

Violence Exposure and Drug Use in Central American Youth: Family Cohesion and Parental Monitoring as Protective Factors

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Associations between witnessing serious violence and drug use, and the protective influences of family cohesion and parental monitoring, were

investigated among 9,840 adolescents (50.5% female, M age = 15.29 years, $SD = 1.76$) living in Panama and Costa Rica. After accounting for demographics and parental and sibling substance use, witnessing serious violence was associated with greater drunkenness, tobacco use, number of illicit drugs used, and problems with drugs and alcohol. In every analysis, exposure to violence was associated with more drug use, while family cohesion and parental monitoring attenuated risk. Further, family cohesion and parental monitoring exerted a protective-stabilizing effect on number of illicit drugs used and on problems with drugs and alcohol. There were few interactions with age. Implications for prevention are discussed.

Violence exposure and drug use are serious problems for youth both within and outside of the United States (Johnston, O'Malley, & Bachman, 1995; Weaver & Maddaleno, 1999). In addition to previous work documenting associations of exposure to violence and internalizing and externalizing problems (Lynch, 2003), several researchers have now documented links between community violence exposure and substance use (e.g., Berenson, Wiemann, & McCombs, 2001; Brook et al., 2001; Kilpatrick et al., 2000; Sullivan, Kung, & Farrell, 2004; Vermeiren, Schwab-Stone, Deboutte, Leckman, & Ruchkin, 2003). To our knowledge, with the exceptions of Brook and colleagues, who studied youth in Colombia, South America, and Vermeiren and colleagues whose work included adolescents in Belgium and Russia, studies of violence exposure and drug use have sampled youth living in the United States.

Although the links between exposure to community violence and substance use in youth have now been established, we could locate only two studies (Kung & Farrell, 2000; Sullivan et al., 2004) that have examined family factors that might attenuate these associations. Both studies were conducted with young adolescents living in the United States. Both found that parental monitoring or family support were protective for youth. These studies, however, sampled youth with lower levels of violence exposure than seen in the present study, and focused on drug use initiation. A third study examined a range of family factors that might be protective against drug use (Brook et al., 2001). However, that study focused on the protective effects of family factors in light of illegal drug use among family members, and did not specifically examine interactions of violence exposure and family factors predicting adolescent drug use. Further, their measure of violence exposure assessed victimization and not witnessing violence. None of these three studies examined problems associated with alcohol or drug use (Clark & Winters, 2002), which is actually more relevant than levels of use *per se* in predicting substance abuse and dependence problems. The present large-scale epidemiologic study was conducted in Panama and Costa Rica, and was designed to extend

previous work linking exposure to violence and substance use in a context where violence was a growing cultural problem, and to replicate the findings that parental monitoring and family support were protective against violence in a different social and cultural milieu.

Exposure to Violence and Adolescent Substance Use

Most of the research on violence exposure and drug use to date has revealed strong associations between victimization and youth substance use and abuse, but witnessing violence also is associated with increased risk of adolescent substance use and abuse. From a public health perspective, witnessed violence is an important risk factor because many more adolescents witness versus experience violence, and therefore, given its strength of association witnessing violence accounts for greater attributable risk (Rothman & Greenland, 1998) than experiencing violence. In a sample of 517 sexually active adolescent girls who presented for contraceptive care, those girls who had witnessed violence (but had not experienced violence themselves) were 2.5 times as likely to report using marijuana in the past year as adolescents who had not been exposed to violence (Berenson et al., 2001). Recent work by Sullivan et al. (2004) demonstrated a prospective relationship between witnessing violence and subsequent drug use initiation among 1,400 sixth graders living in rural areas. Statistically significant odds ratios for violence exposure ranged from 1.20 to 1.56 depending on the drug studied. Kilpatrick et al. (2000) demonstrated that witnessing violence was related to DSM IV criteria for substance abuse of alcohol, marijuana, and hard drugs among 3,900 randomly selected adolescents after controlling for age, sex, ethnicity, familial alcohol and drug problems, and history of physical and sexual assault. Odds ratios ranged from 2.73 for alcohol abuse/dependence to 4.58 for marijuana abuse/dependence. Vermeiren et al. (2003) found that witnessing violence was associated with increased odds for tobacco, alcohol, marijuana, and hard drug use among adolescents in Belgium, Russia, and the United States. After controlling for demographic variables and violent behavior by the adolescents, odds for substance use comparing youth who never witnessed violence rather than those who witnessed two or more events ranged from 1.43 to 5.18, depending on the country and substance being studied. There are many possible explanations for the above findings, including stress reduction. Simantov, Schoen, and Klein (2000) reported that stress reduction was a main reason North American youth used drugs.

