

## Exposure to Violence in Young Inner-City Adolescents: Relationships With Suicidal Ideation, Depression, and PTSD Symptomatology

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This study examined the relationship of exposure to violence to suicidal ideation, depression, and post-traumatic stress disorder (PTSD) symptomatology in 94 young adolescents from an inner-city school. Participants completed self-report measures of the Reynolds Adolescent Depression Scale, the Suicidal Ideation Questionnaire—Junior, Adolescent Psychopathology Scale—Posttraumatic Stress Disorder Subscale, and the Exposure to Violence Questionnaire. Using a hierarchical multiple regression design, exposure to violence demonstrated a unique relationship with PTSD symptomatology. Specifically, the relationship between violence exposure and PTSD symptomatology remained significant after controlling for depression and suicidal ideation severity. Controlling for PTSD symptomatology resulted in nonsignificant relationships between violence exposure and depression and suicidal ideation in adolescents. Additional analyses suggest that PTSD functions as a mediating variable between exposure to violence and depression and suicidal ideation. The implication of these results and suggestions for future research are discussed.

**KEY WORDS:** Exposure to violence; suicidal ideation; PTSD; depression; adolescents.

Violence and exposure to violence in children and adolescents are major concerns for parents, school personnel, and students as well as the general population. Data gathered by the Center for Disease Control (1995) and others (Fingerhut, Ingram, & Feldman, 1992; Richters & Martinez, 1993; Schubiner, Scott, & Tzelepis, 1993) suggest that violence and exposure to violence are relatively common experiences in children and adolescents. Gladstein, Rusonis, and Heald (1992) reported that only 12% of inner-city adolescents indicated that they had not been exposed to violence. The relatively widespread exposure to violence in youth indicates the need to examine potentially detrimental outcomes that may result from such exposure. Of particular interest are negative mental health outcomes of exposure to violence among youth.

In studying the effects of youth violence, researchers have used the term "exposure to violence" to represent several different types of violence, such as TV or media violence, domestic violence, or community violence (Fitzpatrick & Boldizar, 1993; Gladstein *et al.*, 1992; Richters & Martinez, 1993). Given that the focus of this study is community violence, the following review is limited to those studies that have focused on chronic community violence, such as drive-by shootings or seeing someone shot. This is not to minimize the potential effects of the other forms of violence and violence exposure, but rather to emphasize the problem and detrimental relationship of community, including school, violence on mental health outcomes in youth.

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### EXPOSURE TO VIOLENCE AND MENTAL HEALTH OUTCOMES

Research that has examined exposure to community violence in relation to youth mental health has reported similar findings: Violence exposure is associated

with mental health problems, such as depression, suicidal ideation, and post-traumatic stress disorder (DuRant, Cadenhead, Pendergrast, Slavens, & Linder, 1994; Fitzpatrick & Boldizar, 1993; Freeman, Mokros, & Poznanski, 1993; Martinez & Richters, 1993; Osofsky, Wewers, Hann, & Fick, 1993; Pynoos *et al.*, 1987; Pynoos & Nader, 1988; Richters & Martinez, 1993). Most of this research has been conducted with children, and given that some of these mental health problems are more prevalent among adolescents (Reynolds, 1992; Reynolds & Mazza, 1994), the relationship between violence exposure and adolescent mental health warrants further investigation.

One psychological problem that has been frequently identified in relation to violence exposure in inner-city children and adolescents is depression (Fitzpatrick, 1993; Freeman *et al.*, 1993; Martinez & Richters, 1993; Schubiner *et al.*, 1993). Martinez and Richters (1993) in a sample of inner-city elementary children reported that children exposed to violence experienced significantly more distress-related psychological symptoms, including depression. In a sample of 3,735 high school students, Singer, Anglin, Song, and Lunghofer (1995) reported that depression was a significant variable in the relationship between exposure to violence and psychological trauma symptoms.

Adverse effects of exposure to violence also have been reported in the form of post-traumatic stress disorder (PTSD) and PTSD symptomatology (Bell & Jenkins, 1991; Fitzpatrick & Boldizar, 1993; Martinez & Richters, 1993; Pynoos *et al.*, 1987; Singer *et al.*, 1995). Studies examining the relationship between exposure to violence and PTSD in children and adolescents have generally focused on acute violent events (Pynoos *et al.*, 1987). Pynoos and colleagues (1987) reported that children who were exposed to a sniper attack showed higher rates of symptomatology associated with PTSD than peers who attended the same school but were not present the day of the incident. Recent studies examining chronic community violence rather than acute violent events show a similar adverse relationship. Fitzpatrick and Boldizar (1993), in a sample of 221 inner-city youth, found that exposure to violence was a strong predictor of PTSD.

A third mental problem linked to violence exposure is youth suicidal behavior (Center for Disease Control, 1995), although few research studies have been conducted in this area with adolescents. Freeman *et al.* (1993) conducted a study that examined the severity of depression in 223 children, aged 6–12, using a clinical interview. During the clinical interviews, 57 children spontaneously reported experiencing violence in their lives. The authors found that the proportion of these 57 children reporting suicidal symptoms was similar to the proportion of

those children who did not report violence in their lives. The results of the Freeman *et al.* study need to be cautiously interpreted because suicidal behavior, including suicidal ideation, is relatively rare in children under age 10 (Reynolds & Mazza, 1994), which may account for the nonsignificant differences. Further research in this area is warranted, especially in the adolescent population where suicidal ideation is more prevalent.

Research studies examining the relationship between violence exposure and youth mental health have predominately focused on a single mental health outcome (Fitzpatrick, 1993; Fitzpatrick & Boldizar, 1993; Freeman *et al.*, 1993; Pynoos *et al.*, 1987). Although results from these studies have been helpful in examining the relationship of violence exposure to specific mental health domains, the overlap of symptomatology across the domains is not considered. Such results make it difficult to determine if exposure to violence has a broad or narrow relationship to adolescent mental health. Research examining the simultaneous relationship of multiple mental health outcomes with violence exposure has not been conducted. This type of research would provide an increased understanding of the shared and unique relationships between exposure to violence and mental health problems in adolescents.

