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## Reciprocal Influences Between Stressful Life Events and Adolescent Internalizing and Externalizing Problems

Kee Jeong Kim, Rand D. Conger, Glen H. Elder Jr., and Frederick O. Lorenz

Investigated in this study were hypothesized reciprocal influences between stressful life events and adolescent maladjustment using data from a 6-year, prospective longitudinal study. Stressful life experiences, internalizing symptoms, and externalizing behaviors were assessed for a sample of adolescents (215 males, 236 females) living in the rural Midwest. From 7th to 12th grades, autoregressive analyses showed that stressful life events and these two forms of maladjustment were reciprocally interrelated over time. For example, stressful life events at one point significantly predicted delinquent behaviors 1 year later, which, in turn, significantly predicted stressful life events 1 year later, and vice versa. The findings provide evidence for the accumulating disadvantage for adolescents that results from the mutual reinforcement of problematic situations and adjustment problems over time.

Research evidence suggests that cumulative life stresses increase risk for emotional and behavioral problems (Aneshensel, 1992; Cohen, Kessler, & Gordon, 1995; Compas & Phares, 1991; Jackson & Warren, 2000; Kessler, Gillis-Light, Magee, Kendler, & Eaves, 1997). Consistent with the social-causation hypothesis, these studies suggest that social conditions (i.e., stressful life events) influence variability in subsequent developmental problems (Caspi, 1998; Conger, 1995, 1997; Dohrenwend & Dohrenwend, 1969). With regard to conduct problems or antisocial behavior, some studies have demonstrated a link between specific, serious traumatic events such as child abuse or environmental catastrophes and subsequent behavioral problems (e.g., Stouthamer-Loeber, Loeber, Homish, & Wei, 2001; Thornberry, Ireland, & Smith, 2001); however, research using general additive indices of social stress to predict externalizing problems over time has been rare (e.g.,

Aseltine, Gore, & Gordon, 2000). And although the association between life stress and adolescent depressed and anxious mood is fairly well established (e.g., Compas & Phares, 1991; Menaghan, 1999), there is less evidence that stressful life events actually predict change in internalizing problems over time. To further understanding of the link between life stress and adolescent maladjustment, a first goal of the present study was to examine the degree to which stressful life events predict change in both externalizing and internalizing problems during early, middle, and late adolescence.

A singular focus on social causation, however, ignores the important competing hypothesis that emotional or behavioral problems lead to increasing life stress (Caspi, Elder, & Bem, 1987; Compas & Phares, 1991; Ensley & Lin, 1991). That is, contemporary theory suggests that emotional and behavioral problems may reduce social and instrumental competencies and thus increase risk for crises in social relationships and instrumental activities. This proposed direction of effects has been called the *social-selection hypothesis* (Caspi, 1998; Conger, 1995, 1997; Ensley & Lin, 1991). For example, adolescents who are extremely sad and withdrawn (internalizing symptoms) may be unsuccessful in social relations because they are unrewarding companions. Moreover, aggressive adolescents (externalizing problems) may be too mercurial to be reliable friends. These types of symptoms would also jeopardize school achievement, which requires focus, energy, and the regulation of competing emotions. When evidence for both social causation and social

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During the past several years, support for this research has come from multiple sources, including the National Institute of Mental Health (MH00567, MH19734, MH43270, MH48165, and MH51361), the National Institute on Drug Abuse (DA05347), the Bureau of Maternal and Child Health (MCJ-109572), the MacArthur Foundation Research Network on Successful Adolescent Development Among Youth in High-Risk Settings, and the Iowa Agriculture and Home Economics Experiment Station (Project No. 3320).

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selection is evaluated in a single study, as in the present report, one can determine whether none, one, or both of these hypotheses are consistent with the data.

Unfortunately, very few studies provide empirical evidence that can evaluate the possible mutual influence between stressful life events and either internalizing or externalizing problems, a process we predict would increase risk for both stressful experiences and maladjustment across the years of adolescence. The importance of this issue is underscored by Caspi's (1998) suggestion that clarifying the direction of influence between social conditions and individual characteristics is a central concern for research on life-course development. As a second goal, then, this study examined possible reciprocal influences between stressful life events and adolescent internalizing and externalizing problems (the reciprocity or mutual influence hypothesis).

Another concern in the present study involves the methodological limitations of previous research. Earlier research related to these phenomena has either been cross-sectional or has involved only two waves of data that include measures of both stress and adolescent adjustment problems (e.g., Hoffmann & Su, 1997; Jackson & Warren, 2000; Paternoster & Mazerolle, 1994; Vaux & Ruggiero, 1983). As Kessler and Greenberg (1981) have demonstrated, two waves of data may provide misleading information about how two variables interrelate with one another over time. The third goal of this study was to overcome this limitation in previous research by prospectively investigating the hypothesized reciprocal influence process across the years of adolescence. In the following sections, we review the evidence for an association between stressful life events and adolescent adjustment problems. This review also considers methodological limitations in this earlier research. We then consider the theoretical underpinnings for the present study and provide our analytical model for the investigation.

### **Stressful Life Events and Adolescent Internalizing and Externalizing Problems**

#### *From Life Stress to Adolescent Emotional and Behavioral Maladjustment*

*Internalizing problems.* Earlier research indicates that adolescent risk for emotional problems increases in response to the experience of stressful life events (Aseltine, Gore, & Colten, 1994; Compas & Phares, 1991; Leadbeater, Blatt, & Quinlan, 1995;

Leadbeater, Kuperminc, Blatt, & Hertzog, 1999; Swearingen & Cohen, 1985a). These findings are consistent with the fact that adolescence is a very challenging developmental stage involving significant biological, psychological, and social changes (Compas & Wagner, 1991; Hauser & Bowlds, 1990). The evidence suggests that both nonnormative stressors (e.g., parents' divorce) and normative stresses (e.g., the transition from middle school to high school) increase risk for internalizing symptoms (Hauser & Bowlds, 1990; Swearingen & Cohen, 1985a). Most earlier research has shown that a high number of uncontrollable, negative life events predicts depression and anxiety, especially among adolescent girls (Dornbusch, Mont-Reynaud, Ritter, Chen, & Steinberg, 1991; Gore, Aseltine, & Colten, 1992; Leadbeater et al., 1995, 1999; Swearingen & Cohen, 1985a). For example, a cross-sectional study by Swearingen and Cohen (1985a) showed that seventh graders who reported a higher number of negative life events displayed a higher level of depressed and anxious mood.

Although some researchers, especially those working with clinical samples, have argued that parental psychopathology primarily accounts for child and adolescent emotional problems (e.g., Strober & Carlson, 1982), the research evidence suggests that other life stresses in the lives of young people also play an important role in the development of psychopathology. For instance, Gore et al. (1992) found that parental mental illness did not relate to adolescents' depressed mood when undesirable life events, which were significantly associated with distress, were taken into account. The study by Gore et al. also extended previous research findings on gender differences in depressive symptoms. Although the girls in their study reported a higher number of negative events than did boys, there was no difference in the emotional impact of stressful life events by adolescent gender (Gore et al., 1992). Leadbeater et al. (1995) also reported that boys were as vulnerable as girls in response to negative life events.

