Prevention and Intervention Strategies for Promoting Resilience in Disadvantaged Children

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This article addresses the emergence of a resilience-based prevention practice perspective that focuses on positively affecting the development of disadvantaged, at-risk children. Significant progress has been made in understanding risk and resilience processes; however, use of the field's advances in applied settings has lagged. The article will attempt to bridge this gap by reviewing relevant issues in program design, implementation, and evaluation from a resilience perspective. Risk and resilience dynamics are briefly highlighted to illuminate theoretical routes for promoting positive adaptation. Trends in constructing preventive programs are underscored, focusing on ecological routes to behavioral and environmental change. Finally, prevention and early intervention programs for disadvantaged children ages 3–9 illustrate issues in program conception and effectiveness. Methodological concerns in evaluation of these programs are discussed, and future recommendations are given.

In the past 2 decades, enthusiasm for investigating childhood resilience and preventive interventions has developed on parallel trajectories. Both areas have enjoyed growing public attention and have begun to coalesce fragmentary research attempts into cohesive bodies of research. Yet growth has not occurred without stumbling blocks. The study of resilience has struggled to emerge from the overarching shadow of pathology, and prevention programs have been accused of lacking strong theoretical foundations or rigorous evaluation.[1]

With common roots in epidemiological mapping of risk processes, these estranged disciplines are just beginning to rediscover each other and intertwine more effectively to reinforce practice applications and

program effectiveness.[2] The traditional "problem-focused" orientation, with its preponderance of retrospective research designs, proved to be of little use to prevention programs and public health investigators who were trying to fashion health-promotion interventions. Prevention models within this framework were based on values rather than facts because pathology data provided little direction for skills-building prevention or intervention packages, and retrospective research designs shed limited light on factors promoting positive development.[3] This led to growing dissatisfaction and the gradual shift to include, and at times emphasize, resilience. This dynamic is further reinforced by the current prominence of ecological approaches, which lend themselves to both resilience and prevention intervention frameworks.[4]

I will begin to develop a resilience-based prevention practice perspective by highlighting risk and resilience dynamics. I will then outline prevention and early intervention programs for disadvantaged children ages 3–9 to illustrate issues in program conception and effectiveness. Each of the programs has elements, which I call "modifiable mediators," that lend themselves to resilience-based interventions. These pathways for intervention are briefly outlined. Finally, I will discuss some methodological concerns in evaluations.

Risk and Resilience

Risk factors represent "any influences that increase the probability of onset, digression to a more serious state, or maintenance of a problem condition."[5] There are several important mechanisms through which risk can be transmitted. Risk traits, on the one hand, are individual predispositions that heighten vulnerability to negative outcomes. Temperament or a family history of depression or heart disease are examples of such traits. Contextual effects, on the other hand, are environmental correlates or conditions conducive to risk. These effects can be indirect (e.g., neighborhood poverty, high unemployment) or direct (e.g., inadequate parenting, peer pressure). Links between different risk variables often occur, forming risk chains. Poverty, for instance, commonly coincides with parental unemployment, single-parent households, high parental stress, lower educational attainment, and a complex array of other risk factors. This accumulation of risk and stress has been shown to have strong deleterious effects on children's development.[6] Michael Rutter's investigation of family risk, for instance, showed that when two or more risk factors are present in a child's life, the probability of subsequent disorder is significantly bolstered.[7]

Resilience, in contrast, denotes positive adaptation and competence despite the presence of substantial risk.[8] "Resilience factors" have been described by some authors as adaptive processes internal to the child, while "protective factors" exist in the environment.[9] "Resilience strings" are chains of factors that promote positive outcomes—the adaptive

equivalent to risk chains.[10] Protective mechanisms are commonly thought to promote resilience by interacting with risk factors. In this model, a protective effect is present if an attribute enhances functioning for high-risk individuals but makes no difference for their low-risk counterparts. Protection is also at play when high levels of a variable mediate stress, and yet when low levels of the variable are present, an individual's competence decreases. For instance, parental supervision protects against adolescent delinquency. When supervision is high, there is little delinquent behavior. When supervision is low, delinquency increases. Conversely, vulnerability to risk exists when high levels of a variable are associated with declines in functioning while low levels are not. Parental psychopathology, for instance, leaves children vulnerable to mental health problems; however, low levels or the absence of parental psychopathology is not associated with childhood mental health problems. Important protective mechanisms that moderate or mediate risk include intelligence among preadolescents, gender, social skills, parent-child relationships, and school experiences. Exactly how they work is not well understood, but it is hypothesized that these mechanisms may intercede by reducing risk's effects, reducing negative chain reactions, establishing and maintaining self-esteem and self-efficacy, or opening opportunities.[11]

Research into risk and resilience has grown increasingly complex. Risk factors and protective processes are now considered to exist and interact on a variety of levels with individual, familial, societal, or cultural manifestations. Generic, overarching factors have been mapped, as well as processes specific to a particular problem.[12] Ecological complexities introduce multideterminism, in which many environmental influences contribute to any given adaptive or maladaptive behavioral outcome. Domain specificity has also become prominent. Functional competence in one arena does not necessarily indicate positive adaptation in other behavioral, cognitive, or emotional spheres of functioning.[13] Similarly, levels of risk, resilience, and protection are hypothesized to fluctuate (in some domains more than in others) across developmental periods, to vary by gender, and to show variations by race or ethnicity.[14]

Resilience-Based Intervention Strategies

Only recently has resilience research accumulated enough solid data to begin to offer program planners productive strategies for prevention and intervention. As such, resilience research has begun to reach its potential in aiding program planning through the "alterable factors" perspective.