## THE CURRENT STUDY

This study examined the relationship of violence exposure to multiple adolescent mental health problems, specifically depression, suicidal ideation, and PTSD symptomatology. Severity of violence exposure was measured by the Exposure to Violence Questionnaire (EVQ; Reynolds & Mazza, 1995), a 14-item measure that assesses exposure to different community violent events, such as drive-by shootings, attacks, and violence in school.

The primary research question examined the degree to which exposure to violence is related to suicidal ideation, depression, and PTSD symptomatology when controlling for the shared variance among the latter variables. Although correlational research has examined these three mental health problems in relation to exposure to violence, studies have not determined the strength of these relationships in a combined model. It is likely that in a combined model, the relationship between exposure to violence and mental health outcomes may be substantially different from results found using zero-order correlations. Thus, the relative impact of violence exposure on the three mental health variables needs to be determined.

## METHOD

### Participants

The participants were 94 young adolescents enrolled in the 6th, 7th, and 8th grades in a parochial school in an inner-city neighborhood in Brooklyn, New York. There were 57 girls and 37 boys with a mean age of 12.52 ( $SD = 0.92$ ), and a range from 11 to 15 years with 85% of the sample between 12 and 14 years of age. The ethnicity of the sample was 70% African American, 22% Hispanic, 1% Native American, 1% Caucasian, 3% other, and 2% did not provide this information. The participating school was located in a low-income, high-needs area in the Bedford-Stuyvesant neighborhood next to a low-income housing development. At the time of data collection, this area was considered one of the more violent areas within New York City and had a high rate of homicides as well as other violent crimes, according to the New York City Police Department (M. Stein, personal communication, May 14, 1998). As a function of the violent nature of the school location and to ensure the safety of the students, a police officer was assigned full-time within the school and monitored the entrance of people coming into the school.

### Instrumentation

*Reynolds Adolescent Depression Scale (RADS; Reynolds, 1986b).* The RADS was used to assess severity of depressive symptomatology in participants. The RADS was developed for use with adolescents and consists of 30 items utilizing a four-point (1–4) Likert-type scale, with higher scores indicating greater depressive symptomatology. The items on the RADS reflect the symptom criteria from the *Diagnostic and Statistical Manual of Mental Disorders*, third edition (*DSM-III*; American Psychiatric Association, 1980) for major depression and dysthymic disorder as well as symptoms found in unipolar depression (Reynolds, 1987a). The RADS was standardized on 2,460 adolescents from 7th to 12th grade, and has been used as a measure of depressive symptomatology in numerous studies with school-based and clinical samples of adolescents (e.g., Adams & Adams, 1993; Brand, King, Olson, Ghaziuddin, & Naylor, 1996; Brown, Overholser, Spirito, & Fritz, 1991; Carey, Finch, & Carey, 1991; King *et al.*, 1996; King, Radpour, Naylor, Segal, & Jouriles, 1995; Reynolds & Coats, 1986; Shain, Naylor, & Alessi, 1990).

The psychometric properties of the RADS show strong reliability and validity. Reynolds (1987a) reported an internal consistency coefficient using Cronbach's alpha

(Cronbach, 1951) of .92. Concurrent validity was demonstrated by a correlation coefficient of .83 between the RADS and the Hamilton Depression Rating Scale (HDRS; Hamilton, 1960). Convergent validity has been shown by strong correlation coefficients with other self-report measures of depression, such as the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and the Children's Depression Inventory (Kovacs, 1979). In studies of clinical samples, investigators have reported strong evidence for criterion-related validity for the RADS with diagnostic and semistructured clinical interview measures of depression (e.g., King *et al.*, 1997; Reinecke & Schultz, 1995; Shain *et al.*, 1990).

*Suicidal Ideation Questionnaire—Junior (SIQ-JR; Reynolds, 1987b).* The SIQ-JR was used to assess participants' current thoughts about suicide. The SIQ-JR is a 15-item self-report measure developed for young adolescents in Grades 7 through 9. The SIQ-JR takes approximately 7–8 minutes to complete and can be group or individually administered. The SIQ-JR items are scored on a 7-point scale, ranging from 0 (*I never had this thought*) to 6 (*I have this thought almost every day*). Each item examines a specific suicidal cognition (e.g., "I thought if I had the chance I would kill myself," "I thought about how I would kill myself," "I thought that killing myself would solve my problems") and evaluates the frequency of the cognitions over the past month.

The psychometric properties of the SIQ-JR are well-established (Reynolds, 1988). The SIQ-JR was standardized on 1,283 young adolescents in Grades 7 through 9. The internal consistency reliability coefficient in the SIQ-JR standardization sample using Cronbach's coefficient alpha was .94. Construct validity was established through convergent validity, comparing the SIQ-JR with related affective constructs such as anxiety and depression, with correlations ranging from .54 to .66. Reynolds (1990) reported a correlation of .68 between the SIQ-JR and a clinical interview measure of suicidal behavior. Although designed for use with younger adolescents, the SIQ-JR has been also used in assessing suicidal ideation among clinical samples of adolescents of varying ages (e.g., King, Hill, Naylor, Evans, & Shain, 1993; King, Radpour, *et al.*, 1995). King *et al.* (1993), in a sample of 54 inpatient adolescents, reported correlations of .53 and .55 between the SIQ-JR and measures of depression and lifetime severity of suicidal behavior, respectively.

*EVQ (Reynolds & Mazza, 1995).* The EVQ is a self-report measure designed to assess the degree of exposure to community violence experienced by adolescents. The 14 items on the EVQ use a yes–no format, and completion of the EVQ takes approximately 5 minutes. Items evaluate exposure to different community violent events

over the past year such as "Have you ever seen someone get shot?", "Did you ever see a student attacked?", "Have you seen someone use a knife in a fight?", and "Have there been any drive-by shooting near your home?". Each item on the EVQ is scored 0 (*nonexposure*) or 1 (*exposure*), and the total score is the sum of the 14 items. Higher scores on the EVQ represent greater exposure to different violent events. Based on the current sample, the internal consistency reliability of the EVQ using coefficient alpha was  $r_\alpha = .82$ .