A number of parent and family factors are protective against adolescent substance use. We chose to focus on two potential protective factors—

family cohesion/support and parental monitoring—that have been examined in the context of community violence exposure and have received empirical support with samples in the United States. Further, family cohesion and parental monitoring are important in Hispanic cultures (Garcia-Coll, Meyer, & Brillion, 1994). Parental monitoring refers to the extent to which parents “keep tabs” on their adolescents and know how and with whom they are spending their time. Family cohesion reflects an environment where members care about one another and enjoy spending time together. Theoretically, both parental monitoring and family competence are key protective factors because they meet adolescents’ needs for structure, security, and connection (Roth & Brooks-Gunn, 2000). Adolescents who are exposed to violence, but who live in families where parents monitor what they do and where there is a sense of family connectedness may be less likely to use substances for several reasons. Because these adolescents know there are boundaries to their behavior, and that their parents will check up on them, they may find that there are fewer opportunities to use drugs as well as a lower likelihood of being exposed to violence. Further, the concern from parents that monitoring conveys, and the connection to family may give adolescents coping resources to manage negative affect produced by exposure to violence. Several empirical studies support these notions. For example, in a study of 5,775 adolescents living in Colombia, South America, who were exposed to serious violence against a family member, Kliower, Murrelle, Mejia, Torres, and Angold (2001) found that family support, including disclosure of feelings to mother and family cohesion, reduced the relation between violence exposure and internalizing symptoms, particularly anxiety. Family support provided a level of protection not observed with support from friends. The authors argue that this is because parents are better able to meet the emotional needs of adolescents than are peers, and on average are better able to listen and respond effectively.

Developmental Issues

Associations between exposure to violence, family cohesion and parental monitoring, and substance use and abuse could be moderated by age. From a developmental perspective, monitoring might become less effective as adolescents age. Most parental monitoring is dependent on flow of information from the adolescent to the parent (Kerr & Stattin, 2000). As adolescents age, they have increased cognitive capacities, and are better able to anticipate parental objections to activities in which they want to engage. Thus, with age, adolescents use more *strategic disclosure* (Dowdy,

1995) to achieve their behavioral autonomy goals, and regulate the flow of information to parents more tightly, reducing the potential protective effects of monitoring. On the other hand, the need for monitoring increases as youth age and are exposed to a wider sphere of influence. An additional goal of this research was to determine whether the extent of protection afforded by parental monitoring or family cohesion varied across age. This study differs from other work on violence exposure and substance use by including a broad age range, and by specifically examining age as a moderator.

The Present Study

In sum, this large-scale epidemiological study focused on the role of family cohesion and parental monitoring affecting the relation between exposure to serious violence and substance use and abuse in youth, and examined age as an additional moderator of these associations. The study was located in Panama and Costa Rica, two countries that have seen considerable change in recent years that has heightened the risk for youth violence exposure, yet at the same time provide a cultural context that values close family connections and support. These two countries differ in important ways. At the time of this study, drug trafficking and guerrilla violence in Colombia had led many Colombian citizens to relocate to Panama. Increases in violence in Panama unfortunately followed. Unemployment was high (13.9% overall—with rates as high as 18.5% in the provinces studied). Shortly after the migration to Panama, two very different groups—Colombians who were primarily middle and upper middle class citizens and Nicaraguans who were mainly underprivileged—began to relocate to Costa Rica and the social dynamic there changed dramatically, mainly toward greater violence. Up to that point in history, Costa Rica had been one of the least violent countries in the world. Costa Rica has a lower unemployment rate than Panama (4.6% overall, with rates as high as 6.8% in the provinces studied). Homicide rates are fairly similar between the United States and Panama, but are lower in Costa Rica (Pan American Health Organization, 1996). Replication across Panama and Costa Rica would weaken the argument that the observed associations between exposure to serious violence and drug use were spurious.