Ann Masten outlined four distinct strategies for fostering individual resilience and bolstering adaptive outcomes.[15] Reducing vulnerability and risk was the first approach and is strongly couched in primary prevention methods. Mark Fraser and Maeda Galinsky write, "Risk factors should guide intervention efforts, and the goal of intervention should be

to reduce the effect of specifically targeted risk factors significantly."[16] In this approach, programs attempt to circumvent high-risk situations before the individual encounters their effects. Contraception and "safe-sex" strategies, for example, are designed to intervene before teenagers contract a sexually transmitted disease or conceive a baby. Early childhood interventions such as Head Start, which attempts to raise children's cognitive abilities to acceptable levels before school entry, are other examples of this approach.

The second approach to promoting positive outcomes lies in reducing stressors and "pileup." Consider poverty. Low socioeconomic status often coincides with or precipitates risk factors such as parental distress, marital discord, parental substance use, inadequate access to health services, and lapses in parental supervision, among others. These risk factors become risk chains, which subsequently heighten the likelihood of child maltreatment, adolescent alcohol and drug use, delinquency, and teenage pregnancy. If intervention can lessen the effect of the individual stressors or disrupt their accumulation, the risk chain may break down. Many early childhood programs for disadvantaged children attempt to do this by integrating parenting-skills training and parent-child attachment elements into their interventions. Theoretically, despite the stressors inherent in poverty, if high-quality parenting remains as a protective factor, the likelihood of child maltreatment, teenage substance use, delinquency, and so forth, should not be heightened.

Increasing available resources is a third strategy for facilitating adaptive outcomes. Yet again, poverty serves as an example. Poverty elevates a child's vulnerability to every kind of risk, causing more social, behavioral, and physical problems than are present in nearly any other type of situation. Simultaneously, it often reduces access to high-quality resources that can help in coping with the stress and strain, causing a situational double jeopardy for disadvantaged children.[17] If access to community health care, educational services, or employment-oriented and recreational services could be enhanced, many of poverty's concomitant sources of stress might be lessened. Some straightforward examples of this dynamic are found in programs that try to prevent childhood diseases through free immunization clinics or promote "safe sex" by disseminating free condoms.

The final strategy Masten offers is mobilizing protective processes.[18] Protective factors may aid in interventions by directly decreasing dysfunction, buffering the effects of risk factors, preventing the onset of a particular risk factor, or by breaking the risk chain that fosters disorder.[19] Mapping such protective processes for intervention targets may be the single most important contribution resilience research makes to program development. Protective mechanisms operating for high-risk children who do not suffer negative outcomes must be understood and used in fashioning intervention programs. Providing a supportive adult to a child at risk in a Big Brother or Big Sister program is an example of

mobilizing a well-researched protective factor. A wide range of protective factors that may serve as targets for interventions are delineated in table 1.

Similar to mobilizing protective factors is attempting to foster "resilience strings" of beneficial behavior.[20] An intervention that encourages academically successful students to tutor their less-accomplished peers is an example of such an approach.[21] Beyond the benefits to the less-accomplished student, the successful child experiences a sense of mastery and also enhances his or her communication skills or social skills, which are useful protective factors in the social domain.

The strategies outlined above are in no way mutually exclusive. In fact, multifaceted prevention and intervention programs regularly integrate several of these objectives. The early intervention programs Head Start and Child Parent Centers, which will serve as in-depth examples later in the discussion, have multiple targets for intervention effectiveness, thus mobilizing several "modifiable mediators" using a variety of approaches. Notably lacking in the literature, however, are studies of the effectiveness of programs designed to foster resilience.[22] Extrapolations commonly have to be made from allied outcome variables such as academic achievement or "social competence" as manifested by such measures as academic tests and IQ scores.[23] This practice fosters fragmentation and contributes to the dearth of application knowledge.

Wedding Prevention and Resilience

Prevention programs offer a natural opportunity to wed resilience theory to practice. Interest in prevention has grown substantially in the last 2 decades. Whether the focus is on drug abuse, teenage pregnancy, school failure, delinquency, nutrition, or a host of other problems, the primary goal of prevention is to reduce the incidence, duration, or intensity of undesirable outcomes.[24]

The Institute of Medicine has provided careful categories for efforts in this area.[25] "Universal" prevention interventions target an entire population group, regardless of individualized risk status. "Selective" prevention programs, in contrast, target high-risk subpopulations. Biological, psychological, or social risk factors that indicate heightened vulnerability are used to identify groups to target. Finally, "indicated" prevention interventions target high-risk individuals after some detectable signs of disorder have begun to surface but before the problem has grown substantially.

The Institute of Medicine's new terminology highlights the importance of understanding risk factors when designing interventions. This is a significant step forward in forming an empirically founded, resilience-based practice paradigm. Integration of risk and resilience processes, modifiable mediators, and protective factors in selecting targets and methods for change has become an increasingly important undertaking

Table 1

Childhood and Adolescent Risk and Protective Factors by Problem Area

Problem Area	Risk Factors		
	Individual	Family	Environmental
General, nonspecific	Gender (varies by situation and developmental phase) Biomedical problems Lower IQ Difficult temperament (infancy)	Child maltreatment Parent conflict Parental psychopathology Poor parenting	Few opportunities for education and employment Racial discrimination Poverty
Child abuse and neglect	Parents: Psychological distress Low self-esteem Substance abuse Children: Health complications Low intellect Developmental abnormalities Difficult temperament (infancy) Noncompliant behavior	Parental psychological distress Lack of or conflictual social support Marital discord Lack of positive interactions among family members Single parenting Parental unemployment Family poverty	Poverty, lack of resources Unemployment Lack of support systems Lack of or inadequate housing, health care, helping services High rate of crime and violence Discrimination
Alcohol and drug use	Family history of alcoholism Sensation-seeking orientation Poor impulse control Attention deficits School failure Association with drug-using peers	Family conflict Poor parent-child bonding Poor family management practices Poor family communication Family alcohol and drug use	Availability of alcohol and drugs Tolerant norms on substance use High population density, high crime rates, and residential mobility Poverty, economic deprivation