*Adolescent Psychopathology Scale—Posttraumatic Stress Disorder Subscale (APS-PTS; Reynolds, 1998a).* The APS consists of 20 clinical disorder scales, 5 personality disorder scales, and 11 psychosocial problem content scales. The Posttraumatic Stress Disorder subscale on the APS includes 12 items that assess the experience of a negative or traumatic event and the symptoms associated with such an event. Specific symptoms evaluated include recurrent recollections of the traumatic event; feelings of detachment; increased arousal as manifested by symptoms of difficulty concentrating, sleep difficulty, and outbursts of anger; and difficulty being with people. Items on the APS-PTS subscale are assessed as to their occurrence during the past 6 months. Two of the twelve items use a true-false format, whereas the remaining 10 items use a 3-point scale, *never or almost never*, *sometimes*, and *nearly all the time*. In the APS standardization sample of 1,827 school-based adolescents, an internal consistency reliability of .84 was reported for the APS-PTS scale (Reynolds, 1998c). A similar reliability coefficient was obtained on the same scale with the APS clinical development sample of 506 adolescents evaluated in psychiatric inpatient and outpatient settings (Reynolds, 1998c).

Validity of the APS-PTS is described in the APS Psychometric and Technical Manual (Reynolds, 1998c). Factor analysis of the APS-PTS with a clinical sample of 506 adolescent psychiatric inpatients and outpatients produced a three-factor solution characterized as factors of (a) increased arousal, difficulty concentrating, and poor affect; (b) experiencing negative events; and (c) sleep difficulty. These factors relate to general core symptom specifications in the DSM-IV description of PTSD. Additional evidence for validity is provided by Reynolds (1998c).

### *Procedures*

Prior to data collection, parental consent was obtained and only those students with written consent participated in the study. Of the 150 students in the 6th, 7th, and 8th grades, 120 (80%) returned consent forms, of which

105 received permission to participate (88% of returned consent forms). Students who had received parental permission to participate were also given assent forms on the day of the data collection describing the nature of the study, the procedures, and whom they could talk to after completing the self-report measures. Only those students with signed consent and assent forms participated in the study.

Data collection followed a multiple-stage schoolwide screening model for adolescent mental health problems (Reynolds, 1986a). Participants initially completed a self-report battery that included measures of suicidal ideation, depression, post-traumatic stress, and exposure to violence. For the current study, a second administration of the self-report battery (including measures of depression, suicidal ideation, PTSD symptomatology, and exposure to violence) was used to provide a more accurate presentation of mental health status, as scores tend to decrease from initial assessments (Reynolds, 1986a). The second assessment took place 1 to 5 weeks after the initial assessment. The completion of the second mental health battery occurred in small groups, approximately 6–7 students, and was monitored by James Mazza. This small group setting allowed for close supervision and for students to ask questions, which facilitated the completion of the measures. Most students completed the mental health battery in approximately 30 to 40 minutes. After completing the second battery, semistructured clinical interviews of suicidal behavior and depression were conducted with each participant as part of the follow-up procedure and to determine the need for referral and related mental health services. Participants who were considered at-risk based on the clinical interviews were referred for psychological services.

The second battery of self-report measures was analyzed for this study. Although not all the participants completed these measures at the same time, the second battery allowed for consistent directions given by James Mazza, the opportunity for clarification and questions, and minimal distractions from other students through close supervision. The use of the self-report measures provided a consistent methodology in obtaining the data. Of the 105 participants completing the second battery of mental health measures, 11 students were omitted from the study because of incomplete data or invalid responses, leaving 94 useable cases for the statistical analyses.

### *Data Analyses*

The analyses were conducted using the Statistical Package for the Social Sciences for Windows, Release 7.5 (SPSS, 1996). The primary purpose was to examine the

relationship of the three selected mental health problems (suicidal ideation, depression, and PTSD) to exposure to violence. Separate hierarchical multiple regression analyses were conducted to examine the unique relationship of exposure to violence with each of the three mental health problems. For each mental health problem, the regression analysis consisted of three steps. The first step examined the relationship of age and sex with one of the selected mental health problems as the dependent variable. The second step included the other two mental health problems, and the third step included the violence exposure measure. The three regression analyses were conducted with each mental health problem as the dependent variable. This design allowed us to examine the unique variance (change in  $R^2$ ) in the dependent variable explained by violence exposure beyond that accounted for by the other two related mental health problems and the demographic factors. For each regression analysis, the Type I error rate of .05 was divided by the number of predictors (5), and thus the statistical significance level was set at .01 for each predictor per analysis.

## RESULTS

### Exposure to Violence

On the EVQ, 93% of the participants reported having been exposed to at least one violent event in the past year. As shown in Table I, the mean score on the EVQ of the total sample was 5.12 ( $SD = 3.55$ ). As described earlier, the EVQ items are scored 0 or 1, such that the total score is indicative of the number of violent events that a youngster reports exposure to over the past year. Thus, our sample of inner-city youngsters reported exposure to an average of five violent events over the past year. Boys and girls reported a similar level of exposure to violence, with EVQ mean scores of 5.51 ( $SD = 3.86$ ) and 4.86 ( $SD = 3.34$ ), respectively,  $t(92) = .87, ns$ . As noted above, the majority

of our sample (92.5%) was Hispanic or African American. The difference in EVQ means between these two groups was nonsignificant,  $t(85) = .06, ns$ .

### Mental Health Measures

The mean scores for the mental health measures used in this study with the current total sample are provided in Table I. The means found on the mental health measures in the current study are similar to the means reported by the author of these measures with their respective standardization samples (e.g., Reynolds, 1987a, 1988, 1998b). Based on the cutoff scores for the mental health measures, 7.4% of the current sample had a RADS score above 76, 8.5% had a SIQ-JR score above 30, and 6.4% had a T-score above 65 on the APS-PTS. Similar to the results with the EVQ, differences between Hispanic and African American youngsters on the RADS, SIQ-JR, and APS-PTS were not significantly different,  $t(85) = .95, ns$ ,  $t(85) = 1.30, ns$ , and  $t(85) = .65, ns$ , respectively. As shown in Table I, there was a minimal age effect ( $r = .09$  to  $.11$ ) associated with scores on these measures.

