

ADOLESCENT RESILIENCE: A Framework for Understanding Healthy Development in the Face of Risk

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■ **Abstract** Adolescent resilience research differs from risk research by focusing on the assets and resources that enable some adolescents to overcome the negative effects of risk exposure. We discuss three models of resilience—the compensatory, protective, and challenge models—and describe how resilience differs from related concepts. We describe issues and limitations related to resilience and provide an overview of recent resilience research related to adolescent substance use, violent behavior, and sexual risk behavior. We then discuss implications that resilience research has for intervention and describe some resilience-based interventions.

INTRODUCTION

Resilience refers to the process of overcoming the negative effects of risk exposure, coping successfully with traumatic experiences, and avoiding the negative trajectories associated with risks (43, 65, 72, 84, 106). A key requirement of resilience is the presence of both risks and promotive factors that either help bring about a positive outcome or reduce or avoid a negative outcome. Resilience theory, though it is concerned with risk exposure among adolescents, is focused on strengths rather than deficits. It focuses on understanding healthy development in spite of risk exposure.

The promotive factors that can help youth avoid the negative effects of risks may be either assets or resources (6). Assets are the positive factors that reside within the individual, such as competence, coping skills, and self-efficacy. Resources are also positive factors that help youth overcome risk, but they are external to the individual. Resources include parental support, adult mentoring, or community organizations that promote positive youth development. The term resources emphasizes the social environmental influences on adolescent health and development, helps place resilience theory in a more ecological context, and moves

away from conceptualizations of resilience as a static, individual trait (87). It also stresses that external resources can be a focus of change to help adolescents face risks and prevent negative outcomes.

Adolescents growing up in poverty, for example, are at risk of a number of negative outcomes, including poor academic achievement (2, 96) and violent behavior (34, 37). One approach to understanding why poverty results in negative outcomes is to focus on other deficits to which poverty may be related, such as limited community resources or a lack of parental monitoring. Researchers and practitioners working within a resilience framework recognize that, despite these risks, many adolescents growing up in poverty exhibit positive outcomes. These adolescents may possess any number of promotive factors, such as high levels of self-esteem (21) or the presence of an adult mentor (114), which help them avoid the negative outcomes associated with poverty. Using assets or resources to overcome risks demonstrates resilience as a process. Researchers have also described resilience as an outcome when they identify as resilient an adolescent who has successfully overcome exposure to a risk.

Researchers have suggested that resilience and vulnerability are opposite poles on the same continuum (40), but this may not always be the case. Vulnerability refers to increased likelihood of a negative outcome, typically as a result of exposure to risk. Resilience refers to avoiding the problems associated with being vulnerable. The relationship and distinction between resilience and vulnerability can be depicted in a two-by-two table (104). Table 1 represents four possible combinations of a risk and an outcome. Cell A represents adolescents who are exposed to low levels of a risk factor and who achieve positive outcomes. These adolescents follow trajectories typically considered normative development and are generally not the focus of resilience research. Cell B represents adolescents who are exposed to high levels of risk but who nonetheless achieve positive outcomes. Such adolescents are said to have followed a resilient trajectory. Adolescents in cell C are exposed to low levels of the risk factor and achieve negative outcomes. The adolescents in this cell exhibit an unexpected trajectory. It is likely that these adolescents have been exposed to some risk factor that was either poorly assessed or not measured. Finally, cell D represents adolescents with the expected outcome in risk models because they are exposed to high levels of the risk factor, which results in negative outcomes.

A factor can be considered a risk exposure, or an asset or resource, depending on the nature of the factor and the level of exposure to it. For some constructs, one

TABLE 1 Depiction of a population of adolescents

	Low risk	High risk
Positive outcome	A (normative development)	B (resilience theory)
Negative outcome	C (inadequate risk assessment)	D (risk models)

Note: Adapted from Reference 104.

extreme may be a risk factor, whereas the other extreme may be promotive. Having low self-esteem, for example, may place an adolescent at risk for developing a number of undesirable outcomes. Having high self-esteem, in contrast, may be an asset that can protect youth from negative outcomes associated with risk exposure. For other constructs, opposite poles may simply mean more or less of the construct. The opposite of positive friend influence is not necessarily bad influence of friends. Rather it may just be limited positive influence of friends. Similarly, involvement in extracurricular or community activities may be related to positive outcomes among adolescents, but this outcome does not mean that not participating in such activities should necessarily be considered a risk.

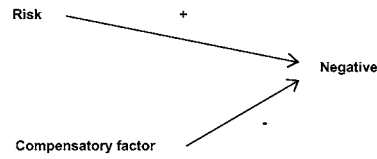
Resilience is sometimes confused with positive adjustment, coping, or competence. Although each of these constructs is related to resilience, they are also distinct. Positive adjustment refers to an outcome of resilience. When youth overcome a risky situation (e.g., the transition to middle school) as evidenced by healthy development (e.g., academic achievement) they have adjusted to their new context. In this case, positive adjustment is a resilient outcome, but the process of overcoming the risk is resilience. Youth may also be considered positively adjusted, however, even though they may not have been exposed to a risk. Resilience processes can have other outcomes as well, such as avoiding a negative outcome or coping successfully with a traumatic event (e.g., the death of a loved one). Resilience is also distinguished from competence. Competence is an asset (i.e., an individual-level promotive factor) that can be a vital component in a resilience process. Competent youth are expected to be more likely to overcome the negative effects of a risk. Competence, however, is only one of many assets that help adolescents overcome adversity. Because resilience models stress the importance of ecological context, external factors in addition to competence may help youth avoid the negative effects of risks.

Models of Resilience

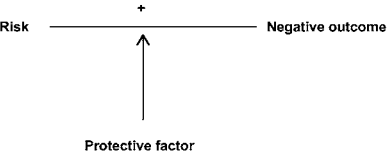
Researchers have identified three models of resilience—compensatory, protective, and challenge—that explain how promotive factors operate to alter the trajectory from risk exposure to negative outcome (43, 84, 113). A compensatory model is defined when a promotive factor counteracts or operates in an opposite direction of a risk factor. A compensatory model therefore involves a direct effect of a promotive factor on an outcome. This effect is independent of the effect of a risk factor (113). Model 1 in Figure 1 depicts how compensatory factors operate to influence outcomes. Youth living in poverty, for example, are more likely to commit violent behavior than are youth not living in poverty (37), but adult monitoring of behavior may help compensate for the negative effects of poverty. This model can be examined using a number of statistical and methodological approaches but is typically tested by examining unique, direct effects in a multiple regression analysis or with structural equation modeling.

Another model of resilience is the protective factor model. In this model, assets or resources moderate or reduce the effects of a risk on a negative outcome.

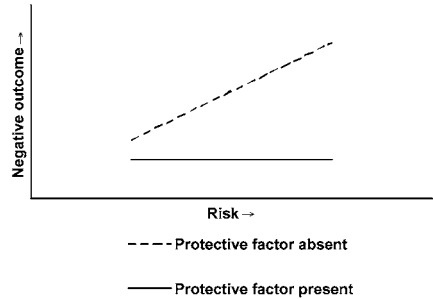
Model 1: Compensatory



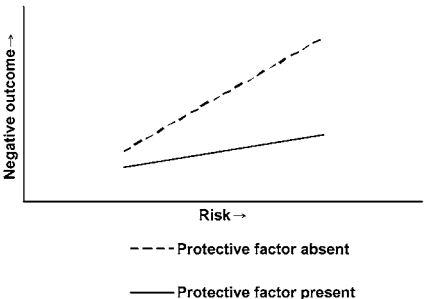
Model 2: Protective



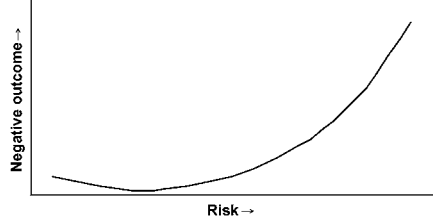
Model 3: Protective-Stabilizing



Model 4: Protective-Reactive



Model 5: Challenging



Model 6: Inoculation

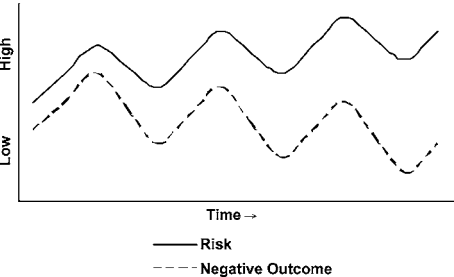


Figure 1 Models of resilience.