PROTECTIVE FACTORS			
Individual	Family	Environmental	PREVENTION-INVERVENTION FOCUS
Easy temperament (infancy) Self-esteem and self-efficacy High IQ Competence playing roles	Social support Presence of caring adult Positive parent-child relationship Effective parenting	Opportunities for education, growth, employment, achievement Sense of community	Identify key risk factors and match effective intervention to reduce vulnerability Strengthen protective processes Emphasize strengths rather than deficits Integrate empowerment models
Parents: Competent parenting Adequate social supports Children: Competent behavior Higher IQ High self-esteem Being seen as affectionate (infancy) Being older at time of mal-treatment Outgoing nature	Family cohesiveness Resilient parents (often lead to re-silient children) Positive role modeling Presence of siblings Marital harmony Availability of sup-portive family members	Availability of sup-portive friends, teachers, neighbors Community well-being, stability, and cohesiveness Availability of role models Healthy economy Strong informal social support networks	Family-Centered Intervention: Behavioral parenting and social-skills training using modeling, positive reinforcement, and short-term, concrete goals Decrease parental aggression and/or hostility Increase positive parent-child inter-action/attachment Child-Centered Interventions: Therapeutic educational and social services on school entry (thera-peutic day care, preschool programs to enhance school readiness) Promote social competence (self-control, communication, problem-solving and resistance to negative social influences) Promote child and family social support Psychotherapy and/or out-of-home placement when trauma has oc-curred or abuse or neglect is severe
Being a firstborn child Good social and problem-solving skills Positive attitude, optimistic about future Easy temperament High IQ Low childhood stress	Small family size Low parental conflict Positive relation-ships with siblings Attachment to parents	Social support from outside family Access to alternative activities (mid-night basketball, nonalcoholic dances) Well-delineated community Positive social norms and values	Identify risk and protective factors most prevalent in local community; target those risk factors Early childhood and elementary school children should be targeted to pre-vent adolescent drug and alcohol problems Tailor prevention-intervention efforts to developmental stages (4–6 years old, focus on aggressive behavior; in adolescence, focus on peer pressure from antisocial peers) Consider racial and ethnic differences in prevention-intervention planning

Table 1 (*continued*)

Problem Area	Risk Factors		
	Individual	Family	Environmental
Adolescent pregnancy	Younger age at puberty, earlier sexual activity (under 14) Substance use Sexual-abuse history Low school-commitment Hopelessness about future Lack of contraceptive knowledge	Single-parent family Chaotic family atmosphere Family poverty Family has permissive sexual attitudes Lack of family support Sibling is sexually active or is teen mother	Neighborhood poverty Inadequate social welfare, health, and educational system for adolescents
Sexually transmitted infections	Early puberty Substance abuse Poor impulse control Sexual abuse history Low self-efficacy Poor communication skills Lack of knowledge concerning sex Sense of invulnerability	Poor communication with parents Parental substance abuse Ineffective adult supervision Older siblings who are sexually active	Violence, substance abuse, poverty in neighborhood Norms that accept early sexual activity Lack of effective sex education Peer pressure Poor access to medical treatment Social disorganization
Childhood disability (risk and protection in subsequent development)	Specific disability (some disabilities, i.e., motor impairments, are higher risk than others) Secondary conditions (physical limitations, stigma)	Inadequate attachment with primary caregiver (parental anxiety, depression, etc.) Parental substance use, lack of resources	Poverty Lack of adequate resources

Protective Factors			
Individual	Family	Environmental	Prevention-Invervention Focus
Delaying sex until over 18 Lack of drug or alcohol use Effective use of contraceptives High educational aspirations and school commitment Optimistic about future Religious affiliation	Two-parent family Higher socio-economic status Higher parent education Open family communication Close to parents, especially mother Effective parental supervision Social support from family	Effective pregnancy prevention programs Access to adolescent health services (school-based clinics)	Multiple preventions-interventions should be considered for closely related risk factors Effective pregnancy prevention programs—combine teaching of abstinence with contraception information and life-skills training. Community-based programs can be more effective than school-based due to stigma Access to adolescent health services (school-based clinics, contraceptive availability) Occupational training and dropout prevention for pregnant teens Strengthen family ties, promote social support
Attending religious services Positive attitude toward condom use	Attending religious services Positive attitude toward condom use	Effective sex education	Comprehensive approaches using individual, family, schools, communities, etc., are emphasized Primary prevention focus is to help postpone sexual activity onset Combine with drug and alcohol use prevention efforts, owing to their interrelated nature For early intervention (youth are already sexually active), promote knowledge of sexually transmitted diseases, availability of condoms, relationship context information (i.e., emotional perspectives) Treatment: access to health care, school-based clinics
Disorder less severe Personal coping resources to handle secondary conditions (stigma, communication difficulties, etc.)	Parents' sense of efficacy Secure attachment to primary caregiver	Access to services	Enhance access to appropriate services Integrate family concerns and parental support to enhance caregiver self-efficacy and ability to foster child's development Coordinate services to reduce family stress Community-based services that "normalize" child's environment are emphasized

Table 1 (*continued*)

| | Risk Factors | | |
Problem Area	Individual	Family	Environmental
Childhood depression	Low academic performance (concomitant with anhedonia and low concentration) Neurobiological vulnerabilities (norepinephrine, serotonin irregularities) Chronic illness Negative perceptual cognitive styles In ethnic cohorts, limited ability to speak English	Less cohesive, more disorganized, emotionally inexpressive, hostile or critical family environment Divorce (especially in cases with high conflict afterward) Parental depression History of abuse or neglect	Lower SES (equivocal association) Single parent and low SES (stronger association) Neighborhood violence
Delinquency and conduct disorder	Academic failure in elementary school (around grade 4) Low commitment to school Aggressive behavior or temper tantrums in early childhood Associations with delinquent peers Having personal attitudes or beliefs favoring deviant behavior ADHD Low IQ Difficult temperament	Family management problems Family or marital conflict Family history of high-risk behavior Inappropriate parental modeling Poor parental supervision Lack of parental involvement Abusive discipline	Antisocial community norms Chronic violence Poverty High population density High residential mobility Low community organization or attachment

for program planners.[26] It also incorporates evaluation methods throughout the entire process, making this a well-balanced model for resilience-based practice. Specific program elements for resilience-based practice are outlined below.

