrained

<u>Trained</u>				
	<u>Mean of Difference</u>	<u>t</u>	<u>p</u>	<u>df</u>
RFT (L)	.82	.81	NS	22
RFT (R)	3.95	2.56	.01	22
RFT (U)	.004	.006	NS	22
<u>Untrained</u>				
RFT (L)	2.05	2.01	.05	21
RFT (R)	5.82	5.1	.001	21
RFT (U)	2.095	2.05	.05	21

Sign Test analysis was also performed to determine if the number of those individuals who improved compared to

those whose scores became more field dependent was less than chance. The results tend to support the above findings (Table 13).

Table 13. Sign Test: probabilities for number of SS scoring less field dependent

	<u>Trained</u>	<u>Untrained</u>
RFT (L)	p < .34	p < .067
RFT (R)	p < .04	p < .001
RFT (U)	p < .58	p < .008

The design of the study contained a second retesting on the RFT one week after the first retest in order to see if improvement, if obtained, had some stability or, if not obtained, had some other variation, e.g. a delayed effect. As the interaction effect in the analysis of variance was found not to be significant, no further analysis of this data is presented.

As explained in the previous chapter, an attempt was made to replicate the original findings concerning the difference between alcoholics and a control sample on the rod and frame test. The alcoholic sample used in the present

study was found to deviate less from the true upright in the tilted left position, and showed no differences in the tilted right and upright positions (Table 14).

Table 14. Initial alcoholic RFT scores vs.
control scores

	<u>Alcoholics</u>		<u>Controls</u>		<u>t</u>	<u>p</u>	<u>df</u>
	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>			
RFT (L)	10.8	(5.2)	15.8	(11.4)	2.67	.01	93
RFT (R)	14.6	(7.7)	13.7	(10.2)	.47	NS	93
RFT (U)	7.6	(4.9)	7.4	(4.9)	1.03	NS	93

Summary of findings

1. Alcoholics' performance on the Heath Rails is poorer than nonalcoholics.
2. Alcoholics with no training on the Heath Rails showed significant improvement in comparison to their initial scores after about a 4 week interval. However, their scores remained poorer in comparison with the nonalcoholics' scores.
3. Alcoholics who had training on the Heath Rails improved significantly in comparison to their initial scores,

and, upon retesting, the difference between their scores and the scores of the nonalcoholics was not significant. The improvement of the trained group in comparison to the change of the untrained group was greater for the trained group.

4. The correlation between rail performance and age was found to be not significant for either the alcoholics or nonalcoholics.
5. The correlation found between years of heavy drinking and rail performance was low and not significant.
6. Low correlations found between poor performance on the rail task and poor performance on the rod and frame for the tilted left and right conditions were significant.
7. The difference found between the trained group's difference between initial scores and retest scores and the untrained group's initial scores and retest scores was not significant. Training on the balance task did not have the hypothesized effect on RFT performance.
8. The mean score difference found between the trained and untrained group for the RFT tilted right retest was significant in favor of the untrained group.
9. A significant difference was found between the initial and retest scores in the right position for the trained group. However, the untrained group differences between

initial and retest scores were found significant for left, right, and upright positions. The number of individuals whose scores deviated less from the upright upon retest compared to those whose scores deviated more tended to support the above.

10. The scores of the alcoholic sample of this study did not support previous findings of greater deviance in adjusting the rod to the upright for alcoholics.

CHAPTER VI

DISCUSSION

The focus of this study has been on an exploration of rod and frame improvement and of a possible relationship between RFT performance and balance. Initially, alcoholics and nonalcoholics were compared on a balance task, the Heath Rails. Analysis of the scores showed that the alcoholics were significantly poorer on this task. This would suggest some possible relationship between continued alcoholic consumption and deficit in balance ability of possible neurological background.

After a four week interval, the group that did not receive the training on the rails was found to improve significantly in comparison to their initial scores. Their performance, however, was still significantly lower than the nonalcoholics. It appears then that abstinence from alcohol and other factors such as better nutrition may play some role in the improved physical, e.g., neurological, disposition of the organism as reflected in better rail scores. Better balance thus may reflect reversibility of abnormal nervous system states. As such, the rail test might be used as a gross measure of the effect of alcoholic treatment. More important, perhaps, this process can be

enhanced by specific intervention in the form of training. As has been reported, the trained group also differed significantly in comparison to their initial scores and, in addition, no significant difference was found on retest between their scores and the scores of the nonalcoholics. From the graph of trials by scores and the greater improvement of the trained group compared to the untrained group, it might be concluded that learning plays a role in this improvement. As a demonstrative device, rail performance appears to have possibilities in illustrating to the alcoholic the effects of alcoholic consumption and its cessation.