A protective model exists if, for example, the relationship between poverty and violent behavior is reduced for youth with high levels of parental support. In this example, parental support operates as a protective factor because it moderates the effects of poverty on violent behavior. Model 2 in Figure 1 shows how a protective factor may influence the relationship between a risk and an outcome. This model can be examined a number of different ways yet is typically tested with an interaction term in multiple regression or with group comparisons in structural equation modeling.

Protective factors may operate in several ways to influence outcomes. Luthar and colleagues (65), for example, define protective-stabilizing and protective-reactive models. A protective-stabilizing model, depicted in Model 3 in Figure 1, refers to instances when a protective factor helps to neutralize the effects of risks. Thus, higher levels of risk are associated with higher levels of a negative outcome when the protective factor is absent, but there is no relationship between the risk and the outcome when the protective factor is present. Among youth whose parents do not provide adequate support or monitoring (risk factors), for example, those without an adult mentor (a protective resource) may exhibit delinquent behaviors (an outcome), whereas those with a nonparental adult mentor may not.

A protective-reactive model, depicted in Model 4 in Figure 1, refers to instances when a protective factor diminishes, but does not completely remove, the expected correlation between a risk and an outcome. Thus, the relationship between the risk and the outcome is stronger when the protective factor is absent. Adolescents who abuse drugs, for example, may be more likely to engage in sexual risk behavior. The relationship between drug abuse (a risk factor) and sexual risk behavior (an outcome), however, may be weaker among adolescents who are exposed to comprehensive sexuality education in their schools (a protective resource) than among adolescents who do not receive such education.

Brook and colleagues (17, 18) also posit a protective-protective model. In this model, a protective factor enhances the effect of another promotive factor in producing an outcome. Parental support, for example, may enhance the positive effect of academic competence for producing more positive academic outcomes than for either factor alone. Yet, resilience requires the presence of risk, so the protective-protective model may not be a resilience model, unless the two protective factors are studied in a population defined to be at risk for a particular negative outcome (115).

A third model of resilience is the challenge model (43), depicted in Model 5 of Figure 1. In this model, the association between a risk factor and an outcome is curvilinear. This suggests that exposure to low levels and high levels of a risk factor are associated with negative outcomes, but moderate levels of the risk are related to less negative (or positive) outcomes (66). The idea is that adolescents exposed to moderate levels of risk are confronted with enough of the risk factor to learn how to overcome it but are not exposed to so much of it that overcoming it is impossible. A vital point concerning the challenge model is that low levels of risk exposure may be beneficial because they provide youth with a chance to practice skills or employ resources. The risk exposure, however, must be challenging enough to elicit a coping response so the adolescent can learn from the process of overcoming the risk. In challenge models, the risk and promotive factors studied are the same variable—whether it is a risk or is promotive for an adolescent depends on the level of exposure. Too little family conflict, for example, may not prepare youth with an opportunity to learn how to cope with or solve interpersonal conflicts outside of the home. Yet, too much conflict may be debilitating and lead youth to feel hopeless and distressed. A moderate amount of conflict, however, may provide youth with

enough exposure to learn from the development and resolution of the conflict. They essentially learn through modeling or vicarious experience. Challenge models of resilience are typically tested with polynomial terms in multiple regression (e.g., quadratic or cubic terms).

The challenge model of resilience can be considered inoculation or steeling (70, 85, 113) if it includes a developmental (i.e., longitudinal) focus. This model, depicted in Model 6 of Figure 1, suggests that continued or repeated exposure to low levels of a risk factor helps inoculate adolescents so they are prepared to overcome more significant risks in the future. The inoculation model is similar to the challenge model because a factor may be seen as risky when it leads to negative outcomes or promotive when it teaches adolescents to better handle stressors in the future. Yates et al. (112) have described this model of resilience as an ongoing developmental process, in which children learn to mobilize assets and resources as they are exposed to adversity. As youth successfully overcome low levels of risk, they become more prepared to face increasing risk. As people age and mature, and continue to be exposed to adversity, their capacity to thrive despite risks increases. Such models must be tested with longitudinal data. In this way, compensatory, protective, or challenge models can operate within a framework of inoculation, as repeated exposures to compensatory, protective, and/or challenge processes prepare adolescents for dealing with adversities in the future.

Issues and Limitations

A number of issues related to resilience research have created confusion within the field and fueled criticism of resilience theory. Unfortunately, as several researchers have pointed out (65), differing uses of terminology has seemed to slow down the development of the field, and we need to develop a common language to bring the field to the next level. Some researchers who have criticized resilience research have assumed that resilience is a trait (103). It is vital to note, however, that resilience is not a static trait (58). That is, resilience is not a quality of an adolescent that is always present in every situation. Rather, resilience is defined by the context, the population, the risk, the promotive factor, and the outcome. Thus, the measurement of resilience with a self-report assessment (76, 105) may not be consistent with resilience theory. Part of the confusion may be because some individual-level assets such as self-efficacy, competence, or coping skills may be involved in resilience processes. This should not be interpreted to mean, however, that resilience lies only within the individual or is a static, personal trait. An analytic approach that examines relationships among risk and promotive factors is necessary for understanding adolescent resilience (72, 113).

As a way of stressing that resilience is not a trait, some researchers have suggested that the term resilience be used in place of resiliency (65), a term favored by others in the field. Although this distinction may not be important as both words are synonymous nouns, it is vital to distinguish resilience from a trait-based conception. Further, Luthar & Zelazo (66) point out that the term resilient should

not be used as an adjective describing a person but as a descriptor of profiles or trajectories. This distinction further assures that the construct of resilience is not taken to be an individual trait. The concern in treating or considering resilience as a trait is that it places blame on the adolescent for failing to overcome adversity or risk. It also raises questions about the usefulness of prevention efforts because individual trait-like characteristics may not be amenable to change. Finally, trait conceptions ignore contextual factors, but resilience theory incorporates social and environmental influences.

Another issue to consider is that resilience may be content- and context-specific (26). That is, an adolescent may be resilient in the face of one type of risk but may be unable to overcome other types of risk. Some adolescents, for example, may be resilient against certain negative effects of poverty because they have supportive families, but some of these same adolescents may be less successful overcoming the effects of attending underfunded schools. The risk of an underfunded school may take more than family support to overcome. Researchers have also found that different assets may be associated with different risk and outcome pairings (32, 49). This makes it difficult to identify universal promotive factors and raises concerns that asset lists (7, 60, 73) may be interpreted to operate in the same manner for all groups, all contexts, or all outcomes.

The process of resilience may also vary for different groups of adolescents (28). Resilience for urban and suburban youth, for example, may differ from resilience for rural youth. Similarly, resilience may differ for high- and low-socioeconomic-status youth, for males and females (41), for early adolescents and late adolescents, or for immigrant and nonimmigrant youth. Sameroff et al. (86), for example, describe how parental control may be beneficial in environments characterized by certain risk exposures such as street crime but may be detrimental in environments where such risks do not exist. Similarly, Gutman et al. (49) found among African American adolescents an interaction between number of risk factors and democratic decision making in the family for predicting grade point average and math achievement. Their results indicated that democratic decision making increased the effects of risk factors on the outcomes. This finding suggests that democratic decision making, often considered a resource, may be detrimental in high-risk-exposed environments. This is a critical issue because researchers and practitioners may need to be aware that findings from one context or population may not apply to their given context or population.