*Externalizing behaviors.* Although life stress may reasonably lead to an angry, acting-out response as well as to an introspective and internalized response, empirical examination of the possible linkage between adversity in life circumstances, as measured by additive scales of negative life events, and conduct problems or delinquent acts is limited. Rather, several studies have shown a connection between single significant traumas (e.g., child abuse) and conduct problems (e.g., Stouthamer-Loeber et al., 2001; Thornberry et al., 2001). Because our

interest focused on the examination of indices of multiple life stressors, such as those typically used in studies of emotional distress, the following literature review is limited to studies that have examined externalizing problems in relation to additive indices of negative life events.

Two cross-sectional studies have provided preliminary evidence for the relationship between stressful life events and externalizing behaviors. In a study of preadolescents from 7 to 13 years old, Jackson and Warren (2000) found a positive relationship between life stresses and externalizing behaviors measured by aggression, hyperactivity, and conduct problems. A study by Vaux and Ruggiero (1983) also demonstrated a link between stressful life events and delinquency. One of the strengths of their study was explicitly defining delinquency by breaking it down into five dimensions: violence, property damage, drug use, theft, and nonserious delinquency. Their regression analyses showed that stressful life events significantly predicted delinquent behaviors regardless of the type of delinquent act. They did not find any significant gender differences except for violent behaviors. Only boys' violence was positively related to stressful life events. Except for violence, however, the relationship between stressful life events and delinquency was stronger for girls than boys (Vaux & Ruggiero, 1983). Although these are promising findings, the cross-sectional research design of these two studies seriously limits inferences about the possible causal relationship between delinquency and stressful life events.

A two-wave longitudinal study conducted by Hoffmann and Su (1997) also investigated stressful life events as a risk factor for delinquency. They demonstrated that stressful life events significantly and positively predicted delinquent acts 1 year later for both males and females after controlling for the previous level of delinquency. These results are consistent with other evidence of a positive association between stressful life events and delinquency over time (Leadbeater et al., 1999; Paternoster & Mazerolle, 1994). These longitudinal studies suggest that stressful life events influence the delinquent behaviors of adolescents after controlling for the initial level of delinquent behavior. That is, stressful events appear to predict change or increasing risk for conduct problems.

#### *From Problem Behaviors to Stressful Life Events*

As noted earlier, most previous research on the link between stressful life events and both inter-

nalizing and externalizing problems has reflected a unidirectional viewpoint, the social-causation hypothesis. Despite the potential importance of the social-selection perspective, there exists almost no empirical evidence regarding the theoretically interesting possibility that antisocial or depressed youth may generate above average levels of stressful life experiences. We could locate only three studies providing preliminary evidence for the social-selection hypothesis. In terms of internalizing problems, findings from a study by Swearingen and Cohen (1985a) support the notion that emotional problems exacerbate stressful life conditions. Based on data collected at two points in time, adolescent depressive symptoms and anxiety at Time 1 predicted stressful life events 4 months later, after controlling for the initial level of life events. Stressful life events at Time 1 did not predict emotional distress at Time 2. These findings support the social-selection hypothesis and are in need of replication.

With respect to externalizing behaviors, Leadbeater et al. (1999) found that only girls' delinquent behaviors were significantly associated with their level of stressful life events 1 year later. Additionally, Aseltine and colleagues (2000) found that delinquent behaviors among 9th, 10th, and 11th graders predicted higher levels of life stress and conflict with family members 1 year later. A significant limitation in both of these studies, however, was that they did not control for earlier levels of stress in the equations predicting later stress from earlier delinquency. That is, from their findings we cannot infer that delinquency is associated with change or increased risk for stressful events over time. Nevertheless, these studies provide preliminary evidence for the social-selection hypothesis.

#### **The Present Investigation**

The present study derived from contemporary theory that suggests that developmental trajectories involve an interconnected accumulation of individual actions and social reactions in which an exogenous variable at one time becomes an endogenous variable at another time and vice versa (Conger, 1997; Conger & Simons, 1997; Elder, 1998; Simons, Johnson, Conger, & Elder, 1998). That is, social stress at one point in time is predicted to increase later maladjustment and maladjustment is expected to increase stress in a reciprocal process. Thus, controlling for earlier levels of these variables, they each should explain significant variance in later levels. What remains to be established, however, is whether this proposed process of increasing

personal and social disadvantage through the mutual reinforcement of emotional or behavioral problems and adversity can actually be observed in the lives of adolescents. For example, research evidence shows that engaging in various delinquent acts may increase several domains of life stress for adolescents, such as conflicts with parents and disrupted academic performance (Elliott, Huizinga, & Ageton, 1985; Herrenkohl et al., 2000; Sampson & Laub, 1993). However, previous research has not clearly shown either that problematic behavior increases life stress in general or that these adversities generate additional risk for behavioral and emotional problems. We evaluated this hypothesized reciprocal process in this study and determined whether it operates in a similar fashion during early, middle, and late adolescence.

By using a five-wave autoregressive model covering the full span of adolescence, the current prospective longitudinal study sought both to establish whether the proposed reciprocal relationship between stressful life events and adolescent maladjustment operates for this sample and to determine whether it exists during each of the three stages of adolescence (early, middle, and late). If the latter finding is obtained, subsequent evidence of mutual influence during middle and late adolescence can be thought of as replications of positive results during early adolescence. In this situation, the resulting path coefficients between stress and adolescent maladjustment can be interpreted as reflecting the degree of change in the dependent measure resulting from its association with the predictor variable (Kessler & Greenberg, 1981). Consistent with findings discussed earlier, we also hypothesized that there would be no gender differences in the association between stressful life events and either delinquency or emotional distress. Finally, this repeated measure research design also overcame the methodological limitations noted earlier for the cross-sectional and two-wave studies typically found in investigations of adolescent maladjustment and negative life events.

## Method

### *Participants*

Data for the present study came from the Iowa Youth and Families Project (IYFP), which was launched in 1989 to investigate family economic hardship and life-course development (Conger & Elder, 1994). In the first year of data collection, 451 intact Caucasian families including a father, a

mother, a target adolescent in the seventh grade (215 boys and 236 girls, *M age* = 12.7 years), and a sibling within 4 years of the target adolescent's age participated in the project. The IYFP continued for 5 years and was renamed the Family Transitions Project in 1994. The Family Transitions Project is an ongoing longitudinal study focusing on the original target adolescent's transition from adolescence to adulthood. Because the original project focused on family financial hardship and family processes among families living in rural Iowa where almost no minority families live, the study sample included only White families. For the purposes of the present study, we used data from the target adolescent's self-report of delinquency (externalizing problems), symptoms of depression and anxiety (internalizing problems), and stressful life events at five points in time (i.e., 1989, 1990, 1991, 1992, and 1994), the period from early (7th grade) to late (12th grade) adolescence.

A common difficulty with multiyear studies, however, involves cases with missing data. Incomplete information from a participant may occur if the subject leaves the study, is unavailable for one or more waves of data collection, or fails to answer some questions during a specific interview. In the present study we used recently developed strategies for handling this difficult problem.

Two common methods for dealing with missing cases involve either deleting the incomplete cases from the entire data set (i.e., listwise deletion) or imputing values based on average scores for missing variables. Both of these procedures have serious limitations. First, deleting incomplete cases forces the researcher to discard a large amount of already observed information (Schafer, 1997). Second, using only completely observed cases tends to introduce a bias in the estimation of statistical parameters if missing cases do not occur at random (Schafer, 1997). If there is a systematic pattern of missing cases, it indicates that the incompletely observed cases behave differently from the completely observed ones. Third, imputing scores from variable means may preserve the overall sample means but it does not consider covariance structures with other variables in the data (Schafer, 1997). That is, mean imputation homogenizes the distribution of scores for a specific variable and ignores the fact that these scores may vary systematically in relation to other characteristics of the respondents.