It should be noted that the RADS and SIQ were standardized with youngsters in Grades 7 through 12, although they have been used in research with younger participants (e.g., Kahn, Kehle, Jenson, & Clark, 1990; King, Franzese *et al.*, 1995). Internal consistency reliability coefficients (coefficient alpha) computed for the Grade 6 participants were high, .92 for both the RADS and SIQ-JR, suggesting the utility of these measures with Grade 6 youngsters. Furthermore, the means for the SIQ-JR ( $M = 11.18$ ) and the RADS ( $M = 60.24$ ) for participants in Grade 6 were similar to the total sample means.

### Intercorrelations Among Study Measures

The intercorrelations among study measures for boys and girls are shown in Table II. As can be seen, the relationships among measures were similar for both boys and girls. The intercorrelations among mental health measures were mostly moderate, and ranged from .29 to .77, with a median  $r = .62, r^2 = .384$ .

In addition to the intercorrelation coefficients, the internal consistency reliability coefficients of the EVQ and mental health measures for the current sample are reported in Table II. As shown, the reliability coefficients of the mental health measures were high and ranged from .86 to .92. The internal consistency reliability coefficient of .82 for the EVQ can also be considered moderately strong given the dichotomous nature of this measure.

Table I. Study Measure Means, Standard Deviations, and Correlations With Age

Measures	<i>M</i>	<i>SD</i>	Age $r^a$
Exposure to Violence Questionnaire	5.12	3.55	.37***
Reynolds Adolescent Depression Scale	59.24	14.90	.11
Suicidal Ideation Questionnaire	12.20	14.86	.09
APS Posttraumatic Stress Disorder Scale	49.60	10.04	.09

Note. APS = Adolescent Psychopathology Scale.

<sup>a</sup>Correlation coefficient between age and mental health variables.

\*\*\*  $p < .001$ .

Table II. Intercorrelations Among Study Measures for Boys and Girls

Measures	1	2	3	4
1. Exposure to Violence Questionnaire	(.82)	.29*	.39**	.51***
2. Reynolds Adolescent Depression Scale	.51**	(.92)	.63***	.72***
3. Suicidal Ideation Questionnaire	.42**	.62***	(.92)	.63***
4. APS Posttraumatic Stress Disorder Scale	.62***	.77***	.71***	(.86)

Note. Intercorrelation coefficients below the diagonal are for boys, and those above the diagonal are for girls. Values in parentheses are internal consistency reliability coefficients for the total sample. APS = Adolescent Psychopathology Scale.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Table III. Summary of the Hierarchical Regression Analysis With Block 1 (Sex &amp; Age), Block 2 (Post-traumatic Stress Disorder Symptomatology &amp; Suicidal Ideation) and Block 3 (Exposure to Violence) as the Independent Variables and Depression as the Dependent Variable

Independent variables	$\Sigma R$	$\Sigma R^2$	$\Delta R^2$	$F^a$	$df$	$p <$
Step 1 (sex & age)	.215	.046	.046	2.20	2, 91	.117
Step 2 (PTSD & suicidal ideation)	.770	.593	.547	59.89	2, 89	.001
Step 3 (exposure to violence)	.773	.597	.004	0.80	1, 88	.375

Note. PTSD = post-traumatic stress disorder.

<sup>a</sup> $F$  value is based on the change in  $R^2$  ( $\Delta R^2$ ).

Table IV. Summary of the Hierarchical Regression Analysis With Block 1 (Sex &amp; Age), Block 2 (Post-traumatic Stress Disorder Symptomatology &amp; Depression) and Block 3 (Exposure to Violence) as the Independent Variables and Suicidal Ideation as the Dependent Variable

Independent variables	$\Sigma R$	$\Sigma R^2$	$\Delta R^2$	$F^a$	$df$	$p <$
Step 1 (sex & age)	.117	.014	.014	0.63	2, 91	.536
Step 2 (PTSD & depression)	.686	.471	.457	38.42	2, 89	.001
Step 3 (exposure to violence)	.687	.472	.002	0.31	1, 88	.578

Note. PTSD = post-traumatic stress disorder.

<sup>a</sup> $F$  value is based on the change in  $R^2$  ( $\Delta R^2$ ).

## MULTIPLE REGRESSION ANALYSES

As noted earlier, a series of hierarchical multiple regression analyses were conducted. These analyses examined the unique relationship of violence exposure to each mental health variable after accounting for the commonality among the mental health factors and the variance explained by the demographic variables. The results of the hierarchical regression analyses are presented below for each of the mental health variables.

### Depression

The results of the hierarchical regression analysis with depression as the dependent variable with age and sex entered as the first step, suicidal ideation and PTSD symptomatology as the second step, and exposure to violence

as the third step are presented in Table III. The variable set of suicidal ideation and PTSD symptomatology, entered as Step 2, was significantly related to depression severity. Exposure to violence, entered in Step 3, did not add significantly to depression severity when suicidal ideation, PTSD symptomatology, and the demographic variables were controlled.

### Suicidal Ideation

The results of the hierarchical regression analysis with suicidal ideation as the dependent variable with age and sex entered as the first step, depression and PTSD symptomatology as the second step, and exposure to violence as the third step are presented in Table IV. Similar to the previous analysis, the variable set of depression and PTSD symptomatology, entered as Step 2, was

Table V. Summary of the Hierarchical Regression Analysis With Block 1 (Sex & Age), Block 2 (Suicidal Ideation & Depression) and Block 3 (Exposure to Violence) as the Independent Variables and Post-traumatic Stress Disorder Symptomatology as the Dependent Variable

Independent variables	$\Sigma R$	$\Sigma R^2$	$\Delta R^2$	$F^a$	df	$p <$
Step 1 (sex & age)	.150	.023	.023	1.05	2, 91	.355
Step 2 (suicidal ideation & depression)	.780	.608	.590	66.55	2, 89	.001
Step 3 (exposure to violence)	.823	.678	.070	19.05	1, 88	.001

Note. <sup>a</sup>F value is based on the change in  $R^2$  ( $\Delta R^2$ ).

significantly related to suicidal ideation severity. Although exposure to violence showed a significant zero-order correlation with suicidal ideation,  $r = .39$ ,  $p < .001$ , it did not add significantly to the regression model after controlling for depression, PTSD symptomatology, and the demographic factors.