Another key point about resilience theory is that, by definition, resilience requires the presence of a risk factor (45). Some have attempted to study resilience among youth not faced with risk (33), but this type of study may be more appropriately defined as research on adolescent development and adjustment more generally. Positive outcomes alone are not sufficient for inferring resilience. Adolescents must have been exposed to some factor or factors (i.e., risks) that increase the likelihood of a poor outcome for promotive factors to be relevant in a study of resilience. Yet, longitudinal research that includes a sample selected on the basis of being at a high level of a risk factor (e.g., poverty) may be problematic because

of the tendency for the sample to regress toward the mean. This phenomenon, and not the presence of a promotive factor, may explain why some youth with a risk factor show fewer negative outcomes over time. In other words, some vulnerable youth may improve simply because of a statistical artifact, regardless of the presence of a promotive factor. Resilience researchers who choose such an approach must be sure to apply designs that will help them eliminate regression to the mean as an explanation of their results.

Adversities facing youth can range from long-term chronic stressors to short-term acute stressors, or to traumatic stressful events (8, 83, 108). Some risk exposures may have immediate, acute effects on adolescents, but the effects may dissipate relatively quickly. Other exposures may not be as dramatic but may be chronic and linger over time. A youth who is HIV positive, for example, faces a number of risk exposures that can lead to poor outcomes. The consistent need to remember to take medications may be considered a long-term chronic stressor, disclosing one's HIV status to a significant other may be a short-term acute stressor, and being hospitalized for a serious opportunistic infection may be a traumatic stressful event. Each of these risk exposures may be responsive to different assets and resources and may be related to different adverse outcomes.

Another issue related to risk exposure is that experiences of the same adverse event or condition may differ across adolescents. For many youth, for example, the divorce of one's parents may be experienced as a negative event. For some youth, however, the same experience may be positive, if it removes family conflict from the home environment (53). Researchers may therefore not always want to assume that because an event is normatively considered negative (or, conversely, normatively considered positive) it is experienced as negative (or positive) by all youth. Researchers may wish to include assessments of how the youth experienced an event in their studies. Failure to consider such a possibility may attenuate research findings, as relationships expected by researchers may operate among some youth in a way that is opposite the hypothesized direction. Similarly, even when an exposure is universally experienced as a risk, the level of adversity may differ. One way to handle this problem is to include measures related to the level of risk exposure in studies. Buckner et al. (21), for example, controlled for variation in experiences of negative events and chronic strains in their study of youth living in poverty. They found that the number of negative events and chronic strains reported was associated with a composite measure of behavior problems, mental health symptoms, functioning and adaptation, and competence.

Resilience research is also somewhat limited because it typically includes single risks and a single promotive factor (111), but most youth are actually exposed to multiple risks, may possess multiple assets, and may have access to multiple resources (45, 86). Several researchers have found that risks (or promotive factors) do not necessarily operate independently in the lives of youth but rather mutually influence each other (49, 65, 74, 75, 86, 94). Masten (71) describes a cascading effect of risks and promotive factors where positive constructs can also be either outcomes or predictors, depending on the situation and when a youth is assessed

(66). A rich understanding of resilience processes therefore necessitates including cumulative risks, assets, and resources studied over time (27, 28, 86, 112).

A final key component of resilience research, though one that is often overlooked, is investigating explanations for how assets or resources interact with risk exposures to produce particular outcomes (65). If researchers find evidence, for example, that parental support (a resource) interacts with negative peer influence (a risk) to predict smoking (an outcome), the next step should be to understand why this is so. The type of parental support provided may be decisive. Parents may provide emotional support necessary to develop the emotional capacity to withstand peer influences, or they may provide informational support related to the health consequences of smoking, increasing the perceived threat of the behavior. Research on the mechanisms by which resilience processes occur, or what Sandler et al. (87) call "small theories," could yield information to be applied in developing interventions. Qualitative studies, like those conducted by Werner and colleagues (106, 107), may also help to answer such questions.

SELECTED RESEARCH FINDINGS ON ADOLESCENT RESILIENCE

Research on resilience has grown exponentially in the past 10 years. A simple Medline search using PubMed and the key words adolescence, adolescent, resilience, resiliency, and protective factors produced 49 citations from 1975 through 1984, 206 citations from 1985 through 1994, and 756 citations from 1995 through 2004. Consequently, we focus our review on recent articles investigating substance use (alcohol, tobacco, and other drugs), violent behavior, and sexual behavior. We chose these outcomes for several reasons. First, most research on adolescent resilience focuses on psychopathology (75), rather than behavior. Second, these three behaviors pose considerable health risks to adolescents and play a significant role in adolescent development. Finally, these behaviors may be particularly amenable to public health intervention.

Substance Use

Researchers have found a number of assets and resources that may compensate for or protect against risks for substance use at the individual, peer, family, school, and community levels. Researchers have found adolescents to be protected from the substance use consequences of stressful or negative life events by assets such as self-esteem (22), internal locus of control (92), positive affect (92), and religiosity (110). Wills et al. (109) found among 1702 adolescents followed from age 12 to age 15 that positive affectivity, or feeling happy, interested, and relaxed, was protective against the risk of emotional distress for cigarette, alcohol, and marijuana use. Resources that have been found to compensate for the effects of emotional distress include family connectedness (42, 63) and parental involvement with school (42).

Similar promotive factors, including planning to attend college (19), and resources such as family connectedness (42, 63) and parental involvement with school (42) have been found to compensate for the effects of delinquent behavior on substance use. Scheier et al. (91) found three assets to compensate for the effects of risk-taking on alcohol use among adolescents: self-control, substance-use refusal skills, and academic achievement. Psychological well-being and social competence (47) compensated for the effects of prior cigarette, alcohol, and marijuana use for predicting current use among 1184 junior high school students in New York City. Academic achievement is a consistent protective factor for substance use. This asset helps protect against the risks of low academic motivation (20) and age-related increases in substance use (19). Parental support resources protect youth from the risks of acculturation (50) and low ethnic identification (16, 93) for substance use.

Individual-level assets and family-level resources are consistent promotive factors for substance-use risks associated with peer influences. Participation in extracurricular and community activities (31) have compensated for the negative influences of peer tobacco, alcohol, and illegal drug use. Decision-making skills (12) and positive orientation toward school (30) have also protected youth from the negative effects of peer substance use. Legitimization of parental authority (57), family connectedness (63), parental monitoring (81), and open communication with parents (100) are resources that appear to compensate for peer substance use. Parental support may also protect against the negative effects of peer substance use (39, 59), peer pressure (39), and age-related increases (90). Similarly, decision-making skills (12) protect against having peers with favorable attitudes toward substance use for alcohol and marijuana use.

Parental substance use is also a significant risk factor for adolescent substance use. Among personal assets, social competence helps compensate for the risk posed by parental use (44), and religiosity helps protect youth from the adverse effects of parental substance use on their own use (15). Family connectedness (63) and parental authority (57) are resources that protect youth from the negative influence of parental substance use. Decision-making skills (12) have also protected youth from the negative effects of parental permissiveness on alcohol and marijuana use.

Family connectedness compensated for the risk of low school connectedness on cigarette smoking in a nationally representative sample (63). Parental support protects against the community-level risk factors of drug availability and low community norms for family closeness (16) on marijuana use. Family income has also moderated the relationship between neighborhood problems and adolescent alcohol and marijuana use (35). Higher family income protected youth from adverse neighborhood effects.