Resilience-Based Program Development

Defining the problem is a first step in determining those mediators that can be modified. Whether positive or negative, mediators are inter-

PROTECTIVE FACTORS			
Individual	Family	Environmental	PREVENTION-INVERVENTION FOCUS
Being male rather than female Being older (over 11 years old) at first onset	Family support Parental education, employment, and health Adequate treatment for parental depression	Research knowledge too limited to specify Social support outside the family	Realize childhood depression is a biological predisposition influenced by contextual risks Decrease environmental risk factors, especially for low-income children Provide access to adequate mental health services, especially to treat parental depression (the most salient risk factor in childhood depression) Skills training for management of emotions Screen for comorbid conditions (conduct disorder, ADHD, substance abuse, anxiety disorders) Cognitive-behavioral group treatment, integrating parents as well as children or teenagers has shown some signs of treatment effectiveness.
Being female rather than male Commitment to school Positive social orientation (i.e., easy temper and enjoys social interaction) Positive social support system or peer group that supports coping efforts Self-discipline Developed social and problem-solving skills Academic success Moderate intelligence	Supportive family atmosphere Strong attachment to a parent Commitment to family Effective parental supervision High degrees of parental involvement Appropriate, positive social parental modeling	Community organization and attachment Positive social recreational and support structures and services (i.e., community centers, organized activities)	Parenting skills and social skills training Intensive family preservation services and family management training to enhance parent-child interaction and decrease family conflict Anger management, problem solving, conflict resolution, and peer mediation skills training Increase opportunities for achievement and bonding to school Behavioral monitoring, school attendance reinforcement, and graduation incentives have shown some effectiveness Firearms regulation and community block watch initiatives Promotion of positive social norms at all levels

NOTE.—Information for this table was largely derived from chapters in M. W. Fraser, ed., *Risk and Resilience in Childhood: An Ecological Perspective* (Washington, D.C.: National Association of Social Work Press, 1997). SES = socioeconomic status; ADHD = attention deficit, hyperactivity disorder.

mediary variables that modulate the effects of two other variables: the antecedent or independent variable and the outcome.[27] For instance, family-system attributes are said to mediate or regulate the effect of neighborhood risk factors on childhood adaptation. Successfully targeting modifiable mediators to guide intervention requires extensive use of empirical findings on risk and protective factors, knowledge of the cause of the unwanted outcome, and a local as well as global understanding of the target population. Contextual characteristics that have been found to be protective, such as family cohesion, warmth, and supportive par-

enting, are examples of possible intervention targets for parenting skills, parent-child relationship programs, or family therapy.[28] In using information on vulnerability and protection for intervention planning, it is critical to recognize differences across subgroups based on gender, ethnicity, and developmental stage.[29]

Designing prevention-program protocol consists of several steps. Consulting the targeted group to assess unique needs, strengths, and concerns within the local community is an important foundation. Prevention programs often find it difficult to recruit and retain appropriate participants. To avoid these difficulties, determining group needs and resources early, through qualitative methods such as interviews and focus group sessions, is an effective screening method.[30] Such client consultation also serves as an informal test of the potential modifiable mediators noted during the problem-identification stage and can inform subsequent work in selecting change objectives. Early needs and strengths assessments also aid in appropriate program targeting by providing information about risk status within the local community. Knowing local risk factors guides decisions concerning how to allocate services while knowing community strengths guides selection of change strategies. Selecting change objectives is a dynamic process that fuses empirical theories with participants' needs and requests. Resilience-based program goals are also usually conceptualized in positive, attainable terms. Deficit-driven problem perspectives, for instance, seek to decrease teen delinquency whereas resilience-based prevention efforts seek to increase positive social activities for adolescents. This increase in positive social behavior is then thought to indirectly affect delinquent behavior.

Choosing change methods is best guided by theoretical, empirical, and practice knowledge. For instance, social-learning perspectives might be an effective model for constructing a skills-training package that addresses problem-solving for middle-school students facing peer pressure surrounding alcohol use.[31] The risk factors of concern may be low parental supervision and negative peer behaviors. The targeted protective factor to enhance may be cognitive problem-solving ability or self-efficacy. Consequently, a prevention package might be adopted using a skills-training approach in which interpersonal skills are modeled and practiced first in nonthreatening situations and subsequently in simulations that closely approximate natural conditions. Packages such as this are quite common and are supported with a wealth of empirical literature documenting differing effectiveness.[32]

Following the design stage, fledgling programs are pilot-tested. Content, feasibility, and potential outcome can be crudely gauged using process and formative evaluation strategies. Evaluation is invaluable at this juncture; it provides data on how accurately program content is being implemented. Evaluation also forges a feedback loop between program designers and participants. Finally, after appropriate revisions,

full-scale implementation and outcome evaluation can take place. The product of implementation and outcome evaluation is a refined program or intervention package with demonstrated effectiveness, ready for dissemination.[33]

To summarize, resilience-based program development integrates empirical knowledge concerning risk and protective factors during several stages of prevention and intervention planning. A thorough conceptualization of processes that promote or inhibit the behaviors under consideration aids intervention targeting. Designating these modifiable mediators helps clarify appropriate intervention goals and guides the selection of strategies for initiating change. Finally, process, formative, and outcome evaluations illuminate how well the program conceptualization and implementation performed when actually applied. These evaluations form an important feedback loop, which further clarifies how empirical knowledge of risk and protective factors can be used in prevention programs. Similarly, substantive knowledge concerning risk and protective processes will further develop from interventions that attempt to initiate environmental and individual change.

