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Psychosocial Variables as Prospective Predictors of Violent Events Among Adolescents

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ABSTRACT: Violent events are main causes of mortality among children and include intentional (e.g., homicide) and unintentional (e.g., accidents) circumstances. This study investigated the prediction of the self-reported occurrence of 14 violent events among eighth-grade youth from psychosocial variables measured in these same youth in seventh grade. Psychosocial variables in-

cluded tobacco and alcohol use, demographic variables, interpersonal variables such as family conflict, and intrapersonal variables such as risk taking. An iterative procedure, involving selection of a set of predictors and a test of the correlation of the set of predictors to the set of events, provided support for an extension of problem behavior theory to violent events.

Violent events include both intentional and unintentional sudden occurrences that may result in physical or psychological injury to one or

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more persons. Examples of intentional violent events include suicide and homicide attempts. Examples of unintentional violent events include accidents. Violent events are the major causes of mortality among children and adolescents. Accidents account for approximately 85% of all violent event-related deaths among children and adolescents, whereas intentional violent events (e.g., homicide and suicide) account for the remaining 15%.^{1,2} Motor vehicle-related accidents (as a passenger or as a driver among older adolescents) account for approximately 40% of childhood mortality resulting from violent events^{3,4} and, in order of descending prevalence among 10-to-14-year-olds, drowning, accidental firing of firearms, burns, homicide, suicide (including drug overdose), falls, poisoning, and choking/suffocation account for the remainder of childhood violent event-related mortality.^{1,2} Implementation of preventive measures is imperative given these high rates.

The available data suggest that both unintentional and intentional violent events are predicted by a set of problem-prone attributes.

The two main types of violent event prevention interventions applicable to children include environmental and educational approaches. Environmental approaches target changing aspects of the physical environment to increase its safety. Educational approaches target changing individuals' behaviors. Several investigators have asserted that both types of approaches need to be implemented.^{4,5} Although environmental approaches currently are most successful, implementation of environmental controls is not always pragmatic (see Scheidt, 1988).⁴ For example, researchers have observed poor adherence to recommendations to improve the safety of physical environments for children.⁶ Educational approaches serve a potential complementary role in prevention, by teaching individuals how to make their environment or their own behavior more safety directed. However, without knowledge of the predictors of violent events, educational programming may be inappropriate or even counterproductive. Indeed, educational approaches may be unsuccessful in the injury prevention arena due to lack of sufficient etiological research to develop acquisition-oriented prevention programming.^{5,7} Thus, to develop more effective educational programming, more etiological research is needed.

Predictors of Violent Events

The available data suggest that both unintentional and intentional violent events are predicted by a set of problem-prone attributes. In particular, family stressors, absence of adult supervision (i.e., latchkey children), risk-taking tendencies, drug use, and a history of previous violent events of the same type have been identified as concurrent and prospective predictors.^{8,9} Interestingly, this

general set of attributes also has been shown to be associated with a variety of age-inappropriate acts¹⁰ as well with lack of concern for health.¹¹ Possibly, predisposition to violent events constitutes part of a syndrome or tendency toward a constellation of problem behaviors.¹⁰ One may refer to this syndrome as indicating "problem proneness." Problem-prone youth spend time away from adult supervision, prefer taking risks, and engage in relatively dangerous activities; thus, it is reasonable to conjecture that these same youth would be prone to suffer the occurrences of a variety of unintentional and intentional violent events.

Several examples in the health and social science research literature in which problem-prone attributes are associated with violent events include prediction of car accidents, skateboarding accidents, cuts and burns, victimization, and suicide attempts.¹²⁻¹⁶ The same variables appear to predict different types of violent events although previous research generally has investigated prediction of only a single type of event within a single study. For example, tolerance for deviance, other drug use, and family stressors predict drinking and driving among adolescents,¹² and 19% of 15-to-17-year-olds, and 35% of 18-to-20-year-olds, who are involved in fatal crashes are alcohol-impaired drivers.¹³ Likewise, youth who engage in skateboarding report a higher risk-taking preference than do most other youth,¹⁴ and skateboarders are highly likely to suffer skateboarding-related accidents and injuries.¹⁵ Converging with these data is evidence that children who previously suffered cuts and burns show more disruptive behavior, less interaction with their parents, and more contact with hazards in a simulated hazardous setting.¹⁶ These data suggest that risk-taking/ disruptive children are relatively likely to approach risky physical environments, leading to injury.