### PTSD

The third hierarchical regression analysis was conducted with PTSD as the dependent variable and age and sex entered in the first step, depression and suicidal ideation entered in the second step, and exposure to violence in the third step. The results of this analysis are presented in Table V. In contrast to the two previous regression analyses, the variables entered in Steps 2 and 3 were significantly related to PTSD symptomatology severity. In this analysis, exposure to violence was found to be significantly related to PTSD symptomatology beyond what could be explained by depression, suicidal ideation, and the demographic factors.

### FOLLOW-UP ANALYSES

The results of the hierarchical regression analyses presented above suggest that a unique relationship between violence exposure and PTSD symptomatology exists and that PTSD symptomatology may act as a mediating variable between exposure to violence and the other two mental health variables. Secondary analyses were conducted to further examine PTSD symptomatology as a potential mediating variable in the relationship between violence exposure and depression and suicidal ideation. A three-step statistical approach delineated by Baron and Kenny (1986) was used to examine the mediating effects of PTSD symptomatology. To test for mediation, Baron and Kenny recommend the use of regression models as presented by Judd and Kenny (1981). In this procedure, for

each dependent variable three multiple regression equations are computed: (a) regression of the mediator on the independent variable, (b) regression of the dependent variable on the independent variable, and (c) regression of the dependent variable on both the independent and the mediator variables. As applied to the current study, the first regression equation for each mental health problem (e.g., depression or suicidal ideation) consists of the regression between PTSD symptomatology (the mediating variable) and exposure to violence (the independent variable), followed by a regression analysis with depression or suicidal ideation as the dependent variable and exposure to violence, and a third regression analysis with either depression or suicidal ideation as the dependent variable and both PTSD symptomatology (mediating variable) and exposure to violence (independent variable) entered simultaneously. PTSD symptomatology is shown to be a mediating variable if the regression coefficient is significant in the first two analyses and if PTSD symptomatology shows a significant relationship with the dependent variable in the third regression analysis. Furthermore, for mediation to be supported, the relationship between the dependent variable and exposure to violence in the third regression equation must be less than that found in the second regression analysis (Baron & Kenny, 1986).

The results of the follow-up analyses examining PTSD symptomatology as a mediator of the relationship between exposure to violence and depression are presented in Table VI. As described above, the first analysis regressed PTSD symptomatology on exposure to violence, which resulted in a significant beta coefficient,  $\beta = .543$ ,  $p < .001$ . The second equation, regressing depression on exposure to violence, showed that exposure to violence was significantly related to depression,  $\beta = .358$ ,  $p < .001$ . The third equation regressed depression on both exposure to violence and PTSD symptomatology. The results of this regression analysis showed that PTSD symptomatology was significantly related to depression,  $\beta = .774$ ,  $p < .001$ , and exposure to violence was no longer significantly related to depression,  $\beta = -.063$ ,

Table VI. Results of Regression Analyses Showing Mediating Characteristics of PTSD Symptomatology Between the Relationships of Exposure to Violence and Depression and Between Exposure to Violence and Suicidal Ideation

Regression equations	$\beta$	$t$	$p <$
Depression			
PTSD with exposure to violence	.543	6.20	.001
Depression with exposure to violence	.358	3.67	.001
Depression with exposure to violence & PTSD			
Exposure to violence	-.063	-0.75	.456
PTSD	.774	9.25	.001
Suicidal ideation			
PTSD with exposure to violence	.543	6.20	.001
Suicidal ideation with exposure to violence	.385	4.01	.001
Suicidal ideation with exposure to violence & PTSD			
Exposure to violence	.044	0.47	.641
PTSD	.629	6.65	.001

Note. PTSD = post-traumatic stress disorder;  $\beta$  = standardized beta coefficient;  $df=92$ .

$p = ns$ . Based on the criteria of Baron and Kenny (1986), these results support the notion that PTSD symptomatology mediates the relationship between exposure to violence and depression.

The results of the regression analyses examining whether PTSD symptomatology mediates the relationship between exposure to violence and suicidal ideation are also presented in Table VI. The results of the first regression analysis were identical to the one above, regressing PTSD symptomatology on exposure to violence. The results of the second analysis, regressing suicidal ideation on exposure to violence, showed that exposure to violence was significantly related to suicidal ideation severity,  $\beta = .385$ ,  $p < .001$ . The third analysis regressed suicidal ideation on both exposure to violence and PTSD symptomatology. Similar to results with depression, exposure to violence was no longer significantly related to suicidal ideation when PTSD symptomatology was added to the model,  $\beta = .044$ ,  $ns$ , with a strong relationship found between suicidal ideation and PTSD symptomatology,  $\beta = .623$ ,  $p < .001$ . Thus, PTSD symptomatology also appears to mediate the relationship between exposure to violence and suicidal ideation.

## DISCUSSION

The current study examined the relationship of exposure to violence with three selected mental health problems: Depression, suicidal ideation, and PTSD symptomatology. Previous research examining the relationship of violence exposure and youth mental health has typically focused on single-outcome factors, making it difficult to

determine if exposure to violence has a broad or narrow relationship to mental health problems.