This last point leads to the next section of this article. Reviewing current prevention and intervention programs provides us with an indication of how amenable selected risk situations are to change. It also illustrates how effective our prevention initiatives have been in mobilizing protective processes for promoting positive adaptation.

Early Childhood Programs

A number of resilience-based programs founded in prevention exist, and I will consider several for varying age groups. The programs outlined below hold particular promise for incorporating resilience perspectives.

Recent years have brought a growing commitment to national dissemination of early childhood programs largely due to impressive research findings that show lasting, positive gains in behavioral and social functioning for children in high-quality programs.[34] In a metanalysis of over 300 studies on the efficacy of early childhood intervention, Karl White concluded that there is strong support for the immediate positive effects of intervention and emerging support for long-term benefits.[35] His best estimate for the immediate strength of program effects is approximately one-half of a standard deviation. Measurements of IQ gain about eight points, and reading achievement is enhanced by about 10 months at the second-grade level. This estimate is higher than the .24–.41 range of effect sizes reported in Mark Lipsey and David Wilson's "metanalysis of metanalyses"; however, White considered a broader range of studies.[36] Further, Lipsey and Wilson did not break down their reported effect sizes by postprogram measurement intervals. When White considered the stability over time of impact estimates, he found immediate ef-

fects deteriorating into, and later even below, the .24–.41 range Lipsey and Wilson reported.

This deterioration of intervention effects has been a controversial issue in the early intervention field. Empirical investigations of small, model programs versus national Head Start initiatives often yield conflicting evidence for and against the long-term benefits of early childhood interventions for disadvantaged children. Lesser-quality programs often do not yield the positive effects that high-quality programs do.[37] Weissberg and Greenberg summarize the "active ingredients" of effective programs: "The lasting benefits of early childhood education have been achieved only by high-quality programs characterized by a developmentally appropriate curriculum based on child-related activities, teaching teams that are knowledgeable in early childhood development and receiving ongoing training and supervision, class size limited to fewer than twenty 3- to 5-year-olds with at least two teachers, administrative leadership that includes support of the program, systematic efforts to improve parents as partners in their child's education, as well as sensitivity to the noneducational needs of the child and family, and evaluation procedures that are developmentally appropriate."[38]

This list includes several important potential protective factors. Smaller class size enables teachers to have more individualized contact with children in the class. This personal attention from a caring adult is one of the most powerful protective mechanisms for early childhood development. Improving parents' roles as partners in learning enhances parent-child communication and attachment, two more potent protective mechanisms. Launching high-quality programs with administrative support and knowledgeable teachers shows an investment in children that may enhance their sense of importance and self-esteem. Finally, multi-component interventions that address the noneducational needs of the child and family enhance access to resources (a protective factor) and are more able to affect protective mechanisms on several ecological levels (i.e., in the family, community, and school).

A brief overview of selected interventions and the variations among them follow.

High/Scope Perry Preschool Program

The High/Scope Perry Preschool Program is one of the most well known, successful prevention programs for 3- and 4-year-old black children. Participants attended 90-minute classes five times a week for 7 months a year for 2 years. Child-initiated learning activities that promoted cognitive, physical, and social development were supervised by well-trained teachers at a child-teacher ratio of approximately six-to-one. This was supplemented by weekly 90-minute teacher home visits that integrated parent involvement into the intervention package.

Evaluators randomly assigned 58 children to preschool intervention and 65 children to a control group, following all of them until age 27. By age 19, Perry participants were more literate, showed more commitment to schooling, had higher academic achievement, less special education, were more competent in daily life skills, had better jobs, higher earnings, less unemployment, less public assistance use, fewer pregnancies, and fewer criminal offenses than the control group.[39] At age 27, Perry students had higher high school graduation rates (67% vs. 49% in the control group), lower lifetime arrest rates (31% vs. 51% in the control group), higher monthly earnings, more home ownership, and lower rates of public assistance use (15% vs. 32% in the control group). Cost-benefit analyses for this program were also impressive, showing that program costs of $12,356 per family yielded benefits of $108,002 per family.

Although this was a model program with a small research sample, Perry findings were impressive enough to maintain Head Start funding in the 1970s, and the findings have often been held up as exemplary within the early intervention field. They also have been the source of the public's overly high expectations for early intervention efforts.[40]

Head Start

In Head Start, one of the nation's most widely implemented prevention programs, results have been mixed; cognitive and academic gains made by program participants in preschool and kindergarten often decline in the elementary school years.[41] Valerie Lee, Jeanne Brooks-Gunn, and Elizabeth Schnur found that Head Start children maintain substantive gains over children without preschool experience.[42] However, these effects were not as large as they were immediately after intervention and may have been the result of having access to preschool rather than Head Start. Although often criticized for lack of long-term academic gains, Head Start program planners were not originally targeting scholastic performance; rather, they were interested in social competence and comprehensive health services.[43] In these areas, evaluations have been somewhat more optimistic. Long-term, improved health benefits were found through age 12 in Head Start participants.[44] Some studies also found improvements during the course of the program on social adjustment, interpersonal relationships, leadership, self-confidence, and emotional maturity, but methodological weaknesses warrant caution in interpreting these findings.[45]

Little adequate evaluation and few longitudinal investigations have been done on large-scale programs such as Head Start even though the programs differ significantly in design, resources, and implementation from small-scale, model programs. The Consortium for Longitudinal Studies, which is highly esteemed for its rigorous investigations of both model and large federally funded early intervention programs, has

found early intervention effects to decline from .35 in kindergarten to .30 in grade 3 and .24 by grade 6.[46]

The Chicago Longitudinal Study

The Chicago Longitudinal Study of the Child Parent Centers (CPC) is a large, federally funded early intervention program for low-income children and their parents. The centers provide comprehensive services, require parent participation, and implement child-centered approaches to social and cognitive development for children. Unlike Head Start, which is primarily a preschool program, many CPC programs integrate a component that involves children and parents in center activities through the early primary-grade years.

