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Dimensions of the Construct of Resilience and Adaptation Among Inner-City Youth

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This article reviews the conceptualization of resilience and empirically examines the dimensionality of a construct of resilience and adaptation by using structural equation modeling techniques. As part of a longitudinal study of youth development, youth ages 12, 14, and 16 and their parents who lived in high-risk neighborhoods in the Denver metropolitan area were interviewed. The construct of resilience and adaptation was measured by six indicators: psychosocial functioning, self-esteem, academic performance, absence or low level of drug use, gang involvement, and delinquent activities. Factor analyses using LISREL suggest the existence of at least two latent constructs of resilience and adaptation: Adjustment and low level of Antisocial Behavior. Implications of the findings are discussed.

Studies of children at risk of psychopathology have played an important role in the outgrowth of research on resilience (Masten, 1994; Masten, Best, & Garmezy, 1990; Rutter, 1990). Risk studies are based on the paradigm that risk factors predict psychopathology and have successfully identified numerous predictors of psychopathology. Under the assumption that all relevant variables are included in the model, the paradigm predicts that all individuals at low risk will have favorable outcomes (Group 3) and all of those who are at high risk will have unfavorable outcomes (Group 2) (see Figure 1).

Empirical findings, in general, support this paradigm. However, many studies have found that numerous high-risk individuals defy unfavorable outcomes (e.g., Long & Vaillant, 1984; Luthar, 1997; Masten et al., 1990), and

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<i>Outcome</i>		
Unfavorable	Group 1: Low risk/Unfavorable outcome	Group 2: High risk/Unfavorable outcome
Favorable	Group 3: Low risk/Favorable outcome	Group 4: <i>Resilience</i> High risk/Favorable outcome
<i>Risk</i>	Low	High

Figure 1. Youth classification based on risk and outcome status.

this observation has prompted the study of resilience. Studies of resilience focus on subgroups of people who are at high risk for psychopathology or maladjustment but somehow avoid unfavorable outcomes (Group 4 in Figure 1). Risk research is interested in the differentiation between Group 2 (high risk/unfavorable outcome) and Group 3 (low risk/favorable outcome), whereas research of resilience investigates the differences between Group 2 (high risk/unfavorable outcome) and Group 4 (high risk/favorable outcome). (Group 1 is presumed nonexistent by both risk and resilience researchers if all factors are considered.)

When studying resilience, therefore, two components must be considered: favorable outcomes (mental health, success, or good adjustment) and their maintenance despite adversity. Resilient youth are a subset of successful youth who have experienced adversity.

In empirical examinations of resilience, the risk component of the construct has been measured by a number of variables, including medical problems at birth (Field, Goldberg, Stern, & Sostek, 1980; O'Grady & Metz, 1987; Werner & Smith, 1982), physical handicap (Garmezy, Masten, & Tellegen, 1984), children of mentally ill parents (Conrad & Hammen, 1993; Garmezy, 1974, 1985; Radke-Yarrow & Brown, 1993; Sameroff & Zax, 1978; Werner, 1989a), children of severely criminal fathers (Kandel et al., 1988), parental alcoholism (Pillow, Barrera, & Chassin, 1998; Puttler, Zucker, Fitzgerald, & Bingham, 1998), parental loss (Brown, Harris, & Bifulco, 1986), absence of father (Baldwin, Baldwin, & Cole, 1990), maltreatment (Cicchetti, Rogosch, Lynch, & Holt, 1993), institutional upbringing (Rutter,

Quinton, & Hill, 1990), family instability (Werner & Smith, 1982), living in multiproblem families (Felsman & Vaillant, 1987; Fergusson & Lynskey, 1996; Long & Vaillant 1984), low socioeconomic status (Baldwin et al., 1990; Elder, Caspi, & Nguyen, 1986; Felsman & Vaillant, 1987; Long & Vaillant 1984; Luthar, 1997; Masten et al., 1988; Ramey, Farran, & Campbell, 1979; Werner & Smith, 1982), minority status (Baldwin et al., 1990), negative life events (Garmezy, 1987; Garmezy & Tellegen, 1984; Luthar, 1991; Tiết et al., 1998), living in urban areas (Garmezy et al., 1984), and being reared by mother with little formal education and living in a family environment troubled by discord, desertion, divorce, or marred by parental alcoholism (Werner, 1989; Werner & Smith, 1992).