Hypotheses

We hypothesized that (1) witnessing serious violence would be associated with greater lifetime drug use, (2) parental monitoring and family cohe-

sion would be associated with less exposure to serious violence, (3) parental monitoring and family cohesion would attenuate associations between witnessing serious violence and lifetime drug use; and (4) parental monitoring would be less effective as adolescents moved closer to adulthood.

METHOD

Participants

The current sample comprised the first portion of a larger collaborative, cross-sectional study of risk and protective factors of adolescent drug use/dependence as well as violence among several Latin American countries. The sample included 9,840 youth attending public and private schools in Panama ($n = 4,599$) and Costa Rica ($n = 5,241$). Slightly more than half (50.5%) of the youths were female, and their mean age was 15.29 years ($SD = 1.76$ years, range = 12–21 years). Two thirds (63.5%) lived with both their mother and father, which is consistent with samples drawn from other Hispanic countries (e.g., Brook et al., 2001). Twenty-one percent of the sample lived in mother-only households, and the remaining sample resided in a variety of family structures. No information was available on family-level socioeconomic status or other family demographic information.

Design and Procedure

A stratified random sampling methodology with some modifications was used. Because psychoactive substance abuse is still a rare event in the epidemiological sense within this age group, the sampling frame was defined by all schools in the four regions of each country found to have the highest prevalence of adolescent alcohol and drug use in the most recent epidemiologic study in the area. Thus, “enrichment” of the study group by selected sampling of children from environments with known risk for drug use was designed to increase the power to detect significant effects of risk factors with regard to outcomes of interest.

In Costa Rica, a small number of schools in regions satisfying sampling criteria were eliminated from consideration as a result of recent student participation in another intensive survey study on drug use. Ultimately, the provinces of San José, Heredia, Puntarenas, and Limón were selected for inclusion in Costa Rica, while the provinces of Panama, Colon, Chiriqui, and Bocas del Toro were selected in the Republic of Panama. Schools and classrooms from the above provinces were then randomly

selected using multistage cluster sampling stratified by age, sex, and geographic region. The population of the four regions studied was broadly representative of each country. Indeed, the most recent census data indicate that from two-thirds (Costa Rica) to three-fourths (Panama) of the population reside in these provinces.

All IRB standards in both countries were met. Two weeks before the day of the study, parents received a letter from the school principal explaining the study and giving them the opportunity to "opt out" on behalf of their children. Parents who did not wish their child to participate returned the consent form to the school with their disapproval. Students also had the opportunity to opt out of the study on the day of testing. All students present in the selected classrooms on the day of the survey who had not opted out of the study were included in the target sample. Less than 1% of the students chose not to participate, which is consistent with other epidemiological research in Latin America. Absenteeism also was low ($\sim 2\text{--}3\%$) and students who were absent on the day of the survey were not replaced.

Research monitors, most with professional level education and who were specifically trained in the goals and methods of the study, informed the students carefully about the study and gave students an opportunity to refuse or to discontinue participation at any time. No compensation was offered for participation in the study. Research monitor training was manualized to provide consistency within and across countries. Research staff was available to answer the questions of individual students. Official school personnel, including classroom teachers, were absent during the average 40-minute administration. Monitors underscored that the students' responses were confidential, meaning their responses would not be seen by anyone other than research staff. Students were not allowed to write their names on the questionnaires and were cautioned not to look at the responses of their peers. These conditions are known to promote valid responses by adolescents to drug abuse-related questionnaires (Bachman, Johnston, & O'Malley, 1996). In spite of opportunities for nonparticipation, cooperation was greater than 98% in both countries. Data collection took place during the first 6 months of 2001.

Measures

Measurement Strategy. Because of the epidemiologic focus of the study, the number of items representing each construct was restricted. Prior field work had indicated to the investigators that Latin American adolescents, particularly younger youth, performed best on surveys

requiring no more than 45 minutes to complete. A pilot study of an adolescent Panamanian sample ($N = 988$), ages 11–19 years, was completed to guide construction of the current study with the goal of using a reduced number of items for each of 18 specific instruments identifying risk/protective factors and behavioral outcomes while maintaining individual item reliability and factor structures of the original instruments (Murrelle et al., 2001). Most of the instruments or items used in the current study had been used extensively in epidemiologic drug abuse research in Latin America and the Caribbean since 1990.