For the past 12 years, the Chicago Longitudinal Study has followed a sample of 1,539 children in the Chicago Public Schools to evaluate the effects of Chicago's CPC program. The study's intervention group includes all children who enrolled beginning in fall 1983 and who completed kindergarten in spring 1986 ($N = 1,150$) in Chicago's 20 CPCs that had preschool and kindergarten programs. Beginning preschool at age 3 or 4, children could participate at some centers until the end of third grade, or until approximately age 9 (spring 1989). Children participated in the preschool, kindergarten, and follow-up intervention for varying lengths of time, resulting in natural groupings of participants with diverse levels of program exposure (1–6 years). This has enabled evaluators to explore intervention timing and duration. A comparison group ($N = 389$) of children with no systematic intervention between preschool and third grade was added for analysis. The total sample of 1,539 children represents 25 schools within the Chicago Public Schools.[47]

Using a variety of modeling methods, Arthur Reynolds and Judy Temple found CPC program-effect sizes ranged from .57 to .58 in kindergarten and from .28 to .30 in grade 6.[48] In another study, grade 6 follow-up effect sizes were in the .36–.38 range for reading achievement and .33–.36 for math achievement.[49] By grades 5 and 8, a dosage-response relationship was found. Having more than 4 years of intervention experience, regardless of when intervention began, had significantly greater effect on school achievement, special education placement, and grade retention. In eighth grade, participants who experienced the full intervention (6 years) had half the grade retention rate of 4-year participants and one-third the rate of control group children.[50] These findings have helped underscore how follow-through program components can be critical to maintaining initial intervention success.[51]

Modifiable Mediators

Using the risk and resilience paradigm, it is straightforward to identify early poverty or disadvantage as the initial problem driving these pro-

grams. As a risk factor, family poverty is commonly related to school failure, child maltreatment, depression, delinquency, and a spectrum of other negative developmental outcomes.[52] Mapping those mediators that may be modified and activating protective factors, however, is much less forthright. Theoretically, there are four major hypothetical pathways for effective early intervention. First, the cognitive advantage hypothesis emphasizes early cognitive development (especially systematic language activities), which leads to greater school readiness, smooth kindergarten transition, and, later, improved scholastic achievement. This improved school readiness may lead to the formation of a resilience string of competence or self-efficacy-building experiences. Specifically, improved school preparation fosters positive teacher reinforcement that, in turn, adds to student self-esteem, motivation, school commitment, and perhaps academic performance in later grades. This string of school successes subsequently forms a protective factor, preventing delinquency and behavioral problems.[53]

Alternatively, the family support hypothesis says that enhanced family functioning (such as increased parental involvement) leads to later adjustment. Home visiting or parent resource rooms in many preschool programs, for example, may increase parents' skills, vigilance, and efficacy in socialization activities for their children. Parent-child attachment and family functioning may also be affected. This enhanced involvement and attachment then becomes a strong protective factor insulating children against a range of negative outcomes.[54]

The social adjustment hypothesis suggests that enhanced social development (such as positive social relations in school) leads to subsequent social adaptation and protects against negative outcomes through enhanced social skills and positive social support networks. Finally, the motivational advantage hypothesis emphasizes that perceived competence and improved self-concept lead to later emotional adjustment, which is yet another important protective factor.

In one of several theory-driven evaluation investigations on the Chicago CPC program, Reynolds found the cognitive advantage and family support hypotheses working in tandem.[55] This dual focus on both children and their socialization environments has similarly been noted by other authors, and integrating family-support components with cognitive-enrichment components finds support in the literature.[56]

To summarize, early childhood programs are a useful example of resilience-based practice. These programs typically try to break the risk chain associated with childhood disadvantage. Childhood poverty is often associated with parental distress, low parental educational attainment, parental unemployment, larger family size, poor nutrition, and decreased access to resources such as appropriate health care. All these risk factors, and others, lead to an accumulation of stressors (often called "pileup") in the lives of disadvantaged children. This risk chain subse-

quently leads to decreased educational achievement and increased be-
havioral problems.

Early childhood programs attempt to disrupt this risk chain using
several strategic modifiable mediators or active program ingredients.
Small class sizes with intensive support by a caring, knowledgeable in-
structor who is teaching a developmentally appropriate curriculum leads
to enhanced school readiness and gains in elementary school academic
achievement. Integrating parent involvement enhances parent-child in-
teraction, family support, and, at times, access to resources. This effort
breeds a more positive family environment and more family time in-
vested in educational endeavors. Both of these protective factors subse-
quently aid the child's social and academic experiences in school. Fi-
nally, providing disadvantaged children with positive social experiences
early on enhances their social skills and emotional well-being, two more
protective factors that prove very useful in buffering stress later in life.
Evaluations of early childhood programs like those surveyed above have
demonstrated impressive short-term and emerging long-term success in
supplanting risk chains with resilience strings, mobilizing useful protec-
tive factors, and fostering positive childhood adaptation.