Similarly, the outcome component of the construct of resilience has also included a number of variables. Researchers have used cognitive competence (Garmezy, 1987; Lösel, Bliesener, & Köferl, 1989), cognitive outcome (Baldwin et al., 1990), academic achievement (Garmezy, 1987), school-based competence (Masten et al., 1988, 1990), self-esteem, social resources, and self-efficacy (Lösel et al., 1989), education, vocation, marriage, and life satisfaction (Werner, 1989), and absence of mental disorders (Conrad & Hammen, 1993; Rutter, 1979; Tiết et al., 1998; Werner & Smith, 1982), schizophrenia (Garmezy & Devine, 1984; Nuechterlein, Phipps-Yonas, Driscoll, & Garmezy, 1990), delinquency (Werner, 1989), and behavioral disturbances (Earls, Beardslee, & Garrison, 1987; Fergusson & Lynskey, 1996).

Several researchers have measured the outcome component of resilience using a number of variables simultaneously (e.g., Garmezy et al., 1984; Lösel et al., 1989; Masten et al., 1995; Radke-Yarrow & Brown, 1993; Tiết et al., 1998; Werner & Smith, 1982). This approach has the advantage of considering many aspects of functioning concurrently. In fact, several studies have suggested that resilience might be multidimensional. For instance, some abused and neglected children were able to cope and adapt well behaviorally despite their apparent emotional disturbances (e.g., Farber & Egeland, 1987). Also, Luthar and colleagues (Luthar, 1991; Luthar, Doernberger, & Zigler, 1993) have found that some socially competent youth have internalizing symptoms. These findings beg the question: Are these socially or behaviorally competent youth "resilient," given their emotional symptoms? There seem to be two ways to define resilience: (a) The socially competent youth are considered resilient regardless of their emotional adjustment, as defined by Luthar and colleagues (Luthar, 1991; Luthar et al., 1993), for instance. Alternatively, (b) the emotionally troubled youth are classified as nonresilient, and the term *resilience* indicates exclusively the youth who adjust well both socially and emotionally.

Masten and colleagues (Masten et al., 1990; Masten & Coatsworth, 1995) have pointed out that historically, psychological adaptation has been studied using two major components, internal adaptation and external adaptation. Many studies have examined the factors of external adaptation (Donovan, Jessor, & Costa, 1988; Garmezy et al., 1984; Gillmore et al., 1991; Luthar, 1991; Masten et al., 1988, 1995). For instance, school-based competence of children was found to have two factors, engaged-disengaged and classroom disruptiveness (Garmezy et al., 1984; Luthar, 1991; Masten et al., 1988). Other studies have examined the dimensionality of delinquent behaviors. Many of these studies suggest a single construct of problem behavior (e.g., Donovan & Jessor, 1985; Donovan et al., 1988), whereas others suggest more than one (e.g., Osgood, Johnston, O'Malley, & Bachman, 1988; Gillmore et al., 1991). Few studies (Block & Block, 1980; Werner & Smith, 1982), however, have examined internal functioning of youth, and even fewer (e.g., Werner & Smith, 1982, 1992) have examined both internal and external adaptation simultaneously in the study of resilience. Moreover, no study has empirically examined the dimensionality and structure of variables used to define resilience that simultaneously incorporates both internal and external adaptation of the youth, such as school competence, delinquent behavior, and psychopathology.

Such a test is fundamental to studying resilience in a multivariate context because it provides an empirical basis, complementary to theoretical conceptualization, of the construct of resilience and adaptation. If the empirical findings show that a single construct of resilience is sufficient to capture the variance that is measured by a number of indicators, this single latent construct of resilience should be the focus of interest. Then the predictors and processes induce resilience that is measured by this single, latent construct should be examined. On the other hand, if the empirical findings show that a single, latent construct of resilience is inadequate, then maybe a composite measure of resilience or a combination of a number of distinct aspects of adaptation is necessary to measure resilience. The objective of this study is to provide one such empirical test of the dimensionality of the construct of resilience.