The results of this study revealed a different relationship of exposure to violence with mental health outcomes than has been previously reported (Fitzpatrick & Boldizar, 1993; Martinez & Richters, 1993; Osofsky *et al.*, 1993; Schubiner *et al.*, 1993; Singer *et al.*, 1995). Based on a series of hierarchical regression analyses, it was found that exposure to violence appears to have a unique relationship with PTSD symptomatology. Although significant zero-order correlations were found between the mental health outcomes and exposure to violence, PTSD symptomatology was the only variable to show a significant relationship with exposure to violence when the other mental health variables were statistically controlled.

Our initial hierarchical multiple regression analyses suggest that depression and suicidal ideation may demonstrate indirect, rather than direct, associations with exposure to violence, and these associations are different from those reported in previous studies (DuRant *et al.*, 1994; Schubiner *et al.*, 1993; Singer *et al.*, 1995). Singer and colleagues (1995) reported that violence exposure had a significant positive relationship with depression in examining psychological trauma in high school adolescents. Although this study consisted of younger adolescents than in the Singer *et al.* study, the different findings may be due to the methodological design of the current study that controlled for the shared variance of PTSD symptomatology, suicidal ideation, and depression. Although depression and suicidal ideation were not directly related to violence exposure in the multiple regression results, this does not negate their importance as mental health concerns for young adolescents exposed to violence. Rather, these



results suggest a complex relationship between violence exposure and adolescent mental health.

The set of hierarchical regression analyses provided evidence for the perspective that PTSD symptomatology may function as a mediating variable between violence exposure and other mental health outcomes, such as depression and suicidal ideation. To further examine this hypothesis, additional regression analyses were conducted according to procedures suggested by Baron and Kenny (1986) for testing a mediational hypothesis. The results of these analyses were consistent with the criteria presented by Baron and Kenny for establishing a mediation effect. PTSD symptomatology demonstrated a mediational effect between exposure to violence and depression and suicidal ideation.

Because the independent variable (i.e., exposure to violence) showed weak relationships with the dependent variables ( $\beta = -.06$  with depression and  $\beta = .04$  with suicidal ideation) when the mediator was controlled, the results suggest a strong mediational effect. Two potential caveats to the interpretation of a mediational effect are the expectation of minimal error variance (e.g., high reliability) in the mediator and that the dependent variable does not cause the mediator. With regard to the latter, it is less than likely that depression and suicidal ideation are causes of PTSD. This perspective is discussed further in the following section. Specific to the issue of measurement error, the APS-PTS scale used to assess PTSD symptomatology demonstrates moderately high reliability. Thus, although there is some overestimation of the effect of the mediation, this effect may be viewed as relatively small.

The mediational model tested in the last set of analyses suggests that exposure to violence results in PTSD symptomatology, which in turn leads to depressive symptomatology and suicidal ideation. The suggestion that PTSD may function as a mediating variable between exposure to violence and other mental health outcomes is intriguing and deserves further discussion. The concept of mediation involves a sequence or progression, and in the current study it is suggested that PTSD symptomatology as a function of violence exposure may occur sequentially and prior to other negative mental health outcomes.

There are similarities between PTSD symptomatology and depression and suicidal ideation as evident by their respective diagnostic criteria (American Psychiatric Association, 1994) and illustrated in this study by the moderate to strong zero-order correlation coefficients shown in Table II. One component of PTSD is a discernable identifiable precipitating factor, witnessed, experienced, or both—a feature not necessary for depression or suicidal ideation. This event may cause an intense physi-

ological reaction and feelings of intense fear, helplessness, or horror (American Psychiatric Association, 1994; Bremner, Davis, Southwick, Krystal, & Charney, 1994; Pynoos *et al.*, 1987). The reexperiencing of the traumatic event through nightmares, recurrent images, flashbacks, and intrusive thoughts sets PTSD apart from other psychiatric disorders (Amaya-Jackson & March, 1995). It may be that the reexperiencing of the event and inability to control the recursiveness behaviors leads to feelings of helplessness and hopelessness and, in turn, to depression or other psychopathology. In addition, the persistent avoidance of people, places, activities, and conversations that relate to the trauma or traumatic event (American Psychiatric Association, 1994) may result in feelings of loneliness and isolation. The unique characteristics that compose PTSD support the perspective that it may be the initial psychopathology experienced after a traumatic event. Children and adolescents who experience a traumatic event often experience difficulties in other areas as well, including mental health and cognitive functioning (Garbarino, 1995; Garbarino, Dubrow, Kostelny, & Pardo, 1992; March, Amaya-Jackson, Terry, & Costanzo, 1997; Pynoos & Nader, 1988; Terr, 1983).

We believe that further research examining PTSD as a potential mediating factor between exposure to violence and adolescent mental health is warranted. Although the results of the regression analyses in this study are based on a relatively small school-based sample and should be viewed as preliminary, they provide information for the future development of models to examine the effects of exposure to violence in relation to adolescent mental health outcomes and the role of PTSD symptomatology as a potential mediating variable. It is important to note that although our results and discussion have suggested a mediating role for PTSD, it cannot be ruled out that an initial elevated level of depressive symptomatology or suicidal ideation may act as a catalyst or risk factor for the development of PTSD in adolescents exposed to violence. In addition, a bidirectional relationship between PTSD and other mental health outcomes cannot be ruled out.

The concurrent, cross-sectional nature of this investigation, as well as the relatively modest sample size, makes our results preliminary but allows for the generation of hypothetical relationships that may be examined longitudinally as well as with more complex modeling procedures. Longitudinal studies may show that a premorbid level of depression and/or suicidal ideation may be critical to the development of PTSD symptomatology as a function of exposure to violence, or it may be that the path to the development of depression and/or suicidal ideation is mediated by the emergence of PTSD symptomatology. It is evident that more research needs to be done in this area and that

we need to go beyond simple one-variable unidirectional models.

The need for further research in this area is supported by the high prevalence rate of adolescents who are exposed to violence. A majority of the students in this study were exposed to at least one violent event in the previous year with similar percentages reported by other researchers (DuRant *et al.*, 1994; Gladstein *et al.*, 1992; Richters & Martinez, 1993; Schubiner *et al.*, 1993). Facilitating the understanding of exposure to violence through continued examination of models and theories will help provide a framework for professionals working with these youth.