To deal with the problem of missing data and to avoid the limitations of these earlier approaches, we imputed missing data in this research using the expectation maximization (EM) algorithm, which

generates maximum likelihood estimates for parametric models when data are missing (for a complete review, see Schafer, 1997). Earlier research has shown that the EM procedure produces more accurate and less biased estimates of statistical coefficients than either listwise deletion or mean imputation even when cases are not missing completely at random and even when a large portion of study participants have some missing data (Schafer, 1997).

Complete data by listwise deletion were available for up to 348 adolescents (77% of the original sample) over the 6-year period. Using the SPSS 10.0 (2000) missing value analysis, we imputed data for missing cases by using the EM algorithm (Dempster, Laird, & Rubin, 1977; Schafer, 1997), which recovered all the missing cases ( $N = 451$ ). Schafer (1997) has demonstrated that EM generates less biased statistical findings than listwise deletion, even when a large proportion of cases has missing data. In the results section, we compare the findings using either the EM or listwise deletion procedure.

In terms of sociodemographic information on participating families, at study initiation 34% of the families lived on farms, 12% lived in a rural area but not on farms, and 54% lived in a town with a population no greater than 6,500. The average ages of fathers and mothers at the first year of contact were 40 and 38 years, respectively. In 1989, the parents had been married for an average of 18 years. Fathers averaged 13.4 years of education and mothers averaged 13.2 years of education. Occupations for fathers were distributed as follows: 20% farmers, 30% professionals or managers, 40% skilled workers such as technicians, and the rest were either office workers or unskilled workers. Mothers' occupations were distributed as follows: 30% clerks and secretaries; 27% service and household workers; 26% professionals, including teachers; 10% full-time homemakers; and the rest were technicians or skilled workers. Family median income in 1988 was \$33,399, and the average family size was 4.95 in 1989.

We examined mean differences in several sociodemographic factors and the study variables for the adolescents who remained in the study and for those who dropped out by 1994. First, among a set of group comparison analyses on family background variables background variables (i.e., parents' age, education, and family income at the initiation of the study), differences arose only in parents' education levels. Both fathers' and mothers' education levels were higher for the target adolescents who remained in the study. Second, the study variables were compared and one other statistical difference was

found. The rates of stressful life events measured in 1989 were higher for the missing or excluded adolescents. No statistically significant differences were found between the two groups in terms of depression, anxiety, and delinquency. These results indicate that the final sample was slightly truncated in terms of the highest levels of negative life events. This truncation should produce a conservative bias in the analyses in the sense that limited variation in life stress will decrease the probability that it will predict or be predicted by adolescent maladjustment.

### *Procedures*

In the first year of the project, 34 public and private school districts in eight counties in rural Iowa agreed to identify potential participants. In the eight counties, names and addresses of families with 7th graders were obtained from all schools in communities with populations of 6,500 or less. Families received a letter including an introductory summary of the project and then were recruited by telephone or in person if they had no phone. Approximately 78% of the eligible families agreed to participate in the project. Each participating family member received about \$10 per hour for his or her time in the study.

For each year's data collection, each family was visited twice in their own home by a trained interviewer. Each visit lasted approximately 2 hr on average. During the first home visit, the four family members separately completed a set of questionnaires, some of which addressed stressful life events and internalizing as well as externalizing problems. Within 2 weeks of the first visit, the second visit was made to videotape structured discussions among the four family members. Because data from the second visit were not used in the present report, we do not discuss the procedures related to that visit.

### *Measures*

*Stressful life events.* During each year of data collection, adolescents completed a stressful life events measure. The index was adapted from the Junior High Life Experiences Survey developed by Swearingen and Cohen (1985b). The original survey included items regarding deviant behaviors (e.g., running away from home) and positive life events (e.g., outstanding academic achievement). Items in these two domains were excluded because the present investigation focused on negative rather than positive life events and because the deviant

behaviors in the original stress scale overlap with the externalizing problems expected to predict and be predicted by negative life events.

Each item in the index was scored 1 if the target adolescent indicated a specific event had occurred during the past year and 0 if the event had not occurred. Examples of items appearing in the index were financial crises, death of a parent, parents' divorce, physical illness, breaking up with a boyfriend or girlfriend, changing schools, and getting into trouble with classmates at school. Because adolescent maladjustment was predicted to affect crises in social relations and social events, we did not attempt to delete potentially controllable events from the checklist. That is, we were interested both in potentially uncontrollable traumas as well as crises that may be exacerbated by the adolescent's own behaviors. Indeed, the distinction between controllable and uncontrollable life events is difficult to make. For example, parents may divorce, in part, because of family difficulties influenced by an adolescent with emotional or behavioral problems.

A total of 25 items was used each year to measure stressful life events. The exact same stressful events were used in the index each year. Again, any items from the original index primarily addressing delinquent behaviors were removed. Based on the final 25-item measure, each adolescent had a possible score of from 0 to 25 negative events for each year of the study. Because each event may occur independently from other events, a traditional estimate of internal consistency is not appropriate for this measure (Hoffmann & Su, 1997; Newcomb & Harlow, 1986). The index has demonstrated concurrent and predictive validity in earlier research (e.g., Ge, Lorenz, Conger, Elder, & Simons, 1994; Swearingen & Cohen, 1985a).

*Externalizing behaviors.* Adolescents reported their externalizing problems in the form of delinquent behaviors using a measure adapted from the National Youth Survey (Elliott et al., 1985; Elliott, Huizinga, & Menard, 1989). Each year the target adolescents indicated how often they engaged in any of 20 different delinquent activities during the past 12 months. Items were rated on a 5-point Likert-type scale (0 = *never*, 4 = *six or more times*). The delinquency scale demonstrated good internal consistency; alpha coefficients ranged from .69 (Year 1, 1989) to .77 (Year 5, 1994).

To form indicators of a latent construct for externalizing behaviors, we divided the 20 items into two dimensions: major and minor delinquent activities. Examples of major activities (10 items in total) included stealing something worth more than

\$25, attacking someone with a weapon, and purposely damaging or destroying property. Minor activities included items such as stealing something worth less than \$25, throwing objects such as rocks to scare someone, and trying to break into a building just for fun or to look around. The major and minor dimensions of delinquency were used as two separate indicators for the construct.

*Internalizing problems.* Adolescent emotional distress was measured in 1989, 1990, 1991, 1992, and 1994 using the depression and anxiety subscales from the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1983). These scales have been validated with samples of adolescents and adults (Derogatis, 1983). Using a 5-point scale (1 = *not distressed*, 5 = *extremely distressed*), we asked adolescents to report how much they had been distressed by each symptom during the past week. The depression subscale (12 items) demonstrated adequate reliability in the present study, providing alpha coefficients of .88, .91, .92, .93, and .90, in 1989, 1990, 1991, 1992, and 1994, respectively. The reliability of the anxiety subscale (10 items) also was satisfactory ( $\alpha = .83, .83, .86, .90$ , and  $.89$ ). Examples of the 12 items for depression included crying easily, feeling blue, feeling everything is an effort, feeling hopeless about the future, and thoughts of ending his or her life. Examples of the 10 items constituting the anxiety subscale included symptoms of nervousness, trembling, feeling fearful, and feeling restless. Two indicators for a latent construct of internalizing problems were generated by summing the 12 items for depression and 10 items for anxiety.