Because there is no empirical evidence or theoretical reason to suggest that the dimensionality of resilience (a favorable outcome despite adversity) might differ from the dimensionality of adaptation (a favorable outcome regardless of the exposure to adversity), this study examines the dimensionality of variables that could be used to define either resilience or adaptation. In other words, this study uses a high-risk sample of youth in which some have a favorable outcome (therefore resilience) and some have an unfavorable outcome (therefore nonresilience or low adaptation).

METHOD

Participants

This study uses data from the Denver Youth Survey (DYS), a prospective study of youth development of 1,527 high-risk youth. To obtain a sample of high-risk youth, the DYS targeted high-risk neighborhoods in the Denver metropolitan area. The neighborhoods were selected based on a social area analysis (cluster analysis of census social indicators at the block group level). From 11 clusters or ecological areas, 3 areas were identified as "socially disorganized." The characteristics of these three areas included overcrowdedness, poverty, and high mobility (low stability). Second, within these three socially disorganized areas, neighborhoods were selected on the basis of high crime rates (top one third). Thus, the neighborhoods included in the DYS were socially disorganized with high crime rates.

Selection of survey respondents was based on a probability sample of households drawn from these high-risk neighborhoods. Of the 20,236 households originally sampled, screening for the presence of eligible children was completed in 18,738 (93%). Of the remaining households, 419 (2%) refused to participate, and in 1,079 (5%), no one was found at home after four or more call-backs. The screened households contained 1,794 eligible children and youth, of which 1,527 (85%) completed the first year's interview. Sample retention rate has been held to 92% to 93% of the original sample of 1,527 pairs of youth and parents. All respondents were paid for their participation. The surveys were conducted by trained interviewers and were usually completed in confidential settings in their homes.

There were five cohorts among these 1,527 youth, aged 7, 9, 11, 13, and 15 in the first year of the DYS study. However, only the 11, 13, and 15 age groups were included in the current report. Because gang involvement was of interest to this study, the younger two cohorts of children were excluded.

Within the three older cohorts ($n = 877$), there were 52.9% (464) males and 47.1% (413) females. The majority of these youth are ethnic minorities, with 47.6% (418) Hispanics, 34.9% (306) African American, 8% (70) Whites, 2.7% (24) Native Americans, 1.3% (11) Asians, and 5.4% (48) other.

Measures

Youth outcome was simultaneously indicated by the youth's academic performance, self-esteem, and absence or low levels of psychosocial problems, delinquent behavior, drug use, and involvement with gangs.

Academic performance. Academic performance was measured by self-reported grade point average. Youth who had dropped out of school received a score of 0.

Self-esteem. Self-esteem was measured by 10 items on a questionnaire, a combination of two self-esteem scales, 4 items by Cobb (Bachman, 1970; Cobb, Brooks, Kasl, & Connelly, 1966), and 6 items by Rosenberg (1965). This measure yielded a Cronbach's alpha of .750 in this sample.

Mental health and behavior problems. Mental health and behavior problems were measured by the Child Behavior Checklist (CBCL) (Achenbach & Edelbrock, 1983, 1986). Several studies yielded Pearson correlations ranging from .80 to .90 for reliability between trained observers simultaneously recording children's behavior (Achenbach & Edelbrock, 1983; Patterson, 1980) and for test-retest reliability of informants' reports repeated over periods of 1 week to 1 month (Achenbach & Edelbrock, 1978, 1983, 1986).

The youth's caretaker rated the CBCL items. A combination of six subscales of the CBCL was used: Aggression, Isolation, Hyperactivity, Conduct Disorder, Cruelty, and Psychological Symptoms. With this population, the Cronbach alphas of the six subscales were .755, .669, .814, .912, .602, and .761, respectively. As a single scale the six subscales yielded a Cronbach alpha of .950.