Most studies include analysis of one risk and promotive factor at a time, but other approaches are to study multiple risks and promotive factors or to combine multiple risk and promotive factors to form cumulative measures. Researchers have studied cumulative risk measures and adolescent substance use, both with single assets or resources and with cumulative promotive measures. Scal et al. (89), for example, investigated the effects of different combinations of assets and resources

for smoking in the presence of a number of risks at the individual, peer, and parental levels. They found that religiosity, academic achievement, family connectedness, and parental education expectations all compensated for the effects of the risks. Other researchers studied cumulative risk measures with cumulative promotive measures. Cumulative measures made up solely of resources (5) and made up of assets and resources (38, 79, 92, 102) have been protective against cumulative risk measures.

Violent Behavior

Empirical evidence also supports the compensatory and protective models for adolescent violent behavior. Assets that have compensated for individual-level risk factors include prosocial beliefs compensating for antisocial socialization (56), religiosity compensating for interest in gang involvement (4), and anger control skills compensating for risk-taking behavior (48). Two dimensions of racial identity, public regard and centrality, are assets that Caldwell et al. (23) found to protect against the effects of racial discrimination on violent behavior among 325 African American adolescents studied from ages 14 to 20. Maternal support has both compensated for and protected against the risk factor for violent behavior of getting in a fight, whereas paternal support has been protective (116). Finally, the resource parental monitoring has compensated for the effects of risk-taking behavior on violent behavior (48).

Peer behaviors and attitudes may also pose a risk for violent behavior that promotive factors may compensate for or protect against. Anger-control skills compensate for the effects of peer delinquent behavior for predicting adolescent violent behavior (48). Perceived social status was found to moderate (i.e., a protective factor) the relationship between peer delinquent behaviors and adolescent violent behavior (80). Parental monitoring was also a compensatory factor (48). Adolescents' religiosity also compensated for the risk of peer substance use (55) and exposure to violence for violent behavior (4). Parental factors are also consistent resources to help youth overcome risks for violent behavior. Maternal support protected youth from the negative influences of peer violent behavior (116). Parental monitoring and paternal support were found to compensate for peer violent behavior (55, 116). Parental monitoring also compensated for the risk of living in a risky neighborhood (48). Maternal and paternal support also compensated for and protected youth from the negative consequences of exposure to violence (116).

Researchers have also found assets and resources that compensate for cumulative risk factors for violent behavior. Borowsky et al. (9) found among 13,781 seventh- through twelfth-grade adolescents studied over two years that academic performance, parental presence, parent-family connectedness, and school connectedness, alone and in combination, compensated for the cumulative effects of prior violent behavior, violence victimization, substance use, and school problems on violent behavior. Other researchers have found that cumulative measures of assets and resources compensate for cumulative risk factors (79, 101).

Sexual Behavior

Sexual behavior among adolescents includes initiation of sex, level of sexual activity, and risky sexual behavior. Substance use is an individual-level risk factor for adolescent sexual behavior that is compensated for by personal assets such as self-esteem (78), participation in extracurricular activities (1), school achievement and attachment (62, 67, 78, 88), religiosity (62, 67), HIV and reproductive health knowledge (67), positive attitudes toward condoms (69), safer sex intentions (69), seeing sex as nonnormative (88), and self-efficacy to refuse drugs and use condoms (88). Resources that have compensated for substance use in predicting sexual behavior include father's education (1), teacher support (1), residence with both parents (1, 62), peer norms for sexual behavior (3), and family socioeconomic status.

Family socioeconomic status (68), parental monitoring (81), and open parental communication (100) have compensated for the risk of peer sexual behavior for adolescent sexual behavior. Paul et al. (78) reported for their 21-year longitudinal study of 1020 participants in New Zealand that school attachment and self-esteem helped compensate for the risk of sexual intercourse before age 16 associated with mothers having had a child before the age of 20. Participation in extracurricular activities and community organizations has also helped counteract the effects of neighborhood poverty on a composite measure of adolescent sexual risk behavior in a study of 370 urban African American adolescents (82).

Research Findings Summary

Across most risk factors for adolescent substance use, violent behavior, and sexual behavior, parental factors seem to be particularly vital in helping youth be resilient. The compensatory model appears to have more empirical support, but for substance use and violent behavior, several promotive factors are also protective. To date, researchers have not yet tested the challenge or inoculation models for these outcomes.

One limitation in the research literature on adolescent resilience is that most studies focus on individual assets and family-level resources. Research that examines adolescent resilience with the help of school and community-level resources would be useful. Another limitation of this literature is the almost complete reliance on cross-sectional research (1, 3–5, 12, 15, 16, 22, 38, 39, 48, 55, 57, 59, 62, 63, 67–69, 79–82, 92, 102, 116). The studies that are longitudinal typically include only two time points (9, 23, 42, 50, 88, 89). It is necessary to include many waves of observation over longer periods of time to understand more completely the developmental factors associated with resilience processes for adolescent substance use, violent behavior, and sexual behavior.

Although the research described provides empirical support for the resilience models described, the researchers did not necessarily use resilience theory to guide the analyses. Rather, they found that positive factors (what we have called promotive factors) counteract (compensate) or moderate (protect) against risks youth

face. More research that specifically applies resilience theory and tests the models within it will help us further understand how resilience processes operate to help youth overcome the risks they face.

Notably, most research on resilience has focused on either nationally representative samples (9, 19, 35, 63, 89), predominantly white youth (42, 62), or predominantly African American samples (3, 20, 23, 39, 48, 55, 57, 81, 82, 88, 93, 100, 102, 116). Research that focuses on other ethnic groups, such as Latino, Native American, or Arab American youth, or on recent immigrants, would further our understanding of resilience among adolescents. In addition, there are virtually no studies of resilience for gay, lesbian, bisexual, or transgendered youth, leaving a significant void in the literature.

RESILIENCE-BASED INTERVENTIONS

The concept of resilience and its associated evidence suggest several implications for prevention. A key idea is that interventions may need to focus on developing assets and resources for adolescents exposed to risk (26, 64, 112) instead of the more traditional approach of focusing on risk amelioration. The educational and ecological assessment phase of the widely used health planning model PRECEDE/PROCEED (46), for example, calls for practitioners to catalog the predisposing, enabling, and reinforcing factors associated with the behavior targeted for change. The usual practice is to list deficits that predispose, enable, and reinforce some negative behavior. A resilience approach, however, emphasizes assets and resources as the focus for change. Internal assets that may be particularly critical to develop include social skills for relating to peers, self-efficacy for health-promoting behavior, academic skills, and participation in extracurricular and community activities.

Botvin and colleagues (11, 13, 14) have suggested that skill building for life in general, such as the development of generic social and problem-solving skills, can be just as important as building skills for risk avoidance. External resources that may be developed include opportunities for adult mentorship (51, 114), parenting skills (61), and provision of health-promoting settings for adolescents (36). Another key idea is that, because of the multidimensional nature of resilience, interventions that cut across behaviors may be most effective. Interventions that focus solely on substance use avoidance, for example, may be too narrowly focused to alter the entire context of influences in adolescents' lives. Yet, it may be critical for practitioners to focus attention on those assets and resources that have been found to promote healthy outcomes in their particular populations.

A number of interventions include development of assets and resources in adolescents' lives. Life Skills Training (10, 13) is a classroom-based program that focuses on general adolescent skill development and on developing skills for resisting social influences to use substances. The intervention includes a number of activities such as demonstration, role-playing, and behavioral homework assignments. This intervention's focus on cognitive-behavior skills related to building

self-esteem, decreasing anxiety, communicating effectively, developing relationships with others, and asserting rights suggests a resilience approach because it focuses on vital individual assets for healthy and effective social interaction. These skills are assets that can counteract risks for a variety of outcomes. The Resourceful Adolescent Program (RAP) (95) is another individual-level intervention focused on enhancing adolescents' skills and social resources. It includes sessions on affirming participants' strengths, learning skills for handling stress, developing social support networks, and conducting interpersonal relationships with others, including family members.