All items in the study questionnaire were translated by a team of bilingual (English–Spanish) mental health professionals, including psychiatrists, psychologists, social workers, educators, and epidemiologists. Given known idiomatic differences between countries in Latin America, the translation team was intentionally comprised of representatives of Central, South, and North America, and considerable effort was made to use common language that was understandable to youths in all regions. In cases in which youths in one country were known to be significantly more familiar with a particular idiom or vernacular, minimal exceptions were made for that specific culture to maximize response validity. Back translation was used to ensure that the “content and spirit” of every original item was maintained.

Demographics. A demographic form was used to assess age, sex, and family structure. For the purposes of analysis, youth who reported living with both parents were compared with all other youth. Not living with both mother and father was coded 0, and living with both mother and father, 1. Females were coded 0, males 1. Age was treated as a continuous variable.

Family drug use. Lifetime frequency of family drug use was assessed with two items obtained from the Drug Use Screening Inventory (DUSI, Family System Domain; Tarter, Kirisci, & Mezzich, 1996) by asking participants how often certain behaviors occur in the home. One item asked about the frequency of parental use of drugs or alcohol, and the other inquired about the frequency of sibling drug use, in particular use of drugs and alcohol that caused problems in the home, with items specifically worded as “One of your parents (siblings) used alcohol or drugs to the point of causing problems at home.” Response options on both items ranged from 0 (never occurring) to 3 (always occurring) and were summed to reflect a scale score of family drug problems. As a result of the skewed distribution of responses, these items were recoded to

reflect any events of family drug use (0 = no family drug use, 1 = any family drug use).

Violence exposure. Lifetime witnessing of violence was assessed with five items from the Children's Report of Exposure to Violence (CREV; Cooley, Turner, & Biedel, 1995) assessing exposure to serious violence. Response options ranged from 0 (never) to 3 (many times) and were summed to create a scale score for violence exposure, with a total possible range for the index of 0–15. Items measuring violence exposure were introduced using the question, "In real life and not on television, have you ever seen any of the following": and specifically referred to witnessing someone being harassed or threatened, a robbery, a shootout, a stabbing, or a killing. Cronbach's α for the measure was .82. Cooley et al. report excellent reliability and validity.

Protective factors. Two distinct types of family protective factors—family cohesion and parental monitoring—were assessed. Family cohesion was assessed with eight items based on the Family Environment Scales (FES; Moos & Moos, 1994). Items assessing positive and negative family functioning were included in the protocol. Factor analyses of these indicated that items assessing parental and family conflict loaded on a different factor than items reflecting family cohesion. Because this study focused on protective factors, only the cohesion items were used. Response options on the cohesion items ranged from 0 (never) to 3 (always), and summed to create a scale score for family cohesion. Possible range for the scale was 0–24. Cronbach's α for the measure was .85. Items measuring family functioning were introduced using the question "How often do the following occur in your home?" Specific items such as "Family members really help one another" and "There is a feeling of togetherness in our family" were used to measure family cohesion. Parental monitoring was assessed with a one-item indicator, "Your parents or guardians do not know where you have been or what you were doing." Scores on this item ranged from 0 (never) to 3 (always) and were reverse coded, so that higher scores indicated greater monitoring.

Youth drug use and drug problems. Lifetime use of nine substances, including alcohol (beer, wine, liquor), cigarettes, inhalants, marijuana, tranquilizers, other non-prescription drugs, and cocaine; lifetime drinking to the point of drunkenness; and 13 symptoms of alcohol and drug use dependence served as the outcome variables in the study. This comprehensive assessment was driven by the overall aims of the collaborative project with the intent of determining differences in

mechanisms of explanatory variables between alcohol, cigarettes, and other drugs. These self-report variables were assessed using items adapted from the Monitoring the Future project (Bachman et al., 1996) and the DUSI (Tarter et al., 1996). Questions specifically asked the respondent "How many times have you consumed the following types of alcohol or drugs in your life?" Specific substances were then listed. The response scale for lifetime use of substances and drinking to drunkenness was 0 (never), 1 (once or twice), 2 (three to four times), and 3 (five or more times). Because of the overlap between lifetime alcohol use and lifetime drunkenness, only drunkenness was used in the present study. Further, because of the low usage of substances other than alcohol and tobacco, an index was created to represent the number drugs other than alcohol and tobacco ever used. Problems with alcohol and drugs were assessed on 9- and 10-item scales, respectively. Response options ranged from 0 (never) to 3 (five or more times), with higher scores indicating greater problems. Cronbach's α for alcohol problems was .80 and .88 for drug problems. Thus, there were five outcomes in the present study: lifetime drunkenness, lifetime tobacco use, number of drugs other than alcohol or tobacco ever used, problems with drugs, and problems with alcohol.