In addition, predictors of victimization include risk-taking behavior, involvement in delinquent acts, and drug use. In other words, self-reported victims of crime are relatively more likely to engage in trouble-seeking behavior or find themselves in situations where likelihood of victimization is enhanced.¹⁷ Finally, predictors of suicide attempts among adolescents include drug use, and risk-taking behavior, as well as perceptions of being unwanted by parents.^{9,18}

One implication of this problem behavior syndrome perspective is that other problem-prone characteristics and behaviors not previously measured as predictors of childhood injury, such as early cigarette smoking, smoking in one's social environment, and low self-esteem, also may predict violent events. However, few studies have investigated this health area using a wide range of psychosocial predictors in prospective designs.⁸

Methodological Approaches

Thorough etiological research requires the use of several different methodological approaches, including use of various types of predictor and outcome measures. The two main etiological designs used to study violent events among adolescents are case-control studies and general population surveys. The case-control studies that examine violent events resulting in pursuit of medical care find that previous visits for nonviolent reasons are predictive of reporting a future violent event-related injury.⁸ Thus, although valid injury cases are ascertained, a self-selection effect may limit the interpretation of the data in such studies. In addition, these studies often do not investigate violent events with more minor consequences as outcome variables. Consequences of such events are likely to have a financial, psychological, and physical cost, as well as be predictive of more serious events.

On the other hand, a reliance on general population surveys demands very large sample sizes to detect occurrences of violent events resulting in serious injury.⁴ Whereas violent events are the most frequent causes of childhood mortality, occurrences of serious injuries are relatively infrequent events in childhood. For example, Scheidt (1988)⁴ reported that a sample of approximately 12,000 children over a one-year period is required to identify 100 injuries requiring hospitalization. Thus, there is a need to identify proxy and precursor measures of violent event-related serious injury. Exploration of precursor measures and correlates of serious injuries, or examination of self-reports of injury not requiring hospitalization (which are of much higher frequency), can permit a more sensitive detection of those at risk for serious injury. Various proxy measures are subject to issues of reliability and predictive validity (e.g., behavior in simulated hazard-

The two main etiological designs used to study violent events among adolescents are case-control studies and general population surveys.

ous settings).¹⁶ Still, self-report data may be *accurate enough* to identify relevant predictor variables.

The Present Study

The present study provides one-year prospective self-report data on 920 adolescents. As part of a study on smoking behavior, these adolescents were administered a 20-page questionnaire in seventh grade that assessed various behavior, demographic, personality, and social domains. In eighth grade, these same youth were administered the same questionnaire, which also contained a set of violent event items. Because relatively few studies of this sort exist, we took an exploratory stance when analyzing the data. We began with a large pool of potential predictors consisting of single items, and we retained significant predictors of violent events for additional analysis.

METHODS

Subjects

Student data were collected from 3,750 seventh-grade youth in southern California, of whom 50% were male and 50% were female. Regarding ethnic composition, 60% were white, 27% were Hispanic, 7% were black, and 6% were Asian or "Other". Students from all seventh-grade classes at 20 schools were followed. One-year follow-up data were collected from 70% of the sample. Further, three item-rotated forms of the questionnaire, as described below, were randomly distributed to students within each classroom. Each student received the same form at each timepoint. Thus, a random subsample of 920 students completed items from both measurement waves for the present analysis. Gender, ethnic composition, and socioeconomic data of the subsample did not differ from the full sample at either timepoint.

Students were administered CO and saliva biochemical collection measures, and they were provided with scripts that informed them that their data were confidential.