Several interventions focus on families as a way to develop both assets and resources. The RAP (95), for example, includes three sessions for participants' parents, with a similar focus as in the adolescent sessions. The Multidimensional Family Prevention project (54) trains counselors to visit participating inner-city families in their homes and to work with the families to identify their existing assets and resources. The program helps the adolescent and parent develop new skills to communicate more effectively in general and with each other. It is also designed to help both parents and youth engage more effectively in their interactions in the community. The Preparing for the Drug Free Years (PDFY) and Iowa Strengthening Families (ISF) programs (97–99) similarly focus on parental skills and adolescent prosocial and peer-pressure resistance skills. PDFY is an intervention with parents of sixth graders; it teaches them how to enhance their relationships with their children, develop appropriate monitoring practices, and manage anger and conflict within the family. Children are included in one of the intervention's sessions. The ISF program includes both parents and children; the parenting content is similar to the PDFY program, and the adolescent content focuses on peer resistance and relationship skills. In some of the sessions, parents and children are brought together to practice the skills they have been learning about. These programs are examples of employing a resilience approach because they focus on building positive relationships as a way to prevent negative outcomes, and they stress the importance of family members as resources for healthy adolescent development. In contrast, a more traditional approach may focus on reducing or eliminating the negative factors in youths' lives.

Some family-based interventions focus on particular racial or ethnic groups so that the intervention stresses risks, assets, and resources unique to the group. The Flint Fathers and Sons program (24, 25) is a family-based intervention focused on strengthening father-son relationships among African American participants. It involves family members in activities to learn skills (e.g., communication skills), participate in community and school activities, and enhance cultural pride and racial/ethnic identity. The focus of the intervention is to prevent or reduce substance use, violent behavior, and sexual risk behavior among the fathers and sons. The Adolescent and Family Rites of Passage program (52) is a similar intervention for African American adolescent males in Washington, D.C., that includes after-school activities, family enhancement, and empowerment activities. The activities include elements of African culture and aim to foster self-esteem, positive peer

relationships, and interpersonal skills among the adolescents. It also includes programs for parents to enhance parenting skills, parent-child bonds, and participation in school and the community. Finally, Familias Unidas is a family-centered intervention for immigrant Latino families in South Florida (29, 77). This program focuses on parents and begins with the development of small parental support networks, which then develop and plan the remaining activities, including family meetings, home visits, parent-child discussion sessions, activities with adolescents, activities with adolescents and peers, meetings with school counselors, and family therapy. These three programs are examples of connecting parents and children in constructive ways so they are both more prepared to address risks for which adolescents are inevitably exposed. Their focus on youths' assets and family resources suggests they use a resilience approach.

CONCLUSION

The goal of this review is to help provide a common language and understanding to conduct research and interventions that focus on assets and resources. Resilience models help us understand why some youth exposed to risks are able to overcome them and avoid negative outcomes. Although assets and resources that help youth overcome the adverse effects of risks may differ by outcome, context, and population studied, several common themes do emerge. Parental factors are consistent and critical resources for youth. These factors include support, monitoring, and communication skills. Youth who have self-confidence and social skills also are somewhat predisposed to being resilient regardless of the risk or outcome. Nevertheless, it is vital that public health interventions that use a resilience approach pay particular attention to the unique features of the population of interest and the context in which the approach is employed. Resilience theory provides researchers and practitioners with a conceptual model that can help them understand how youth overcome adversity and how we can use that knowledge to enhance strengths and build the positive aspects of their lives.

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LITERATURE CITED

1. Anteghini M, Fonseca H, Ireland M, Blum RW. 2001. Health risk behaviors and associated risk and protective factors among Brazilian adolescents in Santos, Brazil. *J. Adolesc. Health* 28:295–302
2. Arnold DH, Doctoroff GL. 2003. The early education of socioeconomically disadvantaged children. *Annu. Rev. Psychol.* 54:517–45
3. Bachanas PJ, Morris MK, Lewis-Gess JK, Sarett-Cuasay EJ, Sirl K, et al. 2002. Predictors of risky sexual behavior in African American adolescent girls: implications for prevention interventions. *J. Pediatr. Psychol.* 27:519–30

4. Barkin S, Kreiter S, Durant RH. 2001. Exposure to violence and intentions to engage in moralistic violence during early adolescence. *J. Adolesc.* 24:777–89
5. Beam MR, Gil-Rivas V, Greenberger E, Chen CS. 2002. Adolescent problem behavior and depressed mood: risk and protection within and across social contexts. *J. Youth Adolesc.* 31:343–57
6. Beauvais F, Oetting ER. 1999. Drug use, resilience, and the myth of the golden child. See Ref. 44a, pp. 101–8
7. Benson PL, Leffert N. 2001. Childhood and adolescence: developmental assets. In *International Encyclopedia of the Social and Behavioral Sciences*, ed. NJ Smelser, PG Baltes, pp. 1690–97. Oxford: Pergamon
8. Bonanno GA. 2004. Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *Am. Psychol.* 59:20–28
9. Borowsky IW, Ireland M, Resnick MD. 2002. Violence risk and protective factors among youth held back in school. *Ambul. Pediatr.* 2:475–84
10. Botvin GJ, Baker E, Dusenbury L, Botvin EM, Diaz T. 1995. Long-term follow-up results of a randomized drug abuse prevention trial in a white middle-class population. *JAMA* 273:1106–12
11. Botvin GJ, Griffin KW. 2002. Life skills training as a primary prevention approach for adolescent drug abuse and other problem behaviors. *Int. J. Emerg. Ment. Health* 4:41–47
12. Botvin GJ, Malgady RG, Griffin KW, Scheier LM, Epstein JA. 1998. Alcohol and marijuana use among rural youth: interaction of social and intrapersonal influences. *Addict. Behav.* 23:379–87
13. Botvin GJ, Schinke SP, Epstein JA, Diaz T. 1994. The effectiveness of culturally focused and generic skills training approaches to alcohol and drug abuse prevention among minority youths. *Psychol. Addict. Behav.* 8:116–27
14. Botvin GJ, Schinke SP, Epstein JA, Diaz T, Botvin EM. 1995. Effectiveness of culturally focused and generic skills training approaches to alcohol and drug-abuse prevention among minority adolescents—2-year follow-up results. *Psychol. Addict. Behav.* 9:183–94
15. Brook JS, Brook DW, De La Rosa M, Whiteman M, Johnson E, Montoya I. 2001. Adolescent illegal drug use: the impact of personality, family, and environmental factors. *J. Behav. Med.* 24:183–203
16. Brook JS, Brook DW, De La Rosa M, Whiteman M, Montoya ID. 1999. The role of parents in protecting Colombian adolescents from delinquency and marijuana use. *Arch. Pediatr. Adolesc. Med.* 153:457–64
17. Brook JS, Gordon AS, Whiteman M, Cohen P. 1986. Dynamics of childhood and adolescent personality traits and adolescent drug use. *Dev. Psychol.* 22:403–14
18. Brook JS, Whiteman M, Gordon AS, Cohen P. 1989. Changes in drug involvement: a longitudinal study of childhood and adolescent determinants. *Psychol. Rep.* 65:707–26
19. Bryant AL, Schulenberg JE, O'Malley PM, Bachman JG, Johnston LD. 2003. How academic achievement, attitudes, and behaviors relate to the course of substance use during adolescence: a 6-year, multiwave national longitudinal study. *J. Res. Adolesc.* 13:361–97
20. Bryant AL, Zimmerman MA. 2002. Examining the effects of academic beliefs and behaviors on changes in substance use among urban adolescents. *J. Educ. Psychol.* 94:621–37
21. Buckner JC, Mezzacappa E, Beardslee WR. 2003. Characteristics of resilient youths living in poverty: the role of self-regulatory processes. *Dev. Psychopathol.* 15:139–62
22. Byrne DG, Mazanov J. 2001. Self-esteem, stress and cigarette smoking in adolescents. *Stress Health* 17:105–10