It should be noted that the focus of this study was exposure to community violence, and victimization was not assessed. Some adolescents who were exposed to violence also may have been victims of violence as well; thus, the results of this study should be cautiously interpreted. The differential impact of being a victim versus witnessing violence on subsequent psychological trauma still remains unclear (Widom, 1989).

A limitation to the generalizability of our results is the parochial school setting in inner-city Brooklyn, New York, from which our sample was drawn. It may be that students attending parochial school settings are less likely to be exposed to school-related violence than those in public schools. Although students attending parochial school may not be representative of those attending public school in the same area, our selection of an inner-city school in a neighborhood known for its community violence provided a sample of young adolescents who reported substantial levels of violence exposure. A second limitation may be that adolescents who have been exposed to family violence were less likely to have received parental permission to participate in our study compared with those youngsters who were not exposed. Thus, it is likely that students exposed to family violence and marital discord may have been underrepresented in our sample.

The current investigation found that PTSD symptomatology appeared to mediate the relationship between violence exposure and depressive symptomatology and suicidal ideation in young adolescents. It remains to be ascertained if PTSD shows similar relationships with other mental health outcomes in adolescents or even if cross-validation produces similar results. As the results of this study suggest, the relationship between exposure to violence and adolescents' mental health is complex.

It is now evident that violence in schools, communities, and in the lives of young people is a significant concern. Research examining the impact of violence exposure that includes both direct and indirect effects is needed in order to enhance our understanding of the deleterious outcomes that violence may have on adolescents. Our study

focused on several internalizing problems, specifically, PTSD symptomatology, depressive symptomatology, and suicidal ideation. It is important that other internalizing as well as externalizing problems and disorders are included in the study of violence exposure in order to fully explore the impact that such exposure may have on young adolescents.

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## REFERENCES

- Adams, J., & Adams, M. (1993). Effects of a negative life event and negative perceived problem-solving alternatives on depression in adolescents: A prospective study. *Journal of Child Psychology and Psychiatry*, *34*, 743-747.
- Amaya-Jackson, L., & March, J. S. (1995). Posttraumatic stress disorder. In J. S. March (Ed.), *Anxiety disorders in children and adolescents* (pp. 276-300). New York: Guilford Press.
- American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: Author.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173-1182.
- Beck, T. A., Ward, C., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, *4*, 561-571.
- Bell, C. C., & Jenkins, E. J. (1991). Traumatic stress and children. *Journal of Health Care for the Poor and Underserved*, *2*, 175-185.
- Brand, E. F., King, C. A., Olson, E., Ghaziuddin, N., & Naylor, M. (1996). Depressed adolescents with a history of sexual abuse: Diagnostic comorbidity and suicidality. *Journal of the American Academy of Child and Adolescent Psychiatry*, *35*, 34-41.
- Bremner, J. D., Davis, M., Southwick, S. M., Krystal, J. H., & Charney, D. S. (1994). Neurobiology of posttraumatic stress disorder. In R. S. Pynoos (Ed.), *Posttraumatic stress disorder: A clinical review* (pp. 141-154). Lutherville, MD: Sidran Press.
- Brown, L. K., Overholser, J., Spirito, A., & Fritz, G. K. (1991). The correlates of planning in adolescent suicide attempts. *Journal of the American Academy of Child and Adolescent Psychiatry*, *30*, 95-99.
- Carey, T. C., Finch, A. J., & Carey, M. P. (1991). Relation between differential emotions and depression in emotionally disturbed children and adolescents. *Journal of Consulting and Clinical Psychology*, *59*, 594-597.
- Center for Disease Control. (1995, April 21). Suicide among children, adolescents, and young adults; United States, 1980-1992. *Morbidity and Mortality Weekly Report*, *44*, 289-291.

- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*, 297-334.
- DuRant, R. H., Cadenhead, C., Pendergrast, R. A., Slavens, G., & Linder, C. W. (1994). Factors associated with the use of violence among urban black adolescents. *American Journal of Public Health*, *84*, 612-617.
- Fingerhut, L. A., Ingram, D. D., & Feldman, J. J. (1992). Firearm and nonfirearm homicide among person 15 through 19 years of age: Differences by level of urbanization, United States: 1979 through 1989. *Journal of the American Medical Association*, *267*, 3048-3053.
- Fitzpatrick, K. M. (1993). Exposure to violence and presence of depression among low-income, African American youth. *Journal of Consulting and Clinical Psychology*, *61*, 528-531.
- Fitzpatrick, K. M., & Boldizar, J. P. (1993). The prevalence and consequences of exposure to violence among African-American youth. *Journal of the American Academy of Child and Adolescent Psychiatry*, *32*, 424-430.
- Freeman, L. N., Mokros, H., & Poznanski, E. O. (1993). Violent events reported by normal urban school-aged children: Characteristics and depression correlates. *Journal of the American Academy of Child and Adolescent Psychiatry*, *32*, 419-423.
- Garbarino, J. (1995). The American war zone: What children can tell us about living with violence. *Developmental and Behavioral Pediatrics*, *16*, 431-435.
- Garbarino, J., Dubrow, N., Kostelny, K., & Pardo, C. (1992). *Children in danger: Coping with the consequences of community violence*. San Francisco: Jossey-Bass.
- Gladstein, J., Rusonis, E. S., & Heald, F. P. (1992). A comparison of inner-city and upper-middle class youths' exposure to violence. *Journal of Adolescent Health*, *13*, 275-280.
- Hamilton, M. (1960). A rating scale for depression. *Journal of Neurology, Neurosurgery, and Psychiatry*, *23*, 56-62.
- Judd, C. M., & Kenny, D. A. (1981). Process analysis: Estimating mediation in evaluation research. *Evaluation Research*, *5*, 602-619.
- Kahn, J. S., Kehle, T. J., Jenson, W. R., & Clark, E. (1990). Comparison of cognitive-behavioral, relaxation, and self-monitoring interventions for depression among middle-school students. *School Psychology Review*, *19*, 196-211.
- King, C. A., Franzese, R., Gargan, S., McGovern, L., Ghaziuddin, N., & Naylor, M. W. (1995). Suicide contagion among adolescents during acute psychiatric hospitalization. *Psychiatric Services*, *46*, 915-918.
- King, C. A., Ghaziuddin, N., McGovern, L., Brand, E., Hill, E., & Naylor, M. (1996). Predictors of comorbid alcohol and substance abuse in depressed adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, *35*, 743-751.
- King, C. A., Hill, E. M., Naylor, M., Evans, T., & Shain, B. (1993). Alcohol consumption in relation to other predictors of suicidality among adolescent inpatient girls. *Journal of the American Academy of Child and Adolescent Psychiatry*, *32*, 82-88.
- King, C. A., Katz, S. H., Ghaziuddin, N., Brand, E., Hill, E., & McGovern, L. (1997). Diagnosis and assessment of depression and suicidality using the NIMH Diagnostic Interview Schedule for Children (DISC-2.3). *Journal of Abnormal Child Psychology*, *29*, 173-181.
- King, C. A., Radpour, L., Naylor, M. W., Segal, H. G., & Jouriles, E. N. (1995). Parents' marital functioning and adolescent psychopathology. *Journal of Consulting and Clinical Psychology*, *63*, 749-753.
- Kovacs, M. (1979). *Children's Depression Inventory*. Pittsburgh, PA: University of Pittsburgh School of Medicine.
- March, J. S., Amaya-Jackson, L., Terry, R., & Costanzo, P. (1997). Post-traumatic symptomatology in children and adolescents after an industrial fire. *Journal of the American Academy of Child and Adolescent Psychiatry*, *36*, 1080-1088.
- Martinez, P., & Richters, J. E. (1993). The NIMH community violence project: II. Children's distress symptoms associated with violence exposure. *Psychiatry*, *56*, 22-35.
- Osofsky, J. D., Wewers, S., Hann, D. M., & Fick, A. C. (1993). Chronic community violence: What is happening to our children? *Psychiatry*, *56*, 36-45.
- Pynoos, R. S., Frederick, C., Nader, K., Arroyo, W., Steinberg, A., Eth, S., Nunez, F., & Fairbanks, L. (1987). Life threat and posttraumatic stress in school-age children. *Archives of General Psychiatry*, *44*, 1057-1063.
- Pynoos, R. S., & Nader, K. (1988). Psychological first aid and treatment approach to children exposed to community violence: Research implications. *Journal of Traumatic Stress*, *1*, 445-473.
- Reinecke, M. A., & Schultz, T. M. (1995). Comparison of self-report and clinician ratings of depression among outpatient adolescents. *Depression*, *3*, 139-145.
- Reynolds, W. M. (1986a). A model for the screening and identification of depressed children and adolescents in school settings. *Professional School Psychology*, *1*, 117-129.
- Reynolds, W. M. (1986b). *Reynolds Adolescent Depression Scale*. Odessa, FL: Psychological Assessment Resources.
- Reynolds, W. M. (1987a). *Reynolds Adolescent Depression Scale: Professional manual*. Odessa, FL: Psychological Assessment Resources.
- Reynolds, W. M. (1987b). *Suicidal Ideation Questionnaire-Junior*. Odessa, FL: Psychological Assessment Resources.
- Reynolds, W. M. (1988). *Suicidal Ideation Questionnaire: Professional manual*. Odessa, FL: Psychological Assessment Resources.
- Reynolds, W. M. (1990). Development of a semistructured clinical interview for suicidal behaviors in adolescents. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, *2*, 382-390.
- Reynolds, W. M. (1992). Depression in children and adolescents. In W. M. Reynolds (Ed.), *Internalizing disorders in children and adolescents* (pp. 149-253). New York: Wiley.
- Reynolds, W. M. (1998a). *Adolescent Psychopathology Scale*. Odessa, FL: Psychological Assessment Resources.
- Reynolds, W. M. (1998b). *Adolescent Psychopathology Scale: Administration and interpretation manual*. Odessa, FL: Psychological Assessment Resources.
- Reynolds, W. M. (1998c). *Adolescent Psychopathology Scale: Psychometric and technical manual*. Odessa, FL: Psychological Assessment Resources.
- Reynolds, W. M., & Coats, K. I. (1986). A comparison of cognitive-behavioral therapy and relaxation training for the treatment of depression in adolescents. *Journal of Consulting and Clinical Psychology*, *54*, 653-660.
- Reynolds, W. M., & Mazza, J. J. (1994). Suicide and suicidal behavior in children and adolescents. In W. M. Reynolds & H. F. Johnston (Eds.), *Handbook of depression in children and adolescents* (pp. 525-580). New York: Plenum Press.
- Reynolds, W. M., & Mazza, J. J. (1995). *Exposure to Violence Questionnaire*. Unpublished scale.
- Richters, J. E., & Martinez, P. E. (1993). The NIMH community violence project: I. Children as victims of and witnesses to violence. *Psychiatry*, *56*, 7-21.
- Schubiner, H., Scott, R., & Tzelepis, A. (1993). Exposure to violence among inner-city youth. *Society for Adolescent Medicine*, *5*, 214-219.
- Shain, B. N., Naylor, M., & Alessi, N. (1990). Comparison of self-rated and clinician-rated measures of depression in adolescents. *American Journal of Psychiatry*, *147*, 793-795.
- Singer, M. I., Anglin, T. M., Song, L. Y., & Lunghofer, L. (1995). Adolescents' exposure to violence and associated symptoms of psychological trauma. *Journal of the American Medical Association*, *273*, 477-482.
- SPSS. (1996). *SPSS for Windows Release 7.5* [Computer software]. Chicago, IL: Author.
- Terr, L. C. (1983). Chowchilla revisited: The effects of psychic trauma four years after a school-bus kidnapping. *American Journal of Psychiatry*, *140*, 1543-1550.
- Widom, C. S. (1989). Does violence beget violence? A critical examination of the literature. *Psychological Bulletin*, *109*, 3-28.