RESULTS

Descriptive Information

Descriptive information on the study variables is presented in Table 1, separately by country. As seen in Table 1, there were small but significant differences between youth living in Panama versus Costa Rica on most of the study variables. A significant number of youth had been exposed to serious violence. Over half of the sample (55.1%) had witnessed a robbery, a third of the sample (35.6%) had seen a shootout, 24.3% had witnessed a stabbing, and 18.3% had seen a killing. Overall, 27.6% of the sample reported being drunk at some point in their life, and 39.6% reported using tobacco. The number of drugs besides alcohol and tobacco that had been used ranged from 0 to 9, with 27.9% of the sample reporting trying at least one other drug.

Analytic Strategy

The intent of this study was fourfold: (1) to examine the extent to which family variables predicted exposure to serious violence; (2) to evaluate the association of exposure to serious violence with levels of and problems

TABLE 1
Descriptive Information on Study Variables by Country

| Variable | Panama | | Costa Rica | | p |
|--------------------------------------|--------|------|------------|------|--------|
| | M | SD | M | SD | |
| Age | 15.25 | 1.84 | 15.32 | 1.69 | < .05 |
| % female | 49.7 | | 51.2 | | > .05 |
| % parents with drug/alcohol problem | 15.3 | | 13.6 | | < .01 |
| % siblings with drug/alcohol problem | 9.1 | | 9.1 | | > .05 |
| % lifetime drunkenness | 25.2 | | 29.7 | | < .001 |
| % life tobacco use | 33.8 | | 44.8 | | < .001 |
| Number of drugs used | .37 | .92 | .66 | 1.38 | < .001 |
| Problems with alcohol | 1.55 | 2.82 | 2.17 | 3.88 | < .001 |
| Problems with drugs | .53 | 2.22 | 1.35 | 4.53 | < .001 |
| Violence exposure | 3.70 | 3.95 | 2.75 | 3.27 | < .001 |
| Family cohesion | 17.31 | 5.22 | 16.97 | 5.31 | < .001 |
| Parental monitoring | 2.23 | .94 | 2.34 | .88 | < .001 |

Note. Because of missing data, *N*'s for the Panama sample range from 4,763 to 4,903, and *N*'s for the Costa Rican sample range from 5,442 to 5,517.

with alcohol and drug use; (3) to examine family cohesion and parental monitoring as protective factors of associations between violence exposure and drug use; and (4) to examine the extent to which the protective effects of family cohesion and parenting monitoring change with age. Gender, family structure, and history of family problems with drug or alcohol use were included as control variables in order to examine the unique contributions of violence, family cohesion, and parenting monitoring to drug use.

For the first question, a hierarchical regression analysis was run. Country was included in this model. For the remaining questions, hierarchical regression analyses were conducted separately by country in order to evaluate the unique contributions of violence exposure and family factors to youth drug use across these cultural contexts. For all analyses, age and gender were entered on step 1, family structure and history of family problems with drug or alcohol use were entered on step 2, violence was entered on step 3, cohesion and monitoring were entered on step 4, all two-way interactions were entered on step 5, and the two three-way interactions (violence \times cohesion \times age and violence \times monitoring \times age) were entered on the final step. The interaction terms allowed us to determine whether the associations between violence exposure and substance use

differed across levels of family cohesion, parental monitoring, and age. Predictor and control variables were centered, and interaction terms were computed from these centered variables (Aiken & West, 1991). Regression coefficients from each step of the analyses are presented. Because of the focus on protective factors in this paper, the significant violence \times cohesion or violence \times monitoring interactions will be emphasized.

Results Predicting Exposure to Violence

The overall model explained 9.6% of the variance in exposure to serious violence, $F(8, 9,831) = 131.81, p < .001$. All terms in the model were significant at the final step at $p < .001$. Country (living in Panama versus Costa Rica; $\beta = -.13$), older age ($\beta = .07$), being male ($\beta = .14$), and parent ($\beta = .04$) and sibling ($\beta = .09$) problems with drugs and alcohol each independently increased the likelihood of exposure to serious violence. In contrast, living in a two-parent household ($\beta = -.06$), having high family cohesion ($\beta = -.05$), and high parental monitoring ($\beta = -.12$) decreased the likelihood of exposure to serious violence.