23. Caldwell CH, Kohn-Wood LP, Schmeelk-Cone KH, Chavous TM, Zimmerman MA. 2004. Racial discrimination and racial identity as risk or protective factors for violent behaviors in African American young adults. *Am. J. Community Psychol.* 33:91–105
24. Caldwell CH, Wright JC, Zimmerman MA, Walsemann KM, Williams D, Isichei PAC. 2004. Enhancing adolescent health behaviors through strengthening non-resident father-son relationships: a model for intervention with African American families. *Health Educ. Res.* <http://her.oupjournals.org/cgi/reprint/cyg078v1>
25. Caldwell CH, Zimmerman MA, Isichei PA. 2001. Forging collaborative partnerships to enhance family health: an assessment of strengths and challenges in conducting community-based research. *J. Public Health Manag. Pract.* 7:1–9
26. Cauce AM, Stewart A, Rodriquez MD, Cochran B, Ginzler J. 2003. Overcoming the odds? Adolescent development in the context of urban poverty. See Ref. 63a, pp. 343–63
27. Cicchette D. 2003. Foreword. See Ref. 63a, pp. xix–xxvii
28. Cicchetti D, Rogosch FA. 2002. A developmental psychopathology perspective on adolescence. *J. Consult. Clin. Psychol.* 70:6–20
29. Coatsworth JD, Pantin H, Szapocznik J. 2002. Familias Unidas: A family-centered ecodevelopmental intervention to reduce risk for problem behavior among Hispanic adolescents. *Clin. Child Fam. Psychol. Rev.* 5:113–32
30. Costa FM, Jessor R, Turbin MS. 1999. Transition into adolescent problem drinking: the role of psychosocial risk and protective factors. *J. Stud. Alcohol* 60:480–90
31. Crosnoe R. 2002. Academic and health-related trajectories in adolescence: the intersection of gender and athletics. *J. Health Soc. Behav.* 43:317–35
32. Crosnoe R, Erickson KG, Dornbusch SM. 2002. Protective functions of family relationships and school factors on the deviant behavior of adolescent boys and girls—reducing the impact of risky friendships. *Youth Soc.* 33:515–44
33. Davey M, Eaker DG, Walters LH. 2003. Resilience processes in adolescents: personality profiles, self-worth, and coping. *J. Adolesc. Res.* 18:347–62
34. Dornbusch SM, Erickson KG, Laird J, Wong CA. 2001. The relation of family and school attachment to adolescent deviance in diverse groups and communities. *J. Adolesc. Res.* 16:396–422
35. Duncan SC, Duncan TE, Strycker LA. 2000. Risk and protective factors influencing adolescent problem behavior: a multivariate latent growth curve analysis. *Ann. Behav. Med.* 22:103–9
36. Eccles J, Gootman JA, eds. 2002. *Community Programs to Promote Youth Development*. Washington, DC: Natl. Acad. Press
37. Edari R, McManus P. 1998. Risk and resiliency factors for violence. *Pediatr. Clin. North Am.* 45:293–305
38. Epstein JA, Botvin GJ, Griffin KW, Diaz T. 2001. Protective factors buffer effects of risk factors on alcohol use among inner-city youth. *J. Child Adolesc. Subst. Abuse* 11:77–90
39. Farrell AD, White KS. 1998. Peer influences and drug use among urban adolescents: family structure and parent-adolescent relationship as protective factors. *J. Consult. Clin. Psychol.* 66:248–58
40. Fergusson DM, Beautrais AL, Horwood LJ. 2003. Vulnerability and resiliency to suicidal behaviours in young people. *Psychol. Med.* 33:61–73
41. Fergusson DM, Horwood LJ. 2003. Resilience to childhood adversity: results of a 21-year study. See Ref. 63a, pp. 130–55
42. Fleming CB, Kim H, Harachi TW, Catalano RF. 2002. Family processes for children in early elementary school as predictors of smoking initiation. *J. Adolesc. Health* 30:184–89

43. Garnezy N, Masten AS, Tellegen A. 1984. The study of stress and competence in children: a building block for developmental psychopathology. *Child Dev.* 55:97–111
44. Garnier HE, Stein JA. 2002. An 18-year model of family and peer effects on adolescent drug use and delinquency. *J. Youth Adolesc.* 31:45–56
- 44a. Glantz MD, Johnson JL, eds. 1999. *Resilience and Development: Positive Life Adaptations*. New York: Kluwer Acad./Plenum
45. Glantz MD, Sloboda Z. 1999. Analysis and reconceptualization of resilience. See Ref. 44a, pp. 109–28
46. Green LW, Kreuter MW. 1999. *Health Promotion Planning: An Educational and Ecological Approach*. Mountain View, CA: Mayfield
47. Griffin KW, Botvin GJ, Scheier LM, Epstein JA, Doyle MM. 2002. Personal competence skills, distress, and well-being as determinants of substance use in a predominantly minority urban adolescent sample. *Prev. Sci.* 3:23–33
48. Griffin KW, Scheier LM, Botvin GJ, Diaz T, Miller N. 1999. Interpersonal aggression in urban minority youth: mediators of perceived neighborhood, peer, and parental influences. *J. Community Psychol.* 27:281–98
49. Gutman LM, Sameroff AJ, Eccles JS. 2002. The academic achievement of African American students during early adolescence: an examination of multiple risk, promotive, and protective factors. *Am. J. Community Psychol.* 30:367–99
50. Hahm HC, Lahiff M, Guterman NB. 2003. Acculturation and parental attachment in Asian-American adolescents' alcohol use. *J. Adolesc. Health* 33:119–29
51. Hanlon TE, Bateman RW, Simon BD, O'Grady KE, Carswell SB. 2002. An early community-based intervention for the prevention of substance abuse and other delinquent behavior. *J. Youth Adolesc.* 31:459–71
52. Harvey AR, Hill RB. 2004. Africentric youth and family rites of passage program: promoting resilience among at-risk African American youths. *Soc. Work* 49:65–74
53. Hetherington EM, Stanley-Hagan M. 1999. The adjustment of children with divorced parents: a risk and resiliency perspective. *J. Child Psychol. Psychiatry* 40:129–40
54. Hogue A, Liddle HA, Becker D, Johnson-Leckrone J. 2002. Family-based prevention counseling for high-risk young adolescents: immediate outcomes. *J. Community Psychol.* 30:1–22
55. Howard D, Qiu Y, Boekeloo B. 2003. Personal and social contextual correlates of adolescent dating violence. *J. Adolesc. Health* 33:9–17
56. Huang B, Kosterman R, Catalano RF, Hawkins JD, Abbott RD. 2001. Modeling mediation in the etiology of violent behavior and adolescence: a test of the social development model. *Criminology* 39:75–107
57. Jackson C. 2002. Perceived legitimacy of parental authority and tobacco and alcohol use during early adolescence. *J. Adolesc. Health* 31:425–32
58. Kaplan HB. 1999. Toward an understanding of resilience: a critical review of definitions and models. See Ref. 44a, pp. 17–83
59. Kim IJ, Zane NWS, Hong S. 2002. Protective factor against substance use among Asian American youth: a test of the peer cluster theory. *J. Community Psychol.* 30:565–84
60. Kumpfer KL. 1999. Factors and processes contributing to resilience: the resilience framework. See Ref. 44a, pp. 179–224
61. Kumpfer KL, Alvarado R. 2003. Family-strengthening approaches for the prevention of youth problem behaviors. *Am. Psychol.* 58:457–65
62. Lammers C, Ireland M, Resnick M, Blum R. 2000. Influences on adolescents' decision to postpone onset of sexual