Questionnaires and Data Collection

Students were administered a 20-page self-report questionnaire at both timepoints. The questionnaire was composed of a core section at the front, which contained items that assessed demographic and behavioral information, followed by three sections that rotated in order on three different forms of the questionnaire. Students were instructed that they were not expected to complete the full questionnaire. Rather, they were told to complete however many items they were able to in the one class period. A majority of these items show adequate psychometric properties.²¹⁻²⁷ Many have been examined as indices but, for the present study, were examined as separate items.

Completion rate for core items was 80% of total enrollment at the first timepoint (seventh grade). Reasons for incomplete data included absenteeism at school on the day of testing (15%) or parental or student declines (5%). Students were administered CO and saliva biochemical collection measures, and they were provided with scripts that informed them that their data were confidential. This procedure increases the accuracy of self-reported tobacco use.^{19,20}

From the seventh-grade questionnaire, 101 psychosocial items were included for the exploratory analysis. Twelve items measured behavior and demographic information. Three items measured trial of smokeless tobacco, cigarettes, and alcohol on 5-point rating scales extending from *never tried* to *more than 10 times*. Three items measured how many times the person would use smokeless tobacco, drink alcohol, or smoke a cigarette in the next 12 months using the same 5-point

rating scale construction. These six items are among those often used in adolescent tobacco and alcohol research.²¹ Three "yes-no" type binary response items were constructed to assess ethnic identity (white, black, Hispanic). Finally, three additional binary response items measured living situation (with both parents, only with mother, only with father or other person).

Fifty-nine items measured social-type information. Six items measured aspects of being a latchkey child on binary and 5-to-6-point rating scales.²² For example, items included "Are adults usually with you after school and on weekends?" ("yes" or "no") and "How many days do you take care of yourself after school or on weekends without an adult being there?" extending from *0 days a week* to *5 or more days a week*. Four items measured peer commitment including "If you found that your group of friends was leading you into trouble, would you still hang around with them?" ("yes" or "no") and "If your group of friends got into trouble, would you lie to protect them?" ("yes" or "no"). Family conflict was assessed with three items: "My family looks for things to nag me about" ("true" or "false"); "My family doesn't understand me" ("true" or "false"); and "I have a lot of arguments with my family" ("true" or "false"). An additional set of eight binary response items assessed smoking in the social environment, requesting the subject to indicate on a checklist format which persons they knew who currently smoke, including their father, mother, sibling, other relative, close friend, teacher, other adult, or no one. Finally, a set of 14 binary response items assessed school activity participation (e.g., "band/ orchestra/ choir," "drama/ dance," "tennis/ golf," "woodshop/ industrial arts"), and a set of 24 binary response items assessed participation in activities outside of school (e.g., "Boys Club/ Girls Club," "playing with a rock band," "church groups/ functions," "getting high").

Thirty items measured intrapersonal-type information. Three binary response items assessed risk-taking preference. Items included "I like to take chances"; "I enjoy doing things people say should not be done"; and "It is worth getting in trouble to have fun".^{14,23} Self-esteem was assessed with 5 items adapted from Rosenberg's 10-item scale, binary response coded.²⁴ Perceived stress was assessed with 3 of the 14-item Perceived Stress Scale

TABLE 1
Self-reported Prevalence of Violent Events Among Eighth Graders

Event	Happened to you (%)	There Were	
		Serious	Injuries (%)
Cuts	71.9	12.0	
Falling down, leading to an injury	42.0	12.5	
Bike or Skating accident	33.9	7.2	
Any accident needing a doctor	31.3	15.9	
Electric shocks	18.9	3.5	
Car accident	17.1	5.7	
Fire burns	14.2	4.5	
Suicide attempt	8.6	4.3	
Suffocation (choking)	8.2	3.1	
Drowning or near drowning	7.9	3.0	
Accidental gun firing	7.3	3.8	
"Beat up" by a stranger	6.2	3.0	
Poisoning	5.2	2.9	
Drug overdose	4.7	3.9	