The next area to be explored was the relation between RFT performance in the tilted positions and rail performance. The low correlations that were found were significantly different from zero to indicate a relationship. However, it appears that the factors involved in rail performance, under the conditions measured, and those involved in RFT performance do not overlap to that great a degree. The difference between initial and retest RFT differences between trained and untrained groups was not significant. This would suggest that training did not have an effect on the RFT scores of the trained group.

Each group showed varied improvement on the RFT when its initial and retest scores were compared. For the

untrained group, significant differences were found in all three positions. The trained group showed change in the right position only. However, when the trained group's right position retest scores were compared to the untrained group's right position retest scores, a significant difference was found in favor of the untrained group. This difference in favor of the untrained group might be taken to suggest that training detracted from the improvement which appears to occur after a relatively short period of hospitalization. In other words, if both groups were equal to begin with, then they should also be equal upon retest, all things held constant. Here it was found that the retest scores of the untrained group were significantly less than the trained group, i.e. the untrained group improved more. These findings lead to a reconsideration of the training task. In part, the original rationale had stemmed from the finding of improvement in RFT performance and the possible relationship to possible improvement in the physical state of the organism, e.g. neurologically, which perhaps resulted in better ability to receive and/or integrate stimuli connected with the experience of imbalance and balance. This led to questions concerning the possible effect of situations for experiencing shifts in body weight distribution in relation to the center of gravity to determine if hastening or

enhancement of this process might occur and thus further improvement of RFT performance. Re-evaluation of the training task leads to consideration of visual factors and the use that is made of verticals and horizontals in the everyday environment in the maintenance of balance. This can be demonstrated by having a person walk in a heel to toe fashion with eyes open and eyes closed. Noticeable difficulty in nonalcoholics is observed and reported in carrying out this task even on an ordinary floor. In addition, but somewhat removed, note is made of walking ability of blind individuals who can maintain their balance without visual cues in normal walking. Thus the possibility can be seen that the use of visual cues is in part a learned process for the sighted individual. Thus, what might have occurred in the training situation was that the organism made more use of visual cues, or the environmental objects, in the initial stages of training to maintain balance and possibly made less use of muscle state changes or nervous system changes even after the possible recovery of functioning. Thus, when deprived of everyday visual cues, e.g. floors and walls, in the RFT situation, the square, luminous frame becomes more of a cue and a distraction. This would suggest possible future research that would investigate rail training with eyes closed versus training with eyes open versus no training.

Another area for research consideration, concerns the spurious improvement findings in the various RFT positions. In the tilted right position both the trained and untrained groups differed from their initial scores on retest in the direction of improvement. However, the retest mean of the untrained group compared to the trained group's retest mean showed the greater improvement. For the left and upright positions, the initial-retest difference was not significant for the trained group but was for the untrained group. However, comparison between the mean retest scores of the trained to untrained revealed no statistical difference. This situation would suggest that general improvement in scores may be a sequential phenomenon beginning to manifest itself in the tilted right position. Further research along these lines might reveal findings regarding some possible dominance or laterality factor insofar as nervous system damage and reversibility variables are involved.

Focusing attention on the untrained group's scores alone, one finds the untrained group's scores showed significant improvement for the tilted left, tilted right, and upright positions. These findings would appear to confirm Goldstein and Chotlos' findings of improvement of RFT performance. In addition, improvement appears to occur

after a shorter interval between test and retest and hospital stay. However, as to the significance of what factors are related to this improvement, e.g. "drying out" or a change in personality, the results of this study only offer a suggestion in favor of the physical factors involved in drying out. This suggestion arises from the improved rail scores of the untrained alcoholics as rail scores are not presently associated with personality functioning but are, to a greater degree, associated with nervous system damage. In addition, personality change is commonly conceived of as an evolving process encompassing a relatively long period of time which was not the case in the present study.

In regard to reduplication of the Witkin group's field dependent scores of alcoholics, comparison of the initial scores of this sample to a control sample of non-alcoholics did not support the previous findings that alcoholics deviate more from the upright in their rod adjustments than nonalcoholics. This finding, the improvement results, and the observation that the degrees of deviation from the upright of several alcoholics is very low, tend not to support the proposition that alcoholics perceive in a homogeneous manner of great consequence. This is further emphasized in the literature review section of this thesis dealing with projective test findings of

alcoholics and suggests that the Witkin group revalidate the RFT in terms of projective tests with alcoholics which was done in their original work with normals. In addition, the present study tends to cast doubt on the stability hypothesis, i.e., RFT scores of alcoholics remain stable over time and are little effected by experimental manipulation, which has been offered in support of a predisposition hypothesis, i.e., alcoholics perceive in a field dependent manner prior to becoming alcoholics and this mode of perception may be a cause of alcoholism. It appears than, from this and previous investigations, that what an alcoholic performance on the RFT represents and for whom certain performance is typical remains an empirical question. The rail performance results of this study tend to support general considerations of equilibrium factors, while the RFT-rail training results do not negate further exploration, but offer some direction.