- intercourse: a survival analysis of virginity among youths aged 13 to 18 years. *J. Adolesc. Health* 26:42–48
63. Lloyd-Richardson EE, Papandonatos G, Kazura A, Stanton C, Niaura R. 2002. Differentiating stages of smoking intensity among adolescents: stage-specific psychological and social influences. *J. Consult. Clin. Psychol.* 70:998–1009
- 63a. Luthar SS, ed. 2003. *Resilience and Vulnerability: Adaptation in the Context of Childhood Adversities*. New York: Cambridge Univ. Press
64. Luthar SS, Cicchetti D. 2000. The construct of resilience: implications for interventions and social policies. *Dev. Psychopathol.* 12:857–85
65. Luthar SS, Cicchetti D, Becker B. 2000. The construct of resilience: a critical evaluation and guidelines for future work. *Child Dev.* 71:543–62
66. Luthar SS, Zelazo LB. 2003. Research on resilience: an integrative review. See Ref. 63a, pp. 510–50
67. Magnani RJ, Karim AM, Weiss LA, Bond KC, Lemba M, Morgan GT. 2002. Reproductive health risk and protective factors among youth in Lusaka, Zambia. *J. Adolesc. Health* 30:76–86
68. Magnani RJ, Seiber EE, Gutierrez EZ, Vereau D. 2001. Correlates of sexual activity and condom use among secondary-school students in urban Peru. *Stud. Fam. Plann.* 32:53–66
69. Malow RM, Devieux JG, Jennings T, Lucenko BA, Kalichman SC. 2001. Substance-abusing adolescents at varying levels of HIV risk: psychosocial characteristics, drug use, and sexual behavior. *J. Subst. Abuse* 13:103–17
70. Masten AS. 1999. Resilience comes of age: reflections on the past and outlook for the next generation. See Ref. 44a, pp. 281–96
71. Masten AS. 2001. Ordinary magic—resilience processes in development. *Am. Psychol.* 56:227–38
72. Masten AS, Powell JL. 2003. A resilience framework for research, policy, and practice. See Ref. 63a, pp. 1–28
73. Murray C. 2003. Risk factors, protective factors, vulnerability, and resilience—a framework for understanding and supporting the adult transitions of youth with high-incidence disabilities. *Remedial Spec. Educ.* 24:16–26
74. Newcomb MD, Felix-Ortiz M. 1992. Multiple protective and risk factors for drug use and abuse—cross-sectional and prospective findings. *J. Pers. Soc. Psychol.* 63:280–96
75. Olsson CA, Bond L, Burns JM, Vella-Brodrick DA, Sawyer SM. 2003. Adolescent resilience: a concept analysis. *J. Adolesc.* 26:1–11
76. Oshio A, Kaneko H, Nagamine S, Nakaya M. 2003. Construct validity of the Adolescent Resilience Scale. *Psychol. Rep.* 93:1217–22
77. Pantin H, Coatsworth JD, Feaster DJ, Newman FL, Briones E, et al. 2003. Familias Unidas: the efficacy of an intervention to promote parental investment in Hispanic immigrant families. *Prev. Sci.* 4:189–201
78. Paul C, Fitzjohn J, Herbison P, Dickson N. 2000. The determinants of sexual intercourse before age 16. *J. Adolesc. Health* 27:136–47
79. Pollard JA, Hawkins JD, Arthur MW. 1999. Risk and protection: Are both necessary to understand diverse behavioral outcomes in adolescence? *Soc. Work Res.* 23:145–58
80. Prinstein MJ, Boergers J, Spirito A. 2001. Adolescents' and their friends' health-risk behavior: factors that alter or add to peer influence. *J. Pediatr. Psychol.* 26:287–98
81. Rai AA, Stanton B, Wu Y, Li XM, Galbraith J, et al. 2003. Relative influences of perceived parental monitoring and perceived peer involvement on adolescent risk behaviors: an analysis of six cross-sectional data sets. *J. Adolesc. Health* 33:108–18

82. Ramirez-Valles J, Zimmerman MA, Newcomb MD. 1998. Sexual risk behavior among youth: modeling the influence of prosocial activities and socioeconomic factors. *J. Health Soc. Behav.* 39:237–53
83. Rosenthal S, Feiring C, Taska L. 2003. Emotional support and adjustment over a year's time following sexual abuse discovery. *Child Abuse Negl.* 27:641–61
84. Rutter M. 1985. Resilience in the face of adversity. Protective factors and resistance to psychiatric disorder. *Br. J. Psychiatry* 147:598–611
85. Rutter M. 1987. Psychosocial resilience and protective mechanisms. *Am. J. Orthopsychiatry* 57:316–31
86. Sameroff A, Gutman LM, Peck SC. 2003. Adaptation among youth facing multiple risks: prospective research findings. See Ref. 63a, pp. 364–91
87. Sandler I, Wolchik S, Davis C, Haine R, Ayers T. 2003. Correlational and experimental study of resilience in children of divorce and parentally bereaved children. See Ref. 63a, pp. 213–43
88. Santelli JS, Kaiser J, Hirsch L, Radosh A, Simkin L, Middlestadt S. 2004. Initiation of sexual intercourse among middle school adolescents: the influence of psychosocial factors. *J. Adolesc. Health* 34:200–8
89. Scal P, Ireland M, Borowsky IW. 2003. Smoking among American adolescents: a risk and protective factor analysis. *J. Community Health* 28:79–97
90. Scaramella LV, Conger RD, Simons RL. 1999. Parental protective influences and gender-specific increases in adolescent internalizing and externalizing problems. *J. Res. Adolesc.* 9:111–41
91. Scheier LM, Botvin GJ, Griffin KW, Diaz T. 1999. Latent growth models of drug refusal skills and adolescent alcohol use. *J. Alcohol Drug Educ.* 44:21–48
92. Scheier LM, Botvin GJ, Miller NL. 1999. Life events, neighborhood stress, psychosocial functioning, and alcohol use among urban minority youth. *J. Child Adolesc. Subst. Abuse* 9:19–50
93. Sellers RM, Caldwell CH, Bernat DH, Zimmerman MA. 2001. *Racial identity and alcohol use in a sample of academically at-risk African American high school students*. Presented at biennial meeting of Soc. Res. Child Dev., Minneapolis, MN
94. Serbin LA, Karp J. 2004. The intergenerational transfer of psychosocial risk: mediators of vulnerability and resilience. *Annu. Rev. Psychol.* 55:333–63
95. Shochet IM, Dadds MR, Holland D, Whitefield K, Harnett PH, Osgarby SM. 2001. The efficacy of a universal school-based program to prevent adolescent depression. *J. Clin. Child Psychol.* 30:303–15
96. Shumow L, Vandell DL, Posner J. 1999. Risk and resilience in the urban neighborhood: predictors of academic performance among low-income elementary school children. *Merrill-Palmer Q.-J. Dev. Psychol.* 45:309–31
97. Spoth R, Lopez Reyes M, Redmond C, Shin C. 1999. Assessing a public health approach to delay onset and progression of adolescent substance use: latent transition and log-linear analyses of longitudinal family preventive intervention outcomes. *J. Consult. Clin. Psychol.* 67: 619–30
98. Spoth RL, Redmond C, Shin C. 2001. Randomized trial of brief family interventions for general populations: adolescent substance use outcomes 4 years following baseline. *J. Consult. Clin. Psychol.* 69:627–42
99. Spoth RL, Redmond C, Trudeau L, Shin C. 2002. Longitudinal substance initiation outcomes for a universal preventive intervention combining family and school programs. *Psychol. Addict. Behav.* 16:129–34
100. Stanton B, Li X, Pack R, Cottrell L, Harris C, Burns JM. 2002. Longitudinal influence of perceptions of peer and