Gang involvement. This measure was a combination of two self-report questions of whether the youth was involved in a gang during the school year and during the summer. Youth obtained a score of 2 if they were involved in a gang both during the school year and in the summer, a score of 1 for either during the school year or in the summer, and 0 for not being involved at all. Only delinquent gangs were included.

Delinquency. The delinquency measure, adopted from the National Youth Survey (Elliot, Huizinga, & Ageton, 1985), was a measure of youth report on the frequency of involvement in 39 kinds of delinquent acts during the past year. The use of delinquency as a measure of resilience led to the interest in general delinquency, and a delinquency measure that combined the frequency of involvement across all delinquent behavior was constructed.

Drug use. Drug use was measured with 19 items including tobacco, alcohol, marijuana, other illicit drug use, and licit drug use without a prescription. The measure of drug use as an indicator of resilience leads to the interest of a

general measure of drug use and therefore was constructed by totaling the number of times a respondent used each drug (i.e., sum of marijuana use, cocaine use, etc.). No weighting was applied. The maximum permitted frequency of cigarette smoking is limited to 365 to prevent an inflated effect of cigarette smoking on the measure of drug use. Results showed that the scores of drug use ranged from 0 up to almost 2,000 and suggested that drug use scores were not simply the effect of scores from cigarette smoking but reflect a general measure of drug use.

Procedure

A combination of data from the second and the third waves of the DYS (1989 and 1990) was used. Because of the nature of the measures, some assessed the functioning of the youth at the time they were interviewed (i.e., self-esteem, school performance, CBCL), whereas other measures evaluated their functioning in the past year (i.e., drug use, delinquency, and gang involvement). For example, the measure of self-esteem collects data on self-esteem in the present; on the other hand, the measure of delinquency collects data on delinquent behaviors in the past year. Therefore, in order to obtain data on self-esteem and delinquent behaviors at the same period (cross-sectional data), this study had to draw on data from two waves of data collection. As a result, the combination of the second and third waves of data was aggregated to measure the youth's functioning at a single period.

Data on delinquent behaviors, drug use, gang involvement, and subscales of the CBCL were skewed—most youth fell on the lower end of the measures. In addition, data on delinquent behaviors, drug use, and gang involvement had modes of 0. Log transformations were used to reduce the distribution skewness of the measures on drug use, delinquent behavior, and the CBCL. However, no transformation was conducted on the measure of gang involvement because it had only three levels. Using the log transformations, zero-order correlations between these six scales tended to go up, with the exception of four pairs that went down: Delinquency and Gang Involvement, Delinquency and Self Esteem, CBCL and Drug Use, and CBCL and Academic Achievement (see Table 1).

Structural equation modeling technique was employed to conduct factor analyses on the dimensionality of the construct of resilience and adaptation. Using LISREL 7 (Jöreskog and Sörbom, 1989) to obtain maximum likelihood estimates of model parameters required a violation of the assumption of normality present in that method because of the skewness of the measures. However, LISREL is quite robust in the face of nonnormality, and particularly when the sample size is reasonably large (Huba & Harlow, 1986;

TABLE 1: Zero Order Correlations Between the Six Indicators and Log-Transformed Scores of Delinquency, Drug Use, and Child Behavior Checklist (CBCL)

	Gang Involvement	Delinquency	Drug Use	CBCL	Academic Performance	Self-Esteem	Delinquency (log)	Drug Use (log)
Delinquency	.361**	1.00						
Drug use	.261**	.316**	1.00					
CBCL	.169**	.121**	.227**	1.00				
Academic performance	-.071*	-.090*	-.114**	-.238**	1.00			
Self-esteem	-.027	-.019	.015	-.175**	.234**	1.00		
Delinquency (log)	.300**	—	—	—	-.220**	-.002	1.00	
Drug use (log)	.290**	—	—	—	-.148**	.017	.551**	1.00
CBCL (log)	.152**	—	—	—	-.212**	-.177**	.174**	.207**

*significant at .05 level. **significant at .01 level.

Muthén & Kaplan, 1985; Tanaka & Bentler, 1985), as in this study. LISREL analyses were calculated again using earlier waves of data from the same participants to confirm the dimensionality of resilience and adaptation.