Results Predicting Levels of Substance Use

Results for youth living in Panama for the outcomes of lifetime drunkenness, lifetime tobacco use, and number of other drugs used are presented in Table 2; corresponding results for youth living in Costa Rica are presented in Table 3. Across both countries, there were main effects of age, gender, family structure, parent and sibling drug use, violence exposure, family cohesion, and parental monitoring on all three outcomes. Being older and male, having parents or siblings with drug or alcohol problems, and being exposed to serious violence increased the likelihood of lifetime drunkenness, tobacco use, and use of drugs other than alcohol and tobacco. Living in a two-parent household, having high levels of family cohesion, and having being exposed to high parental monitoring decreased the likelihood of substance use. However, for the outcomes of drunkenness and tobacco use, there were no violence \times cohesion or violence \times monitoring interactions in either country. For the number of drugs used other than alcohol or tobacco, there was a violence \times monitoring interaction for Costa Rican youth, and a violence \times cohesion interaction for youth in both countries. A plot of the violence \times monitoring interaction (see Figure 1) revealed that as levels of violence increased, number of different drugs used also increased, but this increase was much steeper for youth with low levels of parental monitoring. The vio-

TABLE 2
Regression Analyses Predicting Lifetime Drunkenness, Tobacco Use, and Drug Use for Youth in Panama

| Variable | Outcome Variable | | | | | | | | |
|-----------------------------|------------------|-----|---------|-------------|-----|---------|-----------------|-----|---------|
| | Drunkenness | | | Tobacco Use | | | Number of Drugs | | |
| | B | SEB | β | B | SEB | β | B | SEB | β |
| Cha R ² at step: | .10*** | | | .06*** | | | .00 | | |
| Age | .06 | .00 | .26*** | .06 | .00 | .20*** | .03 | .01 | .06*** |
| Sex | .13 | .01 | .14*** | .06 | .01 | .06*** | .15 | .03 | .08*** |
| Cha R ² at step: | .02*** | | | .01*** | | | .05*** | | |
| Family structure | -.05 | .01 | -.06*** | -.04 | .01 | -.05*** | -.11 | .03 | -.06*** |
| Parent drug use | .06 | .02 | .05*** | .04 | .02 | .03*** | .25 | .01 | .10*** |
| Sibling drug use | .14 | .02 | .09*** | .13 | .03 | .08*** | .51 | .05 | .16*** |
| Cha R ² at step: | .02*** | | | .02*** | | | .03*** | | |
| Violence exposure | .02 | .00 | .15*** | .02 | .00 | .15*** | .05 | .00 | .18*** |
| Cha R ² at step: | .02*** | | | .03*** | | | .02*** | | |
| Family cohesion | -.01 | .00 | -.12*** | -.01 | .00 | -.13*** | -.02 | .00 | -.11*** |
| Monitoring | -.04 | .01 | -.09*** | -.05 | .01 | -.10*** | -.10 | .01 | -.10*** |
| Cha R ² at step: | .00 | | | .00 | | | .01*** | | |
| Violence × monitoring | .00 | .00 | .01 | .00 | .00 | .01 | -.01 | .00 | -.04 |
| Violence × cohesion | .00 | .00 | .01 | .00 | .00 | -.00 | -.00 | .00 | -.07*** |
| Violence × age | .00 | .00 | .05*** | .00 | .00 | .01 | -.00 | .00 | -.02 |
| Cohesion × age | .00 | .00 | .01 | .00 | .00 | .00 | .00 | .00 | .01 |
| Monitoring × age | -.01 | .00 | -.03 | -.01 | .00 | -.04** | -.02 | .01 | -.04** |
| Cha R ² at step: | .00 | | | .00 | | | .00 | | |
| Violence × cohesion × age | .00 | .00 | .02 | .00 | .00 | .03 | .00 | .00 | .03 |
| Violence × monitoring × age | .00 | .00 | -.01 | -.00 | .00 | -.02 | -.00 | .00 | -.02 |

Note. To adjust for the number of analyses, terms significant at $p > .01$ are not noted. Unstandardized β weights, standard errors for β 's, and standardized β weights are presented from the step of the regression model at which they were entered. For drunkenness, $R^2 = .157$, $F(15, 4,583) = 58.29$, $p < .001$. For tobacco use, $R^2 = .119$, $F(15, 4,583) = 42.43$, $p < .001$. For number of drugs used, $R^2 = .117$, $F(15, 4,583) = 41.63$, $p < .001$.