- parental factors on African American adolescent risk involvement. *J. Urban Health* 79:536–48
101. Stouthamer-Loeber M, Loeber R, Wei E, Farrington DP, Wikstrom POH. 2002. Risk and promotive effects in the explanation of persistent serious delinquency in boys. *J. Consult. Clin. Psychol.* 70:111–23
102. Sullivan TN, Farrell AD. 1999. Identification and impact of risk and protective factors for drug use among urban African American adolescents. *J. Clin. Child Psychol.* 28:122–36
103. Tarter RE, Vanyukov M. 1999. Re-visiting the validity of the construct of resilience. See Ref. 44a, pp. 85–100
104. Tiet QQ, Huizinga D. 2002. Dimensions of the construct of resilience and adaptation among inner-city youth. *J. Adolesc. Res.* 17:260–76
105. Tugade MM, Fredrickson BL. 2004. Resilient individuals use positive emotions to bounce back from negative emotional experiences. *J. Pers. Soc. Psychol.* 86:320–33
106. Werner EE. 1992. The children of Kauai: resiliency and recovery in adolescence and adulthood. *J. Adolesc. Health* 13: 262–68
107. Werner EE, Smith RS. 1992. *Overcoming the Odds: High Risk Children from Birth to Adulthood*. Ithaca/London: Cornell Univ. Press
108. Williams NR, Davey M, Klock-Powell K. 2003. Rising from the ashes: stories of recovery, adaptation and resiliency in burn survivors. *Soc. Work Health Care* 36:53–77
109. Wills TA, Sandy JM, Shinar O, Yaeger A. 1999. Contributions of positive and negative affect to adolescent substance use: test of a bidimensional model in a longitudinal study. *Psychol. Addict. Behav.* 13:327–38
110. Wills TA, Yaeger AM, Sandy JM. 2003. Buffering effect of religiosity for adolescent substance use. *Psychol. Addict. Behav.* 17:24–31
111. Wong CA, Eccles JS, Sameroff A. 2003. The influence of ethnic discrimination and ethnic identification on African American adolescents' school and socioemotional adjustment. *J. Pers.* 71:1197–232
112. Yates TM, Egeland B, Sroufe LA. 2003. Rethinking resilience: a developmental perspective. See Ref. 63a, pp. 243–66
113. Zimmerman MA, Arunkumar R. 1994. Resiliency research: implications for schools and policy. *Soc. Policy Rep.* 8:1–17
114. Zimmerman MA, Bingenheimer JB, Notaro PC. 2002. Natural mentors and adolescent resiliency: a study with urban youth. *Am. J. Community Psychol.* 30:221–43
115. Zimmerman MA, Ramirez J, Washienko KM, Walter B, Dyer S. 1995. Enculturation hypothesis: exploring direct and protective effects among Native American youth. In *Resiliency in Ethnic Minority Families: Native and Immigrant American Families*, ed. HI McCubbin, EA Thompson, AI Thompson, JE Fromer, pp. 199–220. Madison: Univ. Wis. Cent. Excell. Fam. Stud.
116. Zimmerman MA, Steinman KJ, Rowe KJ. 1998. Violence among urban African-American adolescents: the protective effects of parental support. In *Addressing Community Problems: Research and Intervention*, ed. S Oskamp, XB Arriaga, pp. 78–103. Newbury Park, CA: Sage

CONTENTS

EPIDEMIOLOGY AND BIOSTATISTICS

- A Life Course Approach to Chronic Disease Epidemiology,
John Lynch and George Davey Smith 1
- Advances in Cancer Epidemiology: Understanding Causal Mechanisms
and the Evidence for Implementing Interventions, *David Schottenfeld*
and Jennifer L. Beebe-Dimmer 37
- Competing Dietary Claims for Weight Loss: Finding the Forest Through
Truculent Trees, *David L. Katz* 61
- Population Disparities in Asthma, *Diane R. Gold and Rosalind Wright* 89
- The Rise and Fall of Menopausal Hormone Therapy,
Elizabeth Barrett-Connor, Deborah Grady, and Marcia L. Stefanick 115
- Magnitude of Alcohol-Related Mortality and Morbidity Among U.S.
College Students Ages 18–24: Changes from 1998 to 2001,
Ralph Hingson, Timothy Hereen, Michael Winter, and Henry Wechsler 259

ENVIRONMENTAL AND OCCUPATIONAL HEALTH

- Advances in Risk Assessment and Communication, *Bernard D. Goldstein* 141
- EMF and Health, *Maria Feychting, Anders Ahlbom, and Leeka Kheifets* 165
- The Public Health Impact of Prion Diseases, *Ermias D. Belay*
and Lawrence B. Schonberger 191
- Water and Bioterrorism: Preparing for the Potential Threat to U.S. Water
Supplies and Public Health, *Patricia L. Meinhardt* 213

PUBLIC HEALTH PRACTICE

- Economic Causes and Consequences of Obesity, *Eric A. Finkelstein,*
Christopher J. Ruhm, and Katherine M. Kosa 239
- Magnitude of Alcohol-Related Mortality and Morbidity Among U.S.
College Students Ages 18–24: Changes from 1998 to 2001,
Ralph Hingson, Timothy Hereen, Michael Winter, and Henry Wechsler 259
- New Microbiology Tools for Public Health and Their Implications,
Betty H. Robertson and Janet K.A. Nicholson 281

The Public Health Infrastructure and Our Nation's Health, <i>Edward L. Baker, Jr., Margaret A. Potter, Deborah L. Jones, Shawna L. Mercer, Joan P. Cioffi, Lawrence W. Green, Paul K. Halverson, Maureen Y. Lichtveld, and David W. Fleming</i>	303
Social Marketing in Public Health, <i>Sonya Grier and Carol A. Bryant</i>	319
Urban Health: Evidence, Challenges, and Directions, <i>Sandro Galea and David Vlahov</i>	341
SOCIAL ENVIRONMENT AND BEHAVIOR	
Urban Health: Evidence, Challenges, and Directions, <i>Sandro Galea and David Vlahov</i>	341
Acculturation and Latino Health in the United States: A Review of the Literature and its Sociopolitical Context, <i>Marielena Lara, Cristina Gamboa, M. Iya Kahramanian, Leo S. Morales, and David E. Hayes Bautista</i>	367
Adolescent Resilience: A Framework for Understanding Healthy Development in the Face of Risk, <i>Stevenson Fergus and Marc A. Zimmerman</i>	399
Declining Rates of Physical Activity in the United States: What are the Contributors?, <i>Ross C. Brownson, Tegan K. Boehmer, and Douglas A. Luke</i>	421
Impact of Nicotine Replacement Therapy on Smoking Behavior, <i>K. Michael Cummings and Andrew Hyland</i>	583
Primary Prevention of Diabetes: What Can Be Done and How Much Can Be Prevented?, <i>Matthias B. Schulze and Frank B. Hu</i>	445
Psychosocial Factors and Cardiovascular Diseases, <i>Susan A. Everson-Rose and Tené T. Lewis</i>	469
Social Marketing in Public Health, <i>Sonya Grier and Carol A. Bryant</i>	319
HEALTH SERVICES	
Abortion in the United States, <i>Cynthia C. Harper, Jillian T. Henderson, and Philip D. Darney</i>	501
Patient Perceptions of the Quality of Health Services, <i>Shoshanna Sofaer and Kirsten Firminger</i>	513
Toward a System of Cancer Screening in the United States: Trends and Opportunities, <i>Nancy Breen and Helen I. Meissner</i>	561
Competing Dietary Claims for Weight Loss: Finding the Forest Through Truculent Trees, <i>David L. Katz</i>	61
Urban Health: Evidence, Challenges, and Directions, <i>Sandro Galea and David Vlahov</i>	341

Impact of Nicotine Replacement Therapy on Smoking Behavior, <i>K. Michael Cummings and Andrew Hyland</i>	583
---	-----

INDEXES

Subject Index	601
Cumulative Index of Contributing Authors, Volumes 17–26	000
Cumulative Index of Chapter Titles, Volumes 17–26	000

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