items, binary response coded.²⁵ Three binary response items measured loneliness: "I often feel lonely when I'm with my friends"; "Even though there are lots of students around, I often feel lonely at school"; and "I often feel lonely even when I am with my family." Assertiveness was measured with five binary response items adapted partially from the Gambrill and Richey²⁶ scale, which were worded "I stand up for my rights"; "I express myself when I feel upset"; "I speak up in class"; "I make requests of others"; and "I compliment others." Two binary response items measured past-present time orientation: "It is hard for me to get over things that have happened in the past," and "I think a lot about the past rather than what is happening now." Two binary response items measured passive-active orientation: "If I had a choice, I would rather..." either "sit around and relax" or "be active and excited," and "I prefer to..." either "do things I have done before" or "do new things." Finally, a third set of seven binary health risk factor response items (seven binary indicators adapted for adolescents²⁷) was included: "I almost always sleep well at night"; "I almost always eat breakfast"; "I almost always handle stress well"; "I will probably never become a smoker"; "I will probably never become a heavy drinker"; "I almost never eat lots of fried food (french fries, potato chips); and "I

almost always get lots of exercise."

The violent event items, measured in eighth grade, consisted of responses to the question "In the last year have any of the following happened to you in real life (you were in this situation; not imagined)?" Underneath and nested within this question were two questions: "Happened to you?" and "Were there serious injuries?" The youth answered "yes" or "no" to each of these two questions regarding each of 14 violent events ("car accident," "bike or skating accident," "drowning or near drowning," "fire burns," "cuts," "poisoning," "electric shocks," "falling down leading to an injury," "accidental gun firing," "suffocation (choking)," "drug overdose," "suicide attempt," "beat up by a stranger," and "any accident needing a doctor").

RESULTS

Prevalence

First, we examined the prevalence of the different violent events, as shown in Table 1. Self-reported frequency of suffering cuts was ranked as most frequent, followed by falls, bike or skating accidents, any accident needing a doctor, electric shocks, car accidents, fire burns, suicide attempts, choking, near drowning, accidental gun firing, being mugged, poisoning, and drug overdose, in that order. Also, as one would expect, events resulting in serious injuries were reported as less prevalent than the overall

TABLE 2
Significant Univariate Correlations Of Predictors With Events
After Using the Multistage Bonferroni Procedure

	Falling down, leading to a injury	Bike or Skating accident	Electrical shocks	Car accident	Fire burns	Suicide attempt	Suffocation (choking)	Drowning or near drowning	Accidental gun firing	"Beat up" by a stranger	Poisoning	Drug overdose
Times tried ST			.15			.18	.16					.18
Times I will use ST in next 12 months						.17						.16
Times tried cigarettes			.15		.13	.28	.15		.14	.16		.26
Times I will smoke cigarettes in next 12 months						.28				.15		.27
Will become a smoker			.18		.17	.28				.15		.24
Times tried alcohol	.13					.23						.17
Times I will drink alcohol in next 12 months	.13					.21						.17
Will become a heavy drinker	.15					.19						.23
Parents usually do not know where you are			.15	.19		.24		.17	.18		.16	.28
Adults usually not with you after school and weekends						.17						.17
Family nags me					.17	.18					.17	
Family does not understand me					.21	.22						

TABLE 2 (cont'd)
Significant Univariate Correlations Of Predictors With Events
After Using the Multistage Bonferroni Procedure

	Falling down, leading to a injury	Bike or Skating accident	Electrical shocks	Car accident	Fire burns	Suicide attempt	Suffocation (choking)	Drowning or near drowning	Accidental gun firing	"Beat up" by a stranger	Poisoning	Drug overdose
I have a lot of arguments with my family						.23						.20
Participation in drama or dance		.14										
I like to take chances						.16						
I enjoy doing things people say should not be done						.15						.18
Worth getting into trouble						.18			.18	.15	.16	
I do not have a lot of good qualities						.20						.18
I am not satisfied with myself						.16						
I do not sleep well at night						.16						
In the last month, I have often felt unable to control the important things in my life						.17						
Feel lonely when with my family										.17		
Feel lonely when with my friends						.18						
I do not compliment others										.17		

Because few studies predict violent event self-reports from a variety of psychosocial items, we were liberal in retaining items for subsequent analysis.

prevalence of the events (i.e., minor injuries are more prevalent than serious injuries).