## Results

Preliminary data analyses did not show any statistically significant differences in the results due to the gender of target adolescents. Two different analyses were used to test for gender differences. First, we estimated the proposed autoregressive model of reciprocity separately for boys and girls. The results were almost identical regardless of the type of maladjustment (i.e., internalizing or externalizing problems). Second, a group comparison was performed (Bollen, 1989). The test involved the comparison of a null model, which held constant the values of the path coefficients for boys and girls, with a model that allowed these coefficients to vary by gender of adolescent. If there were substantial gender differences in the hypothesized model, the chi-square value should improve when the paths are allowed to vary.

With regard to the relationship between stressful life events and externalizing problems, the null



model yielded a chi-square of 779.69 with 166 degrees of freedom. The chi-square statistic of the comparison model that allowed the structural paths in the model to vary by gender was 754.75 ( $df = 150$ ). The change in chi-square was not statistically significant. Similarly, a difference in chi-square between the null model and the gender comparison model for internalizing problems was not large enough to conclude that the model behaved differently by adolescent gender ( $\Delta\chi^2$  with 16  $df = 25.24$ ). Given the absence of gender differences in relationships among stressful events and maladjustment, the following results are based on the combined sample of boys and girls.

Additionally, preliminary analyses demonstrated almost exactly the same results using either listwise deletion or EM imputation. Because earlier simulation studies demonstrated less bias with EM than with listwise deletion (Schafer, 1997), the results from the imputed data are presented in this article. Means, standard deviations, and intercorrelations among all variables used in this investigation are presented in Table 1. There were significant correlational relationships between stressful life events and internalizing problems with  $r$ s ranging from .11,  $p < .05$  (stressful life events at Time 1 and depression at Time 5, and events at Time 1 and anxiety at Time 4), to .43,  $p < .01$  (events and anxiety at Time 2). Similar findings occurred for stressful life events and externalizing problems. Furthermore, correlations between the variables were significant not only within the same measurement period but also across several points in time. Moreover, earlier stressful events were significantly correlated with later maladjustment and vice versa, consistent with the reciprocal influence hypothesis. And, as is usually observed, internalizing and externalizing problems also were intercorrelated (e.g., Aseltine, Gore, & Colten, 1998). These correlational findings suggested that more formal tests of the mutual influence hypothesis would be appropriate.

Because including both forms of maladjustment in a single model would produce too many parameter estimates per available cases (1.5), we estimated the models separately for externalizing and internalizing problems. It also should be noted that descriptive statistics showed that some of the measures were skewed. Stressful life events, minor delinquency, and depression scores were not highly skewed (average kurtosis value = 3.06). Anxiety scores appeared to be more seriously skewed than depression scores (average kurtosis value = 7.01). Considering the nature of the measure, it was not surprising to detect severe skewness in the measure

of major delinquency (kurtosis values ranged from 9.41 to 18.47). However, simulation studies indicate that parameter estimates and statistical inferences in structural equation models using maximum likelihood estimation, as used in the present analyses, are robust even when the assumption of multivariate normality is violated (Bollen, 1989). Therefore, we did not transform the data to reduce skewness for any measures in the study.

#### *Reciprocal Influences Between Life Stress and Externalizing Problems*

Figure 1 shows the results of the cross-lagged estimation of the relationship between stressful life events and adolescent externalizing behaviors using LISREL 8.30 and maximum likelihood estimation (Jöreskog & Sörbom, 1999). A covariance matrix was used to estimate the cross-lagged autoregressive model. All factor loadings for externalizing problems, ranging between .64 and .92, indicate a good correspondence between our measures of problem behaviors and the latent construct. Both stressful life events and externalizing problems demonstrated reasonably high stability from one measurement point to the next. The lowest stability path coefficient for stressful life events was found between 10th and 12th grades ( $\beta = .48$ ,  $p < .01$ ). Stability coefficients for externalizing problems ranged from .43 (7th–8th grade) to .61 (9th–10th grade).

Most important, the findings supported the hypothesis that stressful life events and delinquent behaviors would be reciprocally interrelated over time. For example, delinquent behaviors occurring during the 7th grade predicted an increase in stressful life events from 7th to 8th grade ( $\beta = .07$ ,  $p < .01$ ), and stressful life events during 7th grade predicted an increase in delinquent behaviors from 7th to 8th grade ( $\beta = .21$ ,  $p < .01$ ). It is worth noting that these reciprocal influences also were found between the last two waves in which there was a 2-year lag instead of the 1-year lag during the earlier years of the study. Except for the period from 10th to 12th grade, the magnitudes of the path coefficients for the paths from stressful life events to externalizing problems appeared larger than those for the paths from externalizing problems to stressful life events.

We performed additional analyses to examine whether systematic increases over time in the path coefficients from externalizing problems to stressful life events and the reversed pattern for the paths from stressful life events to externalizing problems were statistically significant. First, a test for detecting the significance of these patterns was performed by



Table 1  
Means, Standard Deviations, and Intercorrelations Among the Study Variables (N = 451)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<b>Stressful life events</b>																									
1. Time 1 (7th grade)	—																								
2. Time 2 (8th grade)	.52**	—																							
3. Time 3 (9th grade)	.46**	.67**	—																						
4. Time 4 (10th grade)	.39**	.54**	.65**	—																					
5. Time 5 (12th grade)	.31**	.33**	.35**	.42**	—																				
<b>Internalizing problems</b>																									
<b>Depression</b>																									
6. Time 1 (7th grade)	.31**	.28**	.20**	.19**	.18**	—																			
7. Time 2 (8th grade)	.25**	.37**	.24**	.33**	.20**	.49**	—																		
8. Time 3 (9th grade)	.22**	.24**	.31**	.34**	.24**	.41**	.54**	—																	
9. Time 4 (10th grade)	.13**	.18**	.18**	.39**	.30**	.38**	.53**	.61**	—																
10. Time 5 (12th grade)	.11*	.17**	.15**	.20**	.24**	.31**	.39**	.53**	.51**	—															
<b>Anxiety</b>																									
11. Time 1 (7th grade)	.33**	.31**	.17**	.19**	.15**	.76**	.43**	.34**	.30**	.21**	—														
12. Time 2 (8th grade)	.25**	.43**	.31**	.34**	.20**	.39**	.72**	.51**	.47**	.33**	.42**	—													
13. Time 3 (9th grade)	.22**	.27**	.38**	.33**	.19**	.35**	.45**	.76**	.50**	.44**	.33**	.58**	—												
14. Time 4 (10th grade)	.11*	.18**	.22**	.35**	.23**	.30**	.43**	.51**	.78**	.46**	.27**	.48**	.59**	—											
15. Time 5 (12th grade)	.12**	.22**	.24**	.23**	.30**	.27**	.31**	.49**	.47**	.76**	.23**	.39**	.53**	.57**	—										
<b>Externalizing problem behaviors</b>																									
<b>Major activities</b>																									
16. Time 1 (7th grade)	.29**	.30**	.24**	.16**	.11*	.18**	.10*	.18**	.04	.10*	.24**	.13**	.25**	.08	.14**	—									
17. Time 2 (8th grade)	.25**	.39**	.28**	.14**	.10*	.11*	.18**	.05	.03	-.02	.14**	.20**	.07	.03	.03	.39**	—								
18. Time 3 (9th grade)	.28**	.46**	.49**	.38**	.15**	.16**	.13**	.25**	.11*	.11*	.14**	.29**	.33**	.17**	.19**	.38**	.42**	—							
19. Time 4 (10th grade)	.19**	.43**	.40**	.43**	.18**	-.01	.19**	.12**	.10*	.03	.02	.26**	.19**	.12*	.09	.26**	.40**	.59**	—						
20. Time 5 (12th grade)	.24**	.25**	.26**	.28**	.25**	-.03	.03	.12*	.08	.00	.02	.14**	.15**	.15**	.08	.13**	.31**	.28**	.42**	—					
<b>Minor activities</b>																									
21. Time 1 (7th grade)	.36**	.43**	.35**	.24**	.13**	.25**	.08	.14**	.06	.04	.30**	.19**	.18**	.10*	.09	.50**	.36**	.34**	.20**	.23**	—				
22. Time 2 (8th grade)	.29**	.45**	.36**	.24**	.11*	.07	.17**	.05	.01	-.05	.12*	.25**	.15**	.05	.02	.31**	.62**	.41**	.44**	.33**	.47**	—			
23. Time 3 (9th grade)	.33**	.43**	.52**	.38**	.17**	.11*	.09	.20**	.10*	.05	.14**	.28**	.33**	.18**	.17**	.38**	.40**	.66**	.47**	.38**	.45**	.55**	—		
24. Time 4 (10th grade)	.28**	.38**	.43**	.49**	.24**	.03	.14**	.16**	.16**	.07	.08	.25**	.28**	.21**	.10*	.29**	.30**	.53**	.64**	.42**	.31**	.44**	.63**	—	
25. Time 5 (12th grade)	.21**	.27**	.29**	.33**	.35**	.02	.08	.10*	.11*	.10*	.07	.16**	.14**	.14**	.17**	.15**	.32**	.23**	.35**	.38**	.28**	.41**	.37**	.48**	—
Mean	5.79	4.47	4.81	4.95	3.48	19.43	17.86	18.25	18.68	19.86	15.02	13.89	14.04	13.70	14.12	28	.33	.36	.46	.74	.44	.59	.87	1.08	1.66
Standard deviation	3.51	3.32	3.36	3.22	2.60	7.07	5.66	6.36	7.06	7.62	5.08	4.51	4.55	4.96	5.12	.61	.67	.74	.86	1.14	.84	.98	1.25	1.37	1.59