RESULTS

To test how well the six outcome measures fit a single dimension of resilience and adaptation, a structural equation modeling analysis using LISREL was conducted. The LISREL program essentially tested how well a hypothesized (specified) model fit the data. In this analysis, the model was specified as a single construct with six indicators, with the coefficient (lambda X) on the variable of gang involvement fixed to -1 (a standard procedure in which one of the coefficients is set to 1 or -1 to scale the rest of the indicators; Hayduk, 1987). In addition, all measurement errors and the variance of the latent construct were set free so they were estimated (see Figure 2). All covariances of the indicators were fixed at 0. The analysis yielded a goodness of fit of .957 and an adjusted goodness of fit of .901, with a chi-square of 94.41 ($df = 9, p < .001, n = 738$). All coefficients were significantly different from 0 except Self-Esteem.

A structural equation modeling using LISREL was calculated on a two-factor model (see Figure 3). This model specified two underlying constructs with three indicators each, with coefficient (lambda) of gang involvement on Factor 1 fixed to 1 and coefficient of the CBCL on Factor 2 fixed to -1 . All variances of measurement errors and the covariance and all variances of the latent constructs were set as free parameters and thus estimated by LISREL. Covariances of indicators were fixed at 0. The analysis yielded a goodness of fit of .979 and an adjusted goodness of fit of .946, with a chi-square of 47.05 ($df = 8, p < .001, n = 738$). All coefficients were significantly different from 0. This model fitted the data substantially better than the one-factor model with a chi-square for the difference of 47.36 ($df = 1, p < .001$).

However, a modification index provided by the LISREL program strongly suggested that in addition to being an indicator of Factor 2, self-esteem was also an indicator of Factor 1 (modification index for lambda = 25.99). Thus, an additional LISREL model was calculated (see Figure 4) with the modification as suggested by the data (coefficient of self-esteem on Factor 1 was allowed to vary). This model yielded a goodness of fit of .992 and an adjusted goodness of fit of .975, with a chi-square of 18.99 ($df = 7, p = .008, n = 738$). The covariance between Factor 1 and Factor 2 ($\phi_{1, 2}$) equals $-.113$ with a t value of -5.332 (see Figure 4). The phi covariance parallels the correlation among the predictors in multiple regression (Hayduk, 1987).

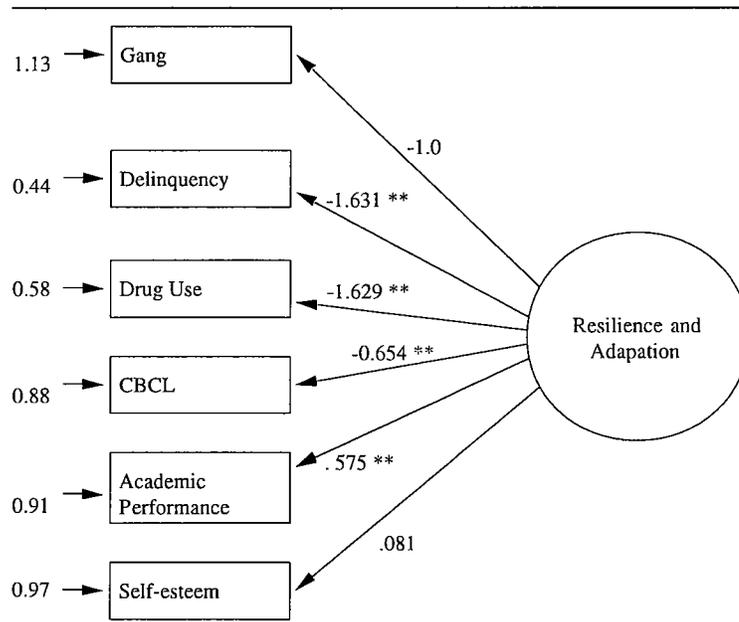


Figure 2. Model 1. LISREL model testing one latent construct of resilience and adaptation.