** $p < .01$; *** $p < .001$.

lence × cohesion interaction effect was similar across both countries. Plots of these interactions revealed a pattern almost identical to that of the violence × monitoring interaction. There were no three-way interactions with age for the outcomes of drunkenness, tobacco use, or number of other drugs used, indicating, the protective processes operated similarly for these outcomes across the periods of development assessed in this study.

TABLE 3
Regression Analyses Predicting Lifetime Drunkenness, Tobacco Use, and Drug Use for Youth in Costa Rica

| Variable | Outcome Variable | | | | | | | | |
|-----------------------------|------------------|-----|---------|-------------|-----|---------|-----------------|-----|---------|
| | Drunkenness | | | Tobacco Use | | | Number of Drugs | | |
| | B | SEB | β | B | SEB | β | B | SEB | β |
| Cha R ² at step: | .08*** | | | .00 | | | .02*** | | |
| Age | .07 | .00 | .27*** | .06 | .00 | .20*** | .10 | .01 | .13*** |
| Sex | .07 | .01 | .07*** | .04 | .01 | .04*** | .20 | .04 | .07*** |
| Cha R ² at step: | .03*** | | | .03*** | | | .08*** | | |
| Family structure | -.06 | .01 | -.06*** | -.08 | .01 | -.08*** | -.49 | .04 | -.15*** |
| Parent drug use | .11 | .02 | .08*** | .07 | .02 | .05*** | .49 | .05 | .12*** |
| Sibling drug use | .21 | .02 | .13*** | .19 | .02 | .11*** | .75 | .06 | .16*** |
| Cha R ² at step: | .02*** | | | .02*** | | | .10*** | | |
| Violence exposure | .03 | .00 | .16*** | .03 | .00 | .16*** | .17 | .01 | .33*** |
| Cha R ² at step: | .03*** | | | .03*** | | | .03*** | | |
| Family cohesion | -.01 | .00 | -.11*** | -.01 | .00 | -.11*** | -.03 | .00 | -.10*** |
| Monitoring | -.06 | .01 | -.12*** | -.07 | .01 | -.13*** | -.22 | .02 | -.14*** |
| Cha R ² at step: | .00 | | | .00 | | | .03*** | | |
| Violence × monitoring | .00 | .00 | .02 | .00 | .00 | .01 | -.06 | .01 | -.12*** |
| Violence × cohesion | -.00 | .00 | -.03 | .00 | .00 | .00 | -.01 | .00 | -.08*** |
| Violence × age | .00 | .00 | .01 | .00 | .00 | .00 | .01 | .00 | .04** |
| Cohesion × age | .00 | .00 | .02 | .00 | .00 | .01 | .00 | .00 | .00 |
| Monitoring × age | -.01 | .00 | -.04** | .00 | .01 | -.00 | -.02 | .01 | -.02 |
| Cha R ² at step: | .00 | | | .00 | | | .00 | | |
| Violence × cohesion × age | .00 | .00 | .01 | .00 | .00 | .02 | .00 | .00 | .02 |
| Violence × monitoring × age | .00 | .00 | .02 | .00 | .00 | .00 | .00 | .00 | .01 |

Note. To adjust for the number of analyses, terms significant at $p > .01$ are not noted. Unstandardized β weights, standard errors for β 's, and standardized β weights are presented from the step of the regression model at which they were entered. For drunkenness, $R^2 = .167$, $F(15, 5,225) = 70.81$, $p < .001$. For tobacco use, $R^2 = .123$, $F(15, 5,225) = 48.775$, $p < .001$. For number of drugs used, $R^2 = .259$, $F(15, 5,225) = 123.41$, $p < .001$.