\* $p < .05$ .\*\* $p < .01$ .

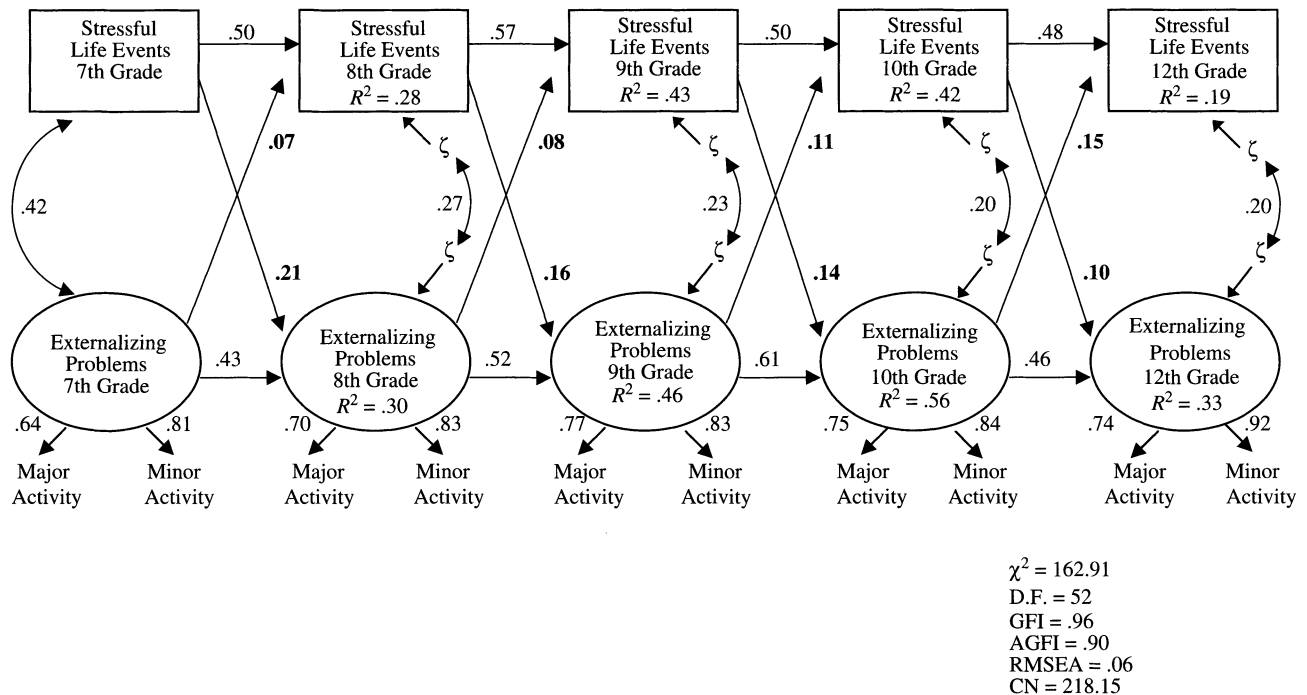


Figure 1. Results of the structural equation analysis evaluating the theoretical model of reciprocity between stressful life events and adolescent externalizing problems. Although not shown, residuals for the same indicators of delinquent behaviors at different points in time were correlated. Maximum likelihood estimation of the theoretical model ( $N = 451$ ) using completely standardized coefficients,  $p < .01$ , for all coefficients. GFI = goodness-of-fit index; AGFI = adjusted goodness-of-fit index; RMSEA = root mean square error of approximation; CN = Hoelter's critical  $N$ .

constraining the corresponding paths to be equal to one another for different periods. For example, the path from externalizing problems at Time 1 to stressful life events at Time 2 was set to be equal to the path from externalizing problems at Time 2 to stressful life events at Time 3, and so on. The constraints did not reduce the model fit. This result indicates that the gradual increments in the path coefficients from externalizing problems to stressful life events over time and decreases in the paths from stressful life events to externalizing problems were not statistically significant. We speculate that the apparent changes in the magnitude of the coefficients might relate to the changing distributions in these variables across time. Table 1 demonstrates that the standard deviations for stressful events decline from early to late adolescence, whereas the reverse pattern occurs for externalizing behaviors. Because a greater distribution in a predictor variable increases its effect as a predictor, these patterns in the variables may account for the nonsignificant changes in path coefficients in Figure 1.

A second test was performed to examine whether differences in the size of path coefficients from stressful life events to externalizing problems and from externalizing problems to stressful life events

at each point in time were statistically significant. We constrained the two paths to be equal to one another for each point in time. During the period from 7th to 8th grade, the test indicated that the magnitudes of the two path coefficients were statistically different ( $\Delta\chi^2$  with 1  $df = 13.09$ ). This result suggests that the path coefficient of .21 ( $p < .01$ ) from stressful life events to externalizing problems indicates a greater effect of life stress on externalizing problems than of externalizing problems on stressful life events ( $\beta = .07$ ,  $p < .01$ ). The same pattern was detected from 8th to 9th grade. The same test did not yield any significant difference in the size of the path coefficients from 10th to 11th grade. However, during the last two waves (10th and 12th grades), the size of the path coefficient from externalizing problems to life stress turned out to be larger than that from life stress to externalizing problems ( $\Delta\chi^2$  with 1  $df = 8.27$ ). These findings indicate that there may be important developmental changes in the relationship between stress and delinquency across the years of adolescence. We return to this issue in the discussion section.