Preliminary Selection of Items

Next, we selected psychosocial predictors. We used a procedure to screen a subset of items from a rather large item set. Because few studies predict violent event self-reports from a variety of psychosocial items, we were liberal in retaining items for subsequent analysis. On the other hand, we also needed to correct for chance associations (i.e., alpha inflation). As a compromise, we took the following approach. First, for each event, we combined the two items pertaining to the same event to form a 3-point ordinal scale (the event did not happen to the youth; the event happened to the youth, but there were no serious injuries; the event happened to the youth, and there were serious injuries). Then, we created a correlation matrix between all selected questionnaire items and the 14 violent-event items. Next, we removed from further analysis any items not found to correlate at $p < .05$ (minimum r was .07) with any of the 14 violent events (as coded on the 3-point scale). We found 73 of 101 items to correlate at $p < .05$ with at least one of the 14 events. Third, we used the multistage Bonferroni procedure to correct for alpha inflation.²⁸ In the first stage of the procedure, the univariate significance level is divided by the number of tests calculated to create an overall level. One then performs each of the individual tests at this overall level. We examined each accident separately, which reduced the number of correlations used in calculation of an overall alpha level. For each of the accidents, the univariate level of .05 was divided by 73 tests, requiring an

overall significance level of .0007 (minimum r was .13). The correlations achieving this level of significance are removed, and then the next stage of the procedure divides the univariate level by the remaining number of tests that had not achieved significance in the prior stage of the procedure. There were 24 significant predictors that were retained at the end of this procedure as shown in Table 2.

Association of Sets of Predictors and Events

Next, we completed a canonical correlation analysis. This analysis provides a multivariate test of the correlation between the set of predictors and the set of events.^{29,30} More specifically, this analysis derives a linear composite of psychosocial items and a linear composite of events so as to obtain the highest attainable correlation between the composites. Also, this analysis permits derivation of additional composites of different items and events that are maximally correlated with each other and minimally correlated with other pairs of composites. The present analysis used 23 psychosocial items as the predictor set and 11 trichotomous violent-event items as the outcome set. Two events (cuts and any accident needing a doctor) were not included because they did not correlate with any psychosocial items. One event was not included because it correlated with only one psychosocial item, which did not correlate with any other event (bike or skating accident with participation in drama or dance).

This analysis revealed two factors of events and items with correlations significantly greater than zero (Factor 1 approximate $F=1.65$, $p < .0001$, squared canonical correlation=.27; Factor 2 approximate $F=1.34$, squared canonical correlation=.17). Only 5 of 23 items did not load on either factor at an item-canonical factor correlation of .30 or greater (feeling of being misunderstood by family, enjoyment of taking risks, enjoyment of doing things people say shouldn't be done, perceived stress, and not sleeping well). Only one of 11 events did not load on either factor at an event-canonical factor correlation of .30 or greater (suffering electric shock; loaded .29 on the first factor). Together, the two event-item factors accounted for 44% of the variance of the relation between the set of predictors and the set of events.

TABLE 3
Canonical Loadings For The Predictor Set and
The Outcome (Event) Set

Predictor Set	Factor One	Factor Two
Times tried ST	.49	-
Times I will use ST in next 12 months	.43	-
Times tried cigarettes	.47	-
Times I will smoke cigarettes in next 12 months	.64	-
Will become a smoker	.49	-
Times tried alcohol	.43	-
Times I will drink alcohol in next 12 months	.36	-
Will become a heavy drinker	.48	-
Parents usually do not know where you are	.31	-
Adults usually not with you after school and weekends	.48	-
Family nags me	-	.47
I have a lot of arguments with my family	.39	.34
Worth getting into trouble	.37	.49
I do not have a lot of good qualities	.63	-
I am not satisfied with myself	.33	-
Feel lonely when with my family	-	.33
Feel lonely when with my friends	.34	-
I do not compliment others	-	.42
Outcome Set	Factor One	Factor Two
Falling down, leading to an injury	-	.34
Car accident	-	.43
Drowning or near drowning	-	.50
"Beat up" by a stranger	-	.70
Poisoning	.33	.61
Accidental gun firing	.41	.57
Suffocation (choking)	.35	.55
Fire burns	.39	.46
Suicide attempt	.87	-
Drug overdose	.86	-