Elementary School Programs

While early childhood programs try to disrupt the risk chain associated
with poverty, elementary school programs attempt to "inoculate" chil-
dren against impending potential risk situations before they arise. A for-
midable array of prevention and competence-promoting programs have
been devised and implemented in schools to deal with health and sex
education, substance abuse, delinquency, violence, teen pregnancy, and
many other social problems.[57] With such diversity, synthesizing fragmen-
tary efforts into coherent, comprehensive packages remains a central
challenge for school personnel, researchers, evaluators, and program
designers.[58] Schools are an opportune setting for programs because they
have consistent contact with children during developmentally critical
times and can initiate social, behavioral, and physical interventions.[59]
Further, schools offer several critical protective mechanisms, such as
positive role modeling from caring adults, academic and social skills ac-
quisition opportunities, social support, and the dissemination of positive
social values.[60] Conversely, school failure is a significant risk factor for a
range of negative developmental outcomes.[61]

The plethora of prevention programs has not spurred a concomitant
expansion in the evaluation literature. Many programs are adopted
based on marketing and convenience rather than on empirical docu-
mentation, comprehensive scope, and theoretical rigor.[62] For example,
drug abuse education, one of the most critical areas for prevention ef-
forts, has many intervention packages, of which the Drug Abuse Resis-
tance Education (DARE) program predominates. Although it is one of

the few programs to have been evaluated, little evidence exists for its effectiveness. The program remains less effective than preventions that emphasize peer-interaction teaching strategies and social skills development, yet it continues to be widely used.[63] In general, research indicates that knowledge-only interventions (such as DARE) have a minimal lasting effect on behavioral change.[64] Alternatively, teaching widely applicable competence strategies in stress management, communication, problem-solving, assertiveness, peer pressure tolerance, and sociability has shown signs of effectively fostering competence.[65]

David Dupper and Curtis Krishef describe the effects of a school-based social-cognitive-skills training program for sixth through seventh graders.[66] Among the 35 participants randomly assigned to treatment or control groups, there were significant differences on locus of control and self-control measures from pretest to posttest for the treatment group members. The two treatment conditions, however, did not show significant differences when compared with each other at posttest, which may be an artifact of the small sample size. This is a common problem in small intervention research.

In a group program targeted at reducing aggression in young adolescents, John Lochman, William Nelson, and Joseph Sims used group discussion, modeling, behavioral rehearsal, problem-solving elements, and cognitive coping during problem situations.[67] In a later, randomized trial of 76 fourth- to sixth-grade program participants, Lochman and colleagues found that cognitive-behavioral training conditions led to more reductions in aggressive behavior in the classroom than found in the control group.[68] Parents also noted similar improvements in the home for intervention youth. Cognitive-behavioral group participants also demonstrated significant increases in self-esteem.[69]

The effects of these skills packages alone, however, will show limited benefits unless they are combined with environmental change strategies that marshal support and reinforcement at varying levels, such as from family, teachers, peers, and important community members.[70] Consequently, there have been calls for comprehensive, ecological, well-integrated, empirically based prevention interventions of sufficient scope and length to produce lasting, positive behavioral change.[71] Programs promoting individual social competence in this way are briefly surveyed below.

Promoting Alternative Thinking Strategies

Promoting Alternative Thinking Strategies (PATHS) is an elementary school curriculum for promoting problem-solving, self-control, and emotional awareness. Coping strategies are taught, rehearsed, and generalized through a range of classroom applications throughout the day. Randomized pretest and posttest clinical trials with a sample of 300 7- and 8-year-olds show significant improvement for intervention children

in social problem-solving and emotional understanding. Significantly, more social planning, less impulsiveness, fewer behavioral conduct problems, and fewer reports of depression all remained at 1- and 2-year follow-up assessments.

A multiyear, long-term application of the PATHS program called Fast Track is currently underway. Fast Track bolsters the PATHS curriculum with additional ecological interventions such as parenting-skills training, academic tutoring, peer group skills training, and school and community integration. Initial evaluations show little evidence for the amelioration of conduct problems but demonstrate strong evidence for improved cognitive, social, and academic skills, increased parental perceptions of warmth with decreased disciplinary behavior at school, and enhanced social ratings from peers.[72] It is hoped that this early construction of ecological protective factors, continued throughout middle school, will lessen antisocial behavior later on.

Midwestern Prevention Project

The Midwestern Prevention Project is a multilevel, multicomponent prevention intervention package for decreasing substance abuse. The ecological curriculum consists of 10 sessions of peer resistance training, media programming, community organization, and extragroup homework tasks of interviewing family about substance use issues. Evaluation revealed significant decreases in alcohol and substance use for a sample of 22,500 sixth- and seventh-grade participants.[73] Program effects were maintained at 3-year follow-up for both high- and low-risk children.

Modifiable Mediators

Individual-level skills promotion packages attempt to enhance competencies by building up resilience factors.[74] Interpersonal, problem-solving, cognitive, affective coping, and self-management skills are often the targets for behavioral augmentation.[75] All of these skills are aimed either directly or indirectly at preventing or coping with specific problematic risk situations. Mastery of these skills is thought to advance the attainment of positive social goals and foster other protective factors, such as self-esteem, self-efficacy, or supportive social networks, that are threads in the resilience string. Programs successful at decreasing high-risk behaviors tend to be empirically based, theory driven, and accentuate both generic and problem-specific skills and protective mechanisms. Providing accurate information is heavily supplemented with cognitive-affective behavioral skills, which promote active participation and leadership. Extensive, multiyear, ecological programs firmly based in schools and community settings with follow-up support are also thought to be more beneficial than brief, more limited programs.[76]

Early childhood and elementary school prevention efforts illustrate di-

verse strategies for approaching risk and mobilizing protective factors. Early childhood programs disrupt the poverty risk-chain by encouraging strong relationships with teachers and parents, enhancing access to resources, and providing early cognitive stimulation (the literal "head start"). Elementary school programs address specific risk situations such as being offered drugs or being pressured to skip school, drink, or have sexual intercourse. Individual skills acquisition is the primary focus for inoculating elementary school children against imminent risk situations. Substantive knowledge paired with interpersonal assertiveness are protective factors that function more effectively together than either does alone when youth are faced with risk-laden choices.

Finally, early childhood and elementary school programs that mobilize a variety of protective factors (i.e., individual skills, positive interpersonal relationships, self-esteem, access to resources) on diverse ecological levels (i.e., family, school, community) are clearly more effective than those that are more limited in scope. Similarly, programs need sufficient duration and resources to have a substantial effect. With adequate investment and rigorous program design, prevention efforts provide strong indications that modifiable mediators can be effectively manipulated. Protective factors can strategically be put into place and risk can be reduced or circumvented.