Despite the large number of parameters that were estimated, the proposed autoregressive model showed a reasonably good fit with the data. With

52 degrees of freedom, the chi-square was 162.91 ( $p < .01$ ). If the ratio between the chi-square statistic and the degrees of freedom is less than 3, the tested model is considered a good fit (Cole, 1987). Because the chi-square statistic is extremely sensitive to sample size (e.g., Bentler, 1990; Bentler & Bonett, 1980), however, the large chi-square value is not unusual for a sample of this size. Thus, recommendations on evaluations of structural equation models suggest the use of more than one fit index (e.g., Bentler, 1990; Hu & Bentler, 1999). The other fit indices reported in Figure 1, including goodness-of-fit (GFI; .96), the adjusted goodness-of-fit (AGFI; .90), the root mean square error of approximation (RMSEA; .06), and Hoelter's critical  $N$  (CN; 218.15), indicated that the model fit the data reasonably well. When the GFI and AGFI are .90 or more, the RMSEA is less than .06, and CN exceeds 200, then the hypothesized model fits the observed data well (Bentler, 1990; Bentler & Bonett, 1980; Cole, 1987; Cramer, 1999; Hoelter, 1983; Hu & Bentler, 1999; Jöreskog & Sörbom, 1999).

Although these various fit indices reached the same conclusion that there was a reasonable fit of the proposed model to the observed data, they are considered a point estimate of fit. MacCallum, Browne, and Sugawara (1996) argued that a point estimate of fit might not be a precise test to estimate model fit in the population. They suggested constructing a confidence interval around a specific fit index, the RMSEA, to assure that the true value of the fit index for a proposed model in a given population exists within the confidence interval. If a constructed confidence interval contains .05, the test fails to reject the null hypothesis that a proposed model demonstrates a good fit. MacCallum et al. also argued that a confidence interval including .08 indicates a fair fit of a tested model. Following their suggestion, we formed a 90% confidence interval for the RMSEA; the interval was between .054 and .078. Because the interval did not include either .05 (marker of good fit) or .08 (marker of fair fit), the test result indicate that the fit of our model from the observed sample was reasonable.

Finally, it should be noted that an alternative analytic strategy for addressing a reciprocal link between stressful life events and externalizing problems is a contemporaneous estimation of the relationship (Compas & Phares, 1991). Indeed, Lorenz, Conger, Simons, and Whitbeck (1995) demonstrated that a contemporaneous model and a cross-lagged model are mathematically equivalent to each other, at least for a two-wave, two-variable, two-indicator model. Although not presented in the

current article, we also examined the contemporaneous relationships between stressful events and externalizing problems and found almost identical results to those from the cross-lagged model presented in Figure 1 (results are available from the first author). However, as Lorenz et al. suggested should be the case, the path coefficients between stressful life events and externalizing problems were larger in the contemporaneous analysis ( $\beta$ s ranging from .17 to .38, all  $ps < .01$ ). The contemporaneous model also demonstrated a good fit with the data. The findings from this alternative analytic approach indicate that the cross-lagged results may underestimate the degree of reciprocity between stress and delinquency. Because the cross-lagged findings provide the more conservative estimates, however, we chose to emphasize them in this report.

#### *Reciprocal Influences Between Stressful Life Events and Internalizing Problems*

As described earlier, internalizing problems were measured by a series of items asking how distressed the adolescents were during the past week. However, stressful life events were assessed by the total number of events that occurred to each target adolescent during the past year. This difference in measurement invalidates the use of a standard cross-lagged model (e.g., Figure 1) to investigate reciprocal influences between stressful life events and internalizing problems. Because of the measurement procedures, the time lag between stressful life events at Time 1 and internalizing problems at Time 2 can be as much as 2 years. For example, stressful life events reported by the targets in the 7th grade could actually have occurred during the 6th grade, whereas depressive and anxious moods measured in 8th grade indicated adolescents' emotional distress during the previous week. For that reason, we used negative events reported in 8th grade, which occurred in the past year including during the 7th grade, to predict internalizing symptoms reported in the 8th grade. Moreover, we used internalizing problems from one year to predict negative life events during the next year. For example, depressive symptoms reported in 7th grade were used to predict negative life events during the period from 7th to 8th grade as reported in the 8th grade. Our analytic strategy followed from these methods of measurement. The results are provided in Figure 2.

As shown in Figure 2, all factor loadings for the indicators of internalizing problems were statistically significant ranging from .81 (depression, Time 5) to .95 (anxiety, Time 5). The stability coefficients

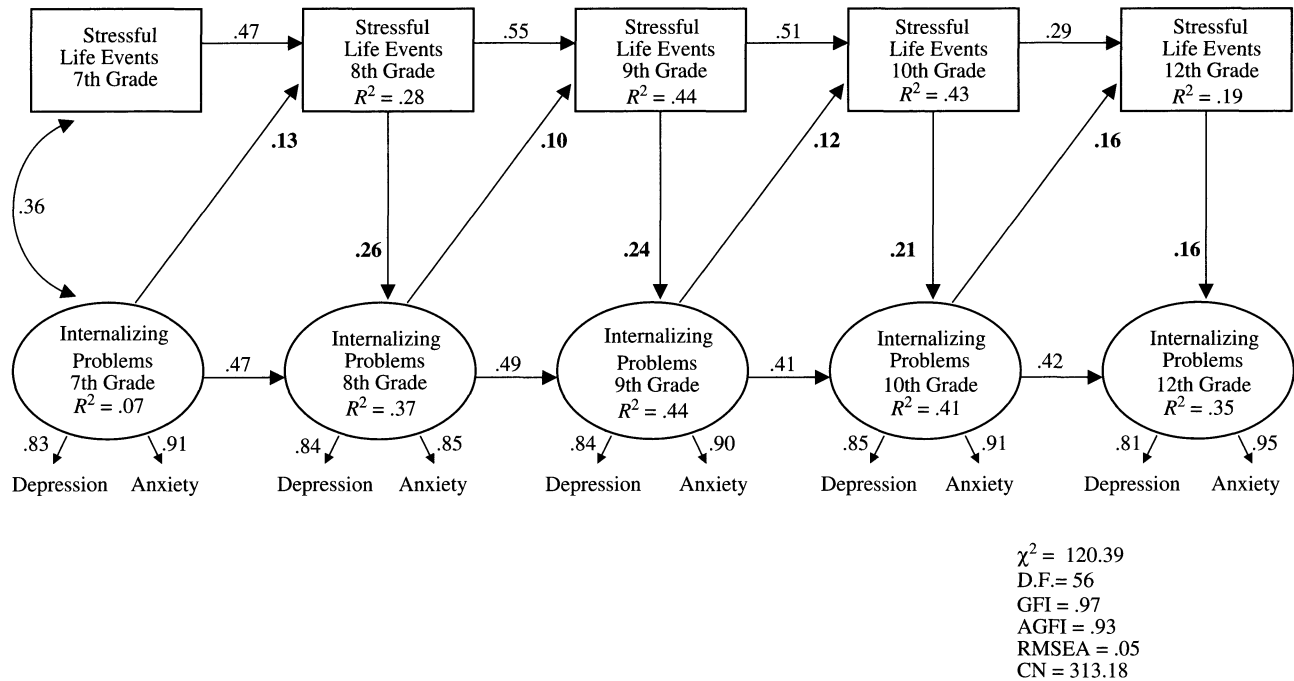


Figure 2. Results of the structural equation analysis evaluating the theoretical model of reciprocity between stressful life events and adolescent internalizing problems. Although not shown, residuals for the same indicators of internalizing problems at different points in time were correlated. Maximum likelihood estimation of the theoretical model ( $N = 451$ ) using completely standardized coefficients,  $p < .01$ , for all coefficients. GFI = goodness-of-fit index; AGFI = adjusted goodness-of-fit index; RMSEA = root mean square error of approximation; CN = Hoelter's critical  $N$ .