CHAPTER VII

SUMMARY AND CONCLUSION

In the introduction of this paper the development of Witkin's Rod and Frame Test and its use and findings with nonalcoholic and alcoholic subjects were outlined. The importance of psychological investigation of alcoholics, and thus the investigation of the RFT, was sketched.

The background of the problem in reviewing criticism of Witkin's work, considerations regarding the concept of the alcoholic personality, studies dealing with perceptual performance of alcoholics and brain damaged individuals, and studies investigating nervous system damage and alcoholism set the overall perspective for possible further investigation of field dependent performance of alcoholics on the RFT. The last part of this section focused attention on the finer details of the problem by considering improvement findings and the possible role of balance and training in regard to alcoholics and improvement.

Description of subjects, apparatus, procedure, and analysis of the data were presented in the Method section, followed by a report of findings on the Results section. The main findings were: differences in rail performance between alcoholics and nonalcoholics; improvement in rail

performance after about four weeks, with greatest improvement in the trained group; a low, significant correlation between rail scores and RFT scores in the tilted positions; and no positive effect of training on RFT performance.

In the Discussion section some uses of rail performance in itself were discussed in addition to possible modification in the use of the rails in the study of improvement of RFT scores. A possible sequential improvement in scores was noted and research in terms of nervous system damage were discussed.

In conclusion, it was felt that the rail performance results support the overall purpose of the explorative nature of the study and that the RFT-training results do not negate further exploration, but offer some direction.

BIBLIOGRAPHY

BIBLIOGRAPHY

- Alexander, J. B. & Gudeman, H. E. Perceptual and interpersonal measures of field dependence. Percept. mot. Skills, 1965, 20, 79-86.
- Armstrong, J. D. The search for the alcoholic personality. Annu. Amer. Acad. polit. Sci., 1958, 315, 40-47.
- Bacon, M. K., Barry, H., III & Child, I. L. A cross-cultural study of drinking: II. Relations to other features of culture. Quart. J. Stud. Alc., Suppl. No. 3, 1965, 29-48.
- Bailey, W., Hustmyer, F. & Kristofferson, A. Alcoholism, brain damage and perceptual dependence. Quart. J. Stud. Alc., 1961, 22, 387-393.
- Bell, R. G. Dependence upon depressant chemicals. Canad. Nurse, 1954, 50, 800-802.
- Bell, R. G. Alcohol and loneliness. J. soc. Ther., 1956, 2, 171-181.
- Bennett, A. B., Mowery, G. L. & Fort, J. T. Brain damage from chronic alcoholism: the diagnosis of intermediate stage of alcoholic brain disease. Amer. J. Psychiat., 1960, 116, 705-711.
- Blakeslee, A. L. Alcoholism - a sickness that can be beaten. New York: Pub. Aff. Comm., Inc., No. 118A, 1964.
- Chafetz, M. E. & Demone, H. W. Alcoholism and society. New York: Oxford Univer. Press, 1962.
- Child, I. L. In Lindzey, G. (ed.) Handbook of social psychology: vol. II. Cambridge, Mass.: Addison-Wesley, 1954.
- Courville, C. B. Effects of alcohol on the nervous system of man. Los Angeles: San Lucas Press, 1955.
- Dahlstrom, W. G. & Welsh, G. S. An MMPI handbook. Minneapolis: Univer. Minn. Press, 1960.

- Elliot, R. Interrelationships among measures of field dependence, ability, and personality traits. J. abnorm. soc. Psychol., 1961, 63, 27-36.
- Force, R. C. Development of a covert test for the detection of alcoholism by keying of the Kuder Preference Record. Quart. J. Stud. Alc., 1958, 19, 72-78.
- Goldstein, G. & Chotlos, J. Dependency and brain damage in alcoholics. Percept. mot. Skills, 1965, 21, 135-150.
- Goldstein, G. & Chotlos, J. Stability of field dependence in chronic alcoholic patients. J. abnorm. soc. Psychol., in press, 1966.
- Goodenough, D. R. & Karp, S. Field dependence and intellectual functioning. J. abnorm. soc. Psychol., 1961, 63, 241-246.
- Graybiel, A. & Fregly, A. R. A new quantitative ataxia test battery. U. S. Naval Schl. Aviat. Med., N.A.S.A., MR005.13-6001 subtask 1 Rep. No. 107, 1965.
- Gruen, A. The relation of dancing experience and personality to perception. Psychol. Monogr., 1955, 69, 1-16.
- Gruen, A. A critique and re-evaluation of Witkin's perception and perception-personality work. J. gen. Psychol., 1957, 56, 73-93.
- Heath, S. R. Rail walking performance as related to mental age and etiological type among the mentally retarded. Amer. J. Psychol., 1942, 55, 240-247.
- Heath, S. R. Clinical significance of motor defect, with military implications. Amer. J. Psychol., 1944, 57, 482-499.
- Holtzman, W. H. A review of Personality through perception. Amer. J. Psychol., 1955, 68, 501-504.
- Jones, H. Alcohol addiction: a psycho-social approach to abnormal drinking. London: Tavistock, 1963.