Research Issues in Resilience-Based Prevention

Resilience-based prevention and competence promotion presents complex challenges to prospective practitioners and program designers. Just as this new perspective lies at the juncture of several theoretical disciplines (developmental psychopathology, stress and coping, epidemiology, and systems frameworks) and applied areas (prevention- and intervention-services programming), so too do salient methodological issues from diverse domains converge.

The resilience-based practice model centers around mobilizing key protective factors that buffer the individual or family against stress and risk. Although important advances in identifying critical generic and problem-specific protection mechanisms have been made, more research is needed in delineating specific protective mechanisms for specific risk situations.[77] The complex interplay between and among ecological levels of influence is just beginning to win a prominent place in empirical investigations. Our understanding of indirect risk mechanisms, for instance, in terms of the more relevant direct processes that mediate their effects, is now beginning to develop.[78] The corresponding search for diverse, problem-specific, multilevel protective mechanisms will provide strong tools for resilience-based practice.

Many prevention programs have been criticized for not having firm theoretical and empirical foundations or rigorous evaluations and for

being based more on feelings than on facts. Prevention as a scientific enterprise as well as a service mission is just beginning to be developed.[79] As the intervention component in resilience-based practice, prevention and competence-promotion programs have several methodological challenges to resolve. Prevention programs need to focus more on their theoretical and empirical roots from conception through dissemination. Program conception and design based on emotion rather than fact is understandably compassionate but not highly effective. With important exceptions, such as the High/Scope Perry Preschool Program and the Chicago Longitudinal Study, few longitudinal studies of comprehensive, ecological intervention programs have been undertaken. This is especially true for elementary school prevention programs, which tend to be more idiosyncratic and less standardized than preschool initiatives.

To understand better the effect of variation in models, curricula, intervention, training, and other program elements, it is necessary to apply more stringent program evaluation methods in each phase of prevention program development.[80] This will enable the effect of variations in models, curricula, intervention timing and duration, staff training, and active program ingredients to be more closely examined and better understood. Process or formative evaluations in particular have been neglected, leaving disturbing questions concerning implementation integrity unanswered. In the concluding comments of his metanalysis, White wrote, "Another serious problem with previous research is that virtually all the existing early-intervention efficacy research has failed to determine the extent to which the intended treatment was actually implemented."[81] This is a critical point that potentially undermines all of the previous efforts to estimate program effects. As Donald Campbell writes, "In program evaluation, the details of program implementation history, the site specific wisdom and the gossip about where the bodies are buried are all essential to interpreting the quantitative data. . . . We need situation-specific wisdom. The lack of this knowledge (whether it be called ethnography, or program history, or gossip) makes us incompetent estimators of program impacts."[82] This lack of documentation concerning implementation integrity was prevalent in both preschool and elementary school prevention efforts. Not recognizing this can lead to what Diane Dobson and Thomas Cook call "type III errors," or evaluating interventions that one assumes were implemented properly when they were actually inappropriately carried out or were never truly implemented.[83]

Similar to the need for formative evaluation, collecting and integrating a variety of data can inform program design and revision decisions. The qualitative information from focus groups and interviews provides important input into the selection and revision of change methods, recruitment and retention strategies, and program effects from the consumer's perspective.[84]

A controversy exists in the program-evaluation literature concerning the use of quasi-experimental designs with nonrandomized comparison control groups. Researchers who view prevention as a science consider the randomized clinical trial as the "gold standard" of effectiveness research, claiming bias results with any less rigorous design.[85] However, others cite the impractical, even unethical, side of randomized trials and support quasi-experimental and alternative evaluation methods.[86] Still others have attempted to directly compare the two approaches and have found no large differences in program estimates.[87] Regardless of the camp, consensus and priority converge on the necessity of integrating comparison groups for testing program effectiveness. Comparisons can ultimately be from randomized clinical trials, alternative treatments, non-equivalent control group designs, matched control group designs, created control groups from existing databases, or time-series methods, but some form of comparison group must be used for informative outcome evaluation.[88] If nonrandomized comparison groups are used, it is critical to delineate initial pretest group differences, or program estimates can be biased downward (the comparison group is more advantaged than the intervention group). This is a greater concern for selected or indicated prevention interventions that target high-risk individuals than for universal prevention efforts that are comprehensive in scope.

Finally, because resilience-based prevention and competence promotion efforts are strongly linked to identifying crucial risk and protective factors, formulating and following an explicit model that delineates how modifying risk and protective mechanisms will promote desired goals is paramount in effective program design.

Conclusion

The interface between resilience research and applied prevention programming is fertile ground for nurturing a resilience-based prevention practice perspective. These fields have both sufficiently matured to inform each other in a productive collaboration. However, continued development can be greatly enhanced by the increasing sophistication in mapping critical risk and protective processes by problem area, gender, developmental stage, age, and ethnicity. The utility that well-delineated risk and protective processes have for program planners in designing prevention packages should motivate and inspire resilience researchers to go further in their work. Further contributing to the vitality of the new resilience-based prevention science is the theoretical utility and proven practice effectiveness of ecological approaches to program design.

High-quality preschool and elementary school intervention efforts have benefited from multicomponent designs that affect both children and their families. Although there is no single panacea, broad-based prevention programs that teach skills, impart information, and enhance ac-

cess to resources have made important strides toward ameliorating risk by mobilizing crucial protective mechanisms.

As Hirokazu Yoshikawa concluded, there still remain many important questions concerning how to design effective prevention intervention programs.[89] Integration of appropriate evaluation techniques at all stages in program development should help in our exploration of these questions. Testing alternative models of active ingredients and mapping out specific modifiable mediators in the form of protective mechanisms are also crucial future undertakings. With these challenges in mind, we can optimistically move forward in our efforts to alleviate risk and promote positive adaptation in our children.

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