for stressful life events were all statistically significant, ranging from .29 (between 10th and 12th grades) to .55 (between 8th and 9th grades). The stability in internalizing problems appeared to be more uniform compared with stressful life events ( $\beta$ s ranging from .41 to .49; all  $ps < .01$ ). All eight paths between life stress and internalizing problems were statistically significant and positive, providing substantial empirical support for the mutual influence or reciprocity model. For example, internalizing symptoms during 7th grade predicted higher levels of stressful life events during 7th and 8th grades ( $\beta = .13$ ,  $p < .01$ ). Equally, adverse life events during 7th and 8th grades predicted an increase in internalizing problems from 7th to 8th grade ( $\beta = .26$ ,  $p < .01$ ).

The autoregressive model also showed a good fit with the data. With 56 degrees of freedom, the chi-square was 120.39. The other fit indices such as GFI (.97), AGFI (.93), RMSEA (.05), and CN (313.18) indicated that the model fit the data well. A 90% confidence interval around the RMSEA was also formed for internalizing problems (MacCallum et al., 1996). The lower bound of the confidence interval was .037 and the upper bound was .062. Because the entire confidence interval was below the indicator of fair fit (.08), results suggest that the fit was reasonable.

### Statistical Power

We also considered the issue of statistical power because some researchers might question whether the results from our two autoregressive models would be reliable given a sample size of 451 and 105 covariances generated for evaluating the models. MacCallum et al. (1996) found that power increases as either degrees of freedom or sample size increases. In their study, a minimum sample size for power of .80 was 243 with 50 degrees of freedom. Each of our two autoregressive models contained 52 degrees of freedom with a sample size of 451. According to MacCallum et al., the estimated power for 50 degrees of freedom with a sample size of 400 was .979 in covariance structure modeling. Based on these statistics, we concluded that our models were estimated with adequate statistical power.

### Comparisons of Alternative, Hierarchically Related Models

Although our proposed reciprocal causation models for both externalizing and internalizing problems demonstrated reasonable fit with the data, it is possible that theoretically interesting alternative models would also fit the data well. Indeed, there

Table 2

*Comparisons of Theoretically Competing Models*

	Externalizing problems			Internalizing problems		
	$\chi^2/df$	$\Delta df$	$\Delta\chi^2$	$\chi^2/df$	$df$	$\chi^2$
1. Null model: stability and measurement model	223.97/60	–	–	256.55/64	–	
2A. Social-causation model	177.50/56	4	46.47	149.41/60	4	107.14
2B. Social-selection model	195.87/56	4	28.10	217.41/60	4	39.14
3. Reciprocal-influence model	162.91/52			120.39/56		
(1) Comparison with Model 1		8	61.06		8	136.16
(2) Comparison with Model 2A		4	14.59		4	29.02
(3) Comparison with Model 2B		4	32.96		4	97.02

Note. For all  $\Delta\chi^2/\Delta df$ ,  $p < .01$ .

often will be alternative equivalent models assessing different path relationships from those evaluated in an originally proposed model (e.g., MacCallum, Wegener, Uchino, & Fabrigar, 1993). The important issue here was that structural equation models using a covariance structure can generate a reasonably good fit to the data from either the proposed model or alternative equivalent models or even both. Thus, goodness-of-fit tests cannot distinguish the original model from equivalent models (MacCallum et al., 1993). Rather, theoretical meaningfulness and interpretability of path coefficients should be used to differentiate the original model from alternative equivalent models (MacCallum et al., 1993). In our study, either the social-causation model or the social-selection model might yield a fit that is as good as that of the reciprocal-causation model. However, if the reciprocal-causation model could improve the overall model fit compared with either the social-causation or the social-selection models, the argument for reciprocity in the relationship between stressful life events and adolescent externalizing and internalizing problems would be strengthened.

Table 2 presents the results of theoretically competing model comparisons. As proposed by Bollen (1989), direct model comparisons were made among alternative, hierarchically related models by interpreting the change in chi-square statistics per change in degrees of freedom. Using the stability and measurement model as a null model, we found that all three theoretically competing models yielded a significant improvement in chi-square compared with the null model. For example, the chi-square statistic for the social-causation model for externalizing problems was 177.50, which improved the chi-square statistic compared with the null model by 46.47. The improvement was statistically significant at  $p < .01$ . Because the null model did not include any structural relationships, the fit of the model was expected to be poor. Adding structural paths to the

model reduced the amount of unexplained variance in the model. In that sense, the substantively and statistically significant change in chi-square compared with the null model for each of the three theoretical models was expected.

The most interesting question was whether the reciprocal influence model would significantly improve the fit between the model and the observed data compared with the social-selection or social-causation models. For externalizing problems, the change in chi-square from the social-causation model to the reciprocal-influence model was 14.59 with 4 degrees of freedom. The chi-square change from the social-selection model to the reciprocal-influence model was 32.96, also with 4 degrees of freedom. Both of these chi-square change statistics were significant ( $p < .01$ ). A very similar pattern emerged in the chi-square statistics for internalizing problems. The reciprocal influence model significantly improved model fit compared with both the social-causation model ( $\Delta\chi^2$  with 4  $df$  = 29.02) and the social-selection model ( $\Delta\chi^2$  with 4  $df$  = 97.02). These results indicate that our hypothesized reciprocal influence model demonstrated a substantively and statistically better correspondence with the observed data than either the social-causation model or the social-selection model.

## Discussion

Three goals guided the present inquiry. The first goal was to extend earlier research by examining the relationship between life stress and both internalizing and externalizing problems of adolescents. The second goal was to evaluate both the influence of stressful events on adolescent maladjustment (the social-causation hypothesis) and the influence of maladjustment on stressful events (the social-selection hypothesis). We predicted that both hypotheses would be supported, thus revealing a

reciprocal process of increasing risk over time. The third goal was to examine the hypothesized reciprocal influence process between life stress and internalizing and externalizing problems across the full span of adolescence. In turn, we consider the results of the study in relation to each of these objectives.

#### *Connecting Stressful Life Events to Internalizing and Externalizing Problems*

Regarding the two dimensions of adjustment problems, earlier research has demonstrated an association between stressful events and depressive symptoms (Aseltine et al., 1994; Leadbeater et al., 1995, 1999; Swearingen & Cohen, 1985a). The results from the current study replicated the findings from this previous body of research by demonstrating that life stresses adolescents experience have a similar effect on their overall emotional distress. The analysis of our five-wave autoregressive model showed that a higher number of negative life events predicted higher levels of depressed and anxious mood among the adolescents in this study. Previous studies showed this adverse association between negative life events and depressive symptoms among adolescents primarily using cross-sectional data (e.g., Swearingen & Cohen, 1985a). Our study adds to this research by showing that stressful events in the lives of adolescents predict increasing risk for internalizing problems over time.