NOTE: CBCL = Child Behavior Checklist, $\chi^2 = 94.41$; $df = 9$; $p < .001$; $n = 738$; goodness of fit = .957; adjusted goodness of fit = .901.

* $p < .005$. ** $p < .001$.

The final model (see Figure 4) fitted the data substantially better than the previous two models (in Figures 2 and 3). Comparing Model 3 (see Figure 4) with Model 1 (see Figure 2), there is a change in the chi-square of 75.42 ($p < .001$, $df = 2$). Model 3 (see Figure 4) also fitted the data better than Model 2 (see Figure 3). The difference in chi-square between these two models equaled 28.06 ($p < .001$, $df = 1$).

To confirm the dimensionality of resilience and adaptation, an identical confirmatory analysis was calculated using earlier waves of data from these youth. All model specifications were identical with the best fitting model above (see Figure 4). This replication analysis showed an extremely good fit between the model and the data (figure not shown). The model yielded a chi-square of 6.69 ($df = 7$, $p = .462$, $n = 778$), with a goodness of fit of .997 and an adjusted goodness of fit of .992. All coefficients were significantly different from 0, and the phi correlation between the two latent constructs showed that

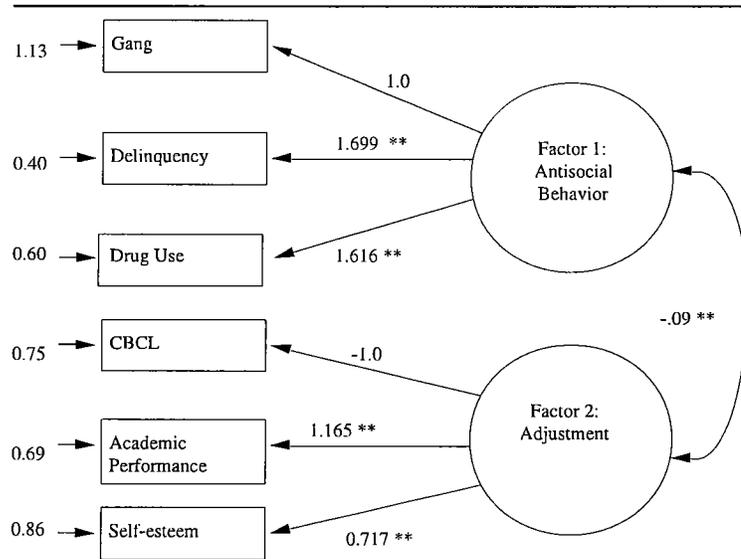


Figure 3. Model 2. LISREL model testing two latent constructs of resilience.
 NOTE: CBCL = Child Behavior Checklist. $\chi^2 = 47.05$; $df = 8$; $p < .001$; $n = 738$; goodness of fit = .979; adjusted goodness of fit = .946.
 $*p < .005$. $**p < .001$.

these constructs were significantly and negatively related ($\phi = -.077$, $t = -5.081$, $p < .001$).

DISCUSSION

When psychosocial functioning, self-esteem, academic performance, gang involvement, delinquent activities, and drug use are used as the indicators of resilience and adaptation, there are at least two latent constructs appropriate for resilience and adaptation among the inner-city youth studied—Adjustment and low level of Antisocial Behavior. The current study also shows that creating composite scales for these latent constructs is not recommended because of the heterogeneity of the attributes that are measured. The latent construct of Antisocial Behavior is indicated by gang involvement, delinquent behavior, drug use, and self-esteem; the latent construct of Adjustment is indicated by academic performance, self-esteem, and parental ratings