Note. Only canonical loadings equal to or greater than .30 are listed.

Items that showed an item-canonical factor correlation of .30 or greater on the first factor included all eight items pertaining to cigarette, smokeless tobacco, or alcohol use, the two latchkey items, one family conflict item pertaining to having a lot of arguments with the family, the two self-esteem items, and the one item pertaining to feeling lonely around friends (item-factor correlations ranged from .31 to .63). Events that showed the highest event-factor correlations on the first factor included drug overdose and suicide (event-factor correlations equal

to .86 and .87). The choking, burn, gun firing, and poison events also showed event-canonical factor correlations of .30 or greater on the first factor (.33 to .41); however, these events loaded much more strongly on the second factor (.47 to .61). In summary, the first set of items and events encompasses the prediction of drug overdose and suicide from drug use behavior, parental absence and arguments with the family, low self-esteem, and loneliness when with friends.

Item-factor correlations equal to or greater than .30 on the second factor

The rank order of the categories assessed in the present study was fairly consistent with the mortality literature . . .

included two of the three family conflict items (feeling nagged by family, arguing with family), one of the three risk-taking items (willingness to get into trouble to have fun), the item pertaining to feeling lonely around the family, and one assertiveness item (not complimenting others). Having lots of arguments with the family loaded almost equally on both factors; however, feeling nagged by the family loaded only on the second factor. Thus, family conflict probably is more central to the second factor. Events correlating most strongly with the second canonical factor included choking, accidental gun firing, fire burns, poisoning, drowning, car accidents, mugging, and accidental falls. In summary, the second set of items and events encompasses the prediction of most of the accidents, as well as reports of being mugged, predicted from family conflict (nagging and arguments) and feeling lonely around the family, a willingness to get into trouble to have fun, and not tending to compliment others.

DISCUSSION

The present analysis first described the prevalence of self-reported nonfatal accidents among a sample of eighth graders and compared these data to available mortality data. The ranking of violent deaths among 10-to-14-year-olds in the literature from most to least prevalent consists of car accidents (43.2%), drowning (14.3%), homicide (6.5%), guns (6.3%), fire (5.4%), suicide (4.9%), falls (1.9%), poisoning (1.8%), and suffocation (1%).^{2,4} The rank order of the categories assessed in the present study was fairly consistent with the mortality literature, even though the present self-report data obviously did not result in fatal consequences. Thus, these findings follow a plausible pattern even if one assumes that the probability of each event transforming into a subsequent mortality is equal across events.

The general pattern of prevalence of the events and the fact that serious events were reported as less prevalent than the overall occurrence of the events provide some (albeit indirect) evidence that the prevalences of different self-reported events may be predictive of mortality resulting from suffering the same type of violent events.

After the prevalence data were described, the analysis highlighted the use of an iterative procedure to explore the psychosocial prediction of self-reported violent events. First, a finite set of predictors was selected by making use of a correction test for multiple item-event correlations. Only 24 of 108 items were retained. The set of predictors resulting from this procedure is consistent with previous research that suggests problem-prone attributes predict violent events. Eight of the items retained pertained to drug use, two items pertained to parental absence, three items pertained to family conflict, three items pertained to risk-taking, two items pertained to self-esteem, and the remaining items pertained to some aspect of perceived stress or loneliness.