- Kaldegg, A. Psychological observations in a group of alcoholic patients. Quart. J. Stud. Alc., 1956, 17, 608-627.
- Karp, S. A., Poster, D. C. & Goodman, A. Differentiation in alcoholic women. J. Pers., 1963, 31, 386-393.
- Karp, S. A., Konstadt, N. L. Alcoholism and psychological differentiation: long range effect of heavy drinking on field dependence. J. nerv. ment. Dis., 1965, 140, 412-416.
- Karp, S. A., Witkin, H. A. & Goodenough, D. R. Alcoholism and psychological differentiation: effect on alcohol on field dependence. J. abnorm. soc. Psychol., 1965, 70, 262-265.
- Knight, R. The psychodynamics of chronic alcoholism. J. nerv. ment. Dis., 1937, 86, 538-548.
- League, B. J. & Jackson, D. N. Activity and passivity as correlates of field independence. Percept. mot. Skills, 1961, 12, 291-297.
- Lemere, F. The nature and significance of brain damage from alcoholism. Amer. J. Psychiat., 1956, 113, 361-362.
- Lemere, F. What causes alcoholism? J. clin. exp. Psychopathol., 1956a, 17, 202-206.
- Lisansky, E. S. Alcoholism in women: social and psychological concomitants. I Social history data. Quart. J. Stud. Alc., 1957, 18, 588-623.
- Lisansky, E. S. The etiology of alcoholism: the role of psychological predisposition. Quart. J. Stud. Alc., 1960, 21, 314-341.
- Lolli, G. Alcoholism as a disorder of the love disposition. Quart. J. Stud. Alc., 1956, 17, 96-107.
- McCord, W. & McCord, J. In Pittman, D. J. & Snyder, C. R. (eds.) Society, culture, and drinking patterns. New York: Wiley, 1962.
- Munt, J. S. Fear of dependency: a factor in casework with alcoholics. Soc. Work, 1960, 5, 25-30.

- Noyes, A. P. & Kolb, L. C. Modern clinical psychiatry. Philadelphia and London: Saunders, 1958.
- Rouse, K. A. Detour alcoholism ahead. Chicago: Kemper Ins., 1965.
- Rouse, K. A. Alcoholism. Chicago: Kemper Ins., 1965a.
- Skillicorn, S. A. Presenile cerebellar ataxia in chronic alcoholic. Neurol., 1955, 5, 527-534.
- Strauss, R. In Rose, A. M. (ed.) Mental health and mental disorder. New York: Norton, 1955.
- Sutherland, E. H., Schroeder, H. G. & Tordella, C. L. Personality traits and the alcoholic. Quart. J. Stud. Alc., 1950, 11, 547-561.
- Syme, L. Personality characteristics and the alcoholic. Quart. J. Stud. Alc., 1957, 18, 288-302.
- Taylor, J. G. The behavioral basis of perception. New Haven: Yale Univer. Press, 1963.
- Teuber, H. L. & Mishkin, M. Judgment of visual and postural vertical after brain injury. J. Psychol., 1954, 38, 161-175.
- Tumarkin, B., Wilson, J. D., & Snyder, G. Cerebral atrophy due to alcoholism in young adults. U. S. Armed Forces Med. J., 1955, 6, 67-73.
- Wahl, C. W. Some antecedent factors in the family history of 109 alcoholics. Quart. J. Stud. Alc., 1956, 17, 643-654.
- Weiner, M. Effects of training in space orientation on perception of the upright. J. exp. Psychol., 1955, 49, 367-373.
- White, W. F. & Gaier, E. L. Assessment of body image and self concept among alcoholics with different intervals of sobriety. J. clin. Psychol., 1965, 21, 374-377.

Witkin, H. A., Lewis, H. B., Hertzman, M., Meissner, P. B.,
& Wapner, S. Personality through perception. New
York: Harper & Brothers, 1954.

Witkin, H. A., Dyk, R. B., Faterson, H. F., Goodenough,
D. R. & Karp, S. A. Psychological differentiation:
studies of development. New York: Wiley, 1962.

Zigler, E. A measure in search of a theory? Contemp.
Psychol., 1963, 8, 133-135.