Regarding externalizing problems, there exists research evidence for a connection between summative indices of stressful life events and angry, acting-out behaviors by adolescents (Aseltine et al., 2000; Hoffmann & Su, 1997; Paternoster & Mazerolle, 1994; Vaux & Ruggiero, 1983). The results from our five-wave study were in line with previous findings. Our findings demonstrated that stressful life events at each point significantly and positively predicted delinquent behaviors at the next measurement point after controlling for the previous level of delinquent behaviors. These results significantly increased confidence in the hypothesis that stressful events will exacerbate both internalizing and externalizing problems in the lives of adolescents.

#### *Examining Reciprocal Influences*

Our second goal was to test a reciprocal causation hypothesis that takes the place of simpler notions of either social causation or social selection. From this perspective, we expected that life stressors would increase emotional distress and delinquent

behaviors and that these dimensions of maladjustment would lead to increasing life stress. We have been able to identify only three previous studies that provided preliminary evidence showing that either depressive mood (Swearingen & Cohen, 1985a) or delinquent behaviors (Aseltine et al., 2000; Leadbeater et al., 1999) predict stressful life events. The primary limitation in these earlier reports was that they did not control for earlier events in predicting later events; thus, they could not determine whether adolescent maladjustment actually predicted change in life stress. Our findings did show that maladjustment predicts increases in life stress over time and provided evidence for a mutually reinforcing process in the relationship between stressful life events and adolescent emotional and behavioral problems. We found consistent evidence across the years of adolescence that both earlier delinquent behaviors and depressed or anxious mood predicted later stressful life events after controlling for the previous level of stressful life events. Thus, both the social-selection and the social-causation hypotheses were supported in this investigation.

More intriguing is the fact that the results were consistent with our hypothesis of reciprocal causation in which the two competing hypotheses are integrated. Support for the reciprocity hypothesis suggests a complex interconnection between stressful life events and adolescent emotional or behavioral problems that cannot be explained by either the social-causation hypothesis or the social-selection hypothesis alone. Specifically, the test of the theoretical model in this investigation demonstrated a reciprocal process through which stressful life events and adolescent maladjustment can be thought of as both causes and effects over time.

Although the results of the present investigation were consistent with the hypothesized reciprocal process of mutual influence between stressful events and adolescent maladjustment, the results also suggest that this dynamic may change over time, at least for externalizing behaviors. One of the statistical tests that we performed revealed that there were differences in cross-lagged influences from early to late adolescence. More specifically, the effect of life stress on externalizing problems during early adolescence (7th–9th grade) turned out to be greater than the effect of externalizing problems on life stress. There was no difference in the effect size of either life stress or externalizing problems on the other study variable during middle adolescence. However, during late adolescence, the effect size of externalizing problems to life stress was statistically larger than from life stress to externalizing

behaviors. The findings indicate that social influences may be relatively stronger during early adolescence, when stressful life events were more predictive of increasing maladjustment than the reverse. We expect this differential effect may result from the rapid pace of life changes during early adolescence. By late adolescence, externalizing problems had a greater influence on stressful events than the reverse, consistent with the idea that increasing mean levels of delinquent activities (see Table 1) will have a relatively greater effect on social circumstances. These issues need to be addressed in future research.

#### *Investigating Reciprocity Over an Extended Period*

Regardless of the dimension of problem behavior, our finding that reciprocal influences persisted over time is consistent with the idea of cumulative continuity proposed by Caspi and colleagues (1987). As they suggested, problem behaviors should produce stressful consequences and these negative consequences will tend to reinforce problem behaviors over time. For example, earlier research suggests that the likelihood of encountering conflict situations with parents is higher for adolescents who engage in various deviant behaviors and who demonstrate poor academic performance (Elliott et al., 1985; Herrenkohl et al., 2000; Sampson & Laub, 1993). These conflicts with parents, in turn, are likely to exacerbate problem behaviors (Conger, 1997; Conger & Simons, 1997). In general, our findings are consistent with the proposal that problem behaviors will increase the risk that adolescents will experience stressful life situations, which, in turn, exacerbate these behaviors in a reciprocal process over time (Caspi et al., 1987; Compas & Phares, 1991; Sampson & Laub, 1993). This risk involves problems in both instrumental activities as well as social relationships. Because of the idiosyncrasies in their behaviors, for example, depressed, anxious, or delinquent youth might be less desirable social partners and less able in instrumental activities than their more well-adjusted peers (e.g., Pope & Bierman, 1999). Crises appear to intensify emotional or behavioral problems, which, in turn, instigate further crises. Our confidence in these results is increased by the fact that the reciprocal process was replicated during each stage of adolescence.

These findings were consistent for boys and girls in our study. Although girls and women experience higher levels of internalizing problems and boys and men demonstrate more externalizing behaviors

(Conger & Simons, 1997; Rosenfield, 1999), the results from our study did not support a gender-specific hypothesis regarding the influence of stressful life events. That is, both boys and girls in our sample showed very similar responses to stressful life events, consistent with some previous research (Gore et al., 1992; Hoffmann & Su, 1997; Leadbeater et al., 1995; Vaux & Ruggiero, 1983).

#### *Other Issues*

The present results also suggest several important issues for future research. First, this investigation was specifically geared toward studying a hypothesized reciprocal process through which adolescent maladjustment and stressful life events were expected to be connected. Hence, the current study did not address specific factors that have either buffering or amplifying effects on adversity in the reciprocal process between the two. A fair amount of research suggests that the effect of social stressors on mental health will be reduced for people with greater compared with fewer personal or social resources (e.g., sense of control or social support; Ensel & Lin, 1991; Pearlin, 1999; Vinokur & van Ryn, 1993). Related to delinquency in adolescents, for example, a recent study showed that good parenting tactics have beneficial and protective effects on adolescents' delinquent behaviors (Scaramella, Conger, & Simons, 1999). Future research should identify factors that buffer as well as intensify the self-perpetuating cycle of stressful life situations and adolescent maladjustment revealed in the present analyses.

Second, although the primary goal of the current study was not to examine co-occurring externalizing and internalizing problems, growing evidence for their co-occurrence should not be ignored. For example, recent studies have documented the co-occurrence of substance use and depression (Aseltine et al., 1998) in adolescent populations. One of the limitations of the present investigation was that we did not have a sufficient sample to evaluate both these related processes and the reciprocal effects of primary interest in our five-wave autoregressive models. These questions should be pursued in future investigations.

Also, the findings need to be replicated across diverse ethnic and socioeconomic populations. Because the original project from which the sample for this investigation came was designed to study the effect of economic hardship on families living in the rural Midwest, and because there are almost no minority families living in this area, the sample was



restricted to White, two-parent families. Future research is needed to determine whether the present findings generalize to families of different ethnic groups, single-parent families, and urban or inner-city families. Earlier attempts at replication of other findings from this study with urban and minority populations have been successful, however, increasing confidence in the potential generalizability of the current results (Conger, Patterson, & Ge, 1995; Conger et al., 2002).

Despite remaining issues to be addressed in the future, the findings from this investigation provided important new evidence regarding the reciprocal process through which social and personal disadvantage appear to be mutually reinforcing over time. These results suggest that negative life events experienced during early adolescence intensify symptoms of sadness, fear, and antisocial conduct. These domains for maladjustment, in turn, increase risk for future adversities and life crises. The results also suggest that the reciprocal process between negative life events and maladjustment has a developmental dynamic that unfolds in a meaningful and understandable fashion across the years of adolescence.

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