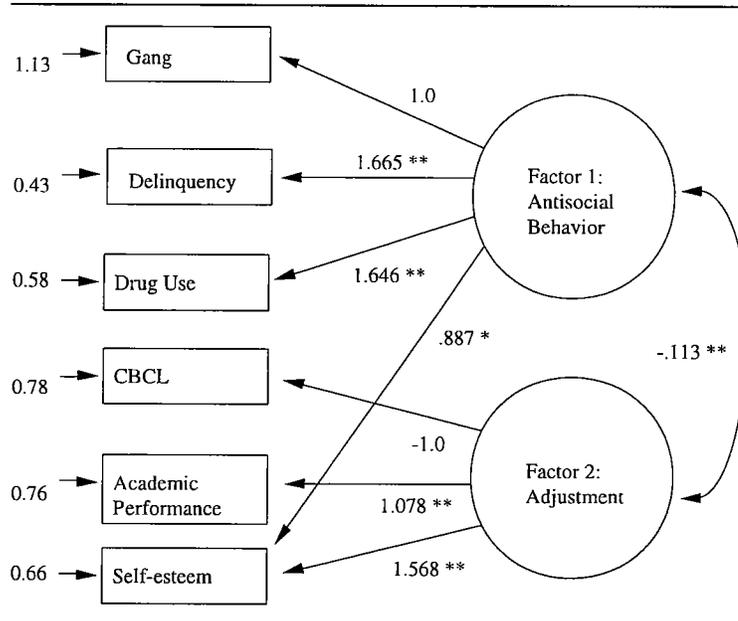


Figure 4. Model 3. Best LISREL model for the construct of resilience.
 NOTE: CBCL = Child Behavior Checklist. $\chi^2 = 18.99$; $df = 7$; $p < .008$; $n = 738$; goodness of fit = .992; adjusted goodness of fit = .975.
 * $p < .005$. ** $p < .001$.

on the CBCL. Furthermore, these two latent constructs are negatively associated.

All of the indicators of Antisocial Behavior (Factor 1) are positively related to each other. The positive relations among delinquent behavior, drug use, and gang involvement are expected. However, the positive relations between self-esteem and these three indicators raise a controversial issue. On one hand, some studies have shown that youth who are involved in delinquent activities have lower self-esteem (Kaplan, 1975; Wells & Rankin, 1983). On the other hand, other studies have indicated that lower self-esteem is a risk factor for involvement in delinquent activities (e.g., Kaplan, 1980; Rosenberg, Schooler, & Schoenbach, 1989), and that delinquent activities are found to enhance self-esteem (Bynner, O'Malley, & Bachman, 1981; Kaplan, 1980; Rosenberg et al., 1989). The findings reported here seem to support the latter view. Youth who are involved in drugs, gangs, and delinquent behaviors, on the average, have a significantly higher self-esteem than the youth who have

similar academic performance and CBCL scores but do not use drugs and are not involved in gangs or in delinquent activities.

The second component of resilience is indicative of adjustment, which includes prosocial behavior and the absence or low levels of psychological symptoms. Self-esteem and academic performance are positively related and are both negatively related to the parent ratings of the CBCL. In other words, this latent construct indicates that youth who have lower scores on the subscales of the CBCL (showing the absence of psychosocial problems) tend to have higher self-esteem and better academic performance than youth who have higher scores on the CBCL measure.

According to this structure of the construct of resilience and adaptation, self-esteem by itself does not seem to be an adequate outcome measure of resilience and adaptation. Because self-esteem is driven positively by both antisocial behavior and adjustment, an increase in self-esteem for these high-risk youth can either be associated with better adjustment or an increase in antisocial behavior.

Although youth in this study were sampled from high-crime and socially disorganized neighborhoods, many of them are resilient despite the adverse environment. Youth at the resilient end of the continuum have a favorable outcome not only relative to their peers but also in an absolute sense, as evidenced in the outcome measures. As mentioned above, the measurements of gang involvement, delinquent activity, and drug use have modes of 0 and are positively skewed, showing that the majority of the youth were not involved in these activities. They also performed well in school, with 18.5% ($n = 162$) as A students and 43.3% ($n = 380$) as B students.

In summary, this study shows that it is necessary to consider adjustment and antisocial behavior independently in a multivariate framework when both factors are considered. This study also suggests the importance of examining multiple outcome constructs in the study of resilience separately and simultaneously. Moreover, future studies of resilience among inner-city youth need to examine predictors of Adjustment and Antisocial Behavior separately because, as illustrated here, they are different outcome constructs, and therefore they may have different predictors and mediating factors.

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