Second, a canonical correlation analysis was completed. This analysis indicated two composites of items and events. Drug overdose and suicide attempts were predicted from drug use behavior, parental absence and arguing with family, low self-esteem, and loneliness when with friends. Reports of these two events were highly correlated ($r=.62$). Possibly, self-injurious behavior is being reflected here. Without parental supervision and without adequate emotional compensation from peers or from one's own self-image, one is likely to use drugs to cope with feelings of inadequacy. Continued use, coupled with subjective feeling of lack of social support, may lead to accidental or intentional overdoses, as well as to thoughts of suicide. This item-event composite is consistent with the notion, suggested by Woznica and Shapiro, that feeling expendable (unwanted, dispensable, hopeless) is a primary characteristic or cause of suicidal adolescents.¹⁸

On the second overlapping set of items and events, most of the accidents, as well as reports of being mugged, were predicted from family conflict and feeling lonely around the family, a willingness to get into trouble to have fun, and a tendency not to compliment others. This

item-event overlap seems most consistent with the notion of the angry problem-prone adolescent who is in constant fights with the family and is trouble seeking. It would not be surprising if such youth approach dangerous objects or enter dangerous situations, leading to unwanted consequences.³¹

It should be mentioned that not all events were predicted well by the pool of predictor items. Still, examinations of their univariate item-event correlations suggest that they might fit into this problem behavior typology. For example, no multivariate predictors were found for accidental cuts. Yet several univariate correlates of accidental cuts, which did not meet the first criterion of our procedure, were still highly significant ($p < .005$). These were number of times alcohol will be drunk in the next year, preference for taking risks, and being worth getting into trouble to have fun. Although not a perfect match, this event seems best predicted by the variables composing the second type of problem-prone youth (trouble seeking). Thus, this two-type problem behavior typology may be applicable to other events as well.

Although these results are encouraging, there are several limitations to the interpretations of these findings. First, as previously mentioned, both the items and events are self-reported information. Whereas the present findings support and extend previous research, future studies should attempt to obtain other sources of data, including school nurse or medical records, if possible.

Second, our iterative analytical procedure was imperfect. This procedure will not always provide consistent summaries of the data because the first method involves essentially a conservative univariate approach, whereas the second method involves a multivariate item reduction approach. The main inconsistency we found was that, using the alpha level correction procedure, reports of suffering a car accident in the last year were correlated only with one latchkey type item (parents knowing where the youth is). On the other hand, the canonical correlation analysis indicated that reports of car accidents loaded on the second factor (event-total factor $r = .55$), which was predicted by family conflict and willingness to get into trouble to have fun, but not by absence of parents. Despite such

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potential inconsistencies resulting sometimes by use of this iterative analytic procedure, the univariate approach remains very useful as a means to screen a subset of variables from a large pool of items. It permits manageable subsequent multivariate analysis.

A third problem with this type of study is that even though the study was prospective, unmeasured variables cannot be ruled out in interpretation of relations found between predictors and events. This study examines prediction of self-reported violent events; causal influences are not made on the basis of such data. For example, problem-prone youth might be more likely to report involvement with violent events than are other youth. Still, this study suggests a fruitfulness to using such precursor variables to identify youth at risk for future serious consequences from violent events, especially since several of these variables are consistent with others found in the literature.

In conclusion, a syndrome of problem behavior, predicted by personality and perceived social environmental variables reflecting deviance or unconventionality,¹¹ appears to summarize not only drug use, precocious sexual behavior, and delinquency, but also exposure to violent events. The present data extend the problem behavior literature because they suggest that two types of problem-prone adolescents are associated with two types of violent events. One type of adolescent may be rather depressed and intentionally self-injurious, related to variables including parental absence, family arguments, and low self-esteem. Prevention activities relevant to this first type of youth may include self-esteem enhancement and family involvement strategies. A second type may be rather angry and unintentionally self-injurious, related to conflicts and dissatisfaction with the family and other people and a tendency to exhibit trouble-seeking behavior. Preven-

tion strategies relevant to this second type of youth may include anger self-management and assertiveness training. Future research should further explore the applicability of this typology to prediction of different violent events. ■

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