** $p < .01$; *** $p < .001$.

Results Predicting Problems with Alcohol and Drug Use

Table 4 summarizes findings for both Panama and Costa Rica predicting problems with alcohol and problems with drugs. As with the previous three outcomes, there were main effects of age, gender, family structure, parent and sibling drug use, violence exposure, family cohesion, and parental monitoring on problems with alcohol and drugs across both coun-



FIGURE 1 Interaction of violence exposure and parental monitoring predicting number of drugs used other than alcohol and tobacco.

tries. Similar to the finding with number of other drugs used, there was a violence \times monitoring interaction predicting problems with alcohol for the Costa Rican sample. Violence \times monitoring and violence \times cohesion interactions were present predicting problems with drugs for both countries. The violence \times monitoring and violence \times cohesion interactions mirrored the pattern observed with number of drugs used. Unlike the previous analyses, however, age moderated the interactions predicting problems with alcohol and drugs. For youth living in Panama, there was a violence \times cohesion \times age interaction predicting problems with alcohol. (This interaction was significant at $p < .05$ for youth living in Costa Rica.) For youth living in Costa Rica, there was a violence \times cohesion \times age interaction predicting problems with drugs. Figure 2 presents the violence \times family cohesion \times age interaction for problems with alcohol; the interaction for problems with drugs was similar. As seen in Figure 2,

TABLE 4
Regression Analyses Predicting Problems with Alcohol and Drugs for Youth in Panama and Costa Rica

| Variable | Outcome Variable and Country | | | | | | | | | | | |
|-----------------------------|------------------------------|-----|---------|---------------------|-----|---------|-----------------------|-----|---------|---------------------|-----|---------|
| | Panama | | | | | | Costa Rica | | | | | |
| | Problems with Alcohol | | | Problems with Drugs | | | Problems with Alcohol | | | Problems with Drugs | | |
| | B | SEB | β | B | SEB | β | B | SEB | β | B | SEB | β |
| Cha R ² at step: | .06*** | | | .02*** | | | .04*** | | | .03*** | | |
| Age | .27 | .02 | .17*** | .05 | .02 | .04*** | .40 | .03 | .18*** | .28 | .04 | .11*** |
| Sex | .84 | .08 | .15*** | .51 | .07 | .11*** | .59 | .10 | .08*** | 1.12 | .12 | .13*** |
| Cha R ² at step: | .05*** | | | .05*** | | | .06*** | | | .08*** | | |
| Family structure | -.10 | .08 | -.02 | -.18 | .07 | -.04** | -.65 | .11 | -.08*** | -.61 | .13 | -.17*** |
| Parent drug use | .56 | .12 | .07*** | .67 | .09 | .11*** | 1.32 | .15 | .12*** | 1.59 | .18 | .12*** |
| Sibling drug use | 1.86 | .14 | .19*** | 1.21 | .12 | .16*** | 2.09 | .18 | .16*** | 2.26 | .21 | .15*** |
| Cha R ² at step: | .04*** | | | .02*** | | | .06*** | | | .09*** | | |
| Violence exposure | .17 | .01 | .19*** | .10 | .01 | .15*** | .37 | .02 | .25*** | .53 | .02 | .31*** |
| Cha R ² at step: | .04*** | | | .02*** | | | .04*** | | | .02*** | | |
| Family cohesion | -.08 | .01 | -.14*** | -.04 | .01 | -.09*** | -.08 | .01 | -.11*** | -.06 | .01 | -.07*** |
| Monitoring | -.40 | .04 | -.13*** | -.19 | .03 | -.08*** | -.65 | .06 | -.15*** | -.68 | .07 | -.13*** |
| Cha R ² at step: | .00 | | | .02*** | | | .01*** | | | .05*** | | |
| Violence × monitoring | -.02 | .01 | -.02 | -.04 | .01 | -.06*** | -.08 | .02 | -.06*** | -.23 | .02 | -.14*** |
| Violence × cohesion | -.00 | .00 | -.02 | -.01 | .00 | -.09*** | -.01 | .00 | -.03 | -.04 | .00 | -.12*** |
| Violence × age | .01 | .01 | .03 | .00 | .01 | .01 | .02 | .01 | .02 | .02 | .01 | .03 |
| Cohesion × age | .00 | .00 | .01 | .01 | .00 | .03 | .01 | .01 | .02 | .01 | .01 | .01 |
| Monitoring × age | -.07 | .02 | -.04** | -.04 | .02 | -.03 | -.08 | .03 | -.03 | -.15 | .04 | -.05*** |
| Cha R ² at step: | .00 | | | .00 | | | .00 | | | .00 | | |
| Violence × cohesion × age | .00 | .00 | .04** | .00 | .00 | .01 | .00 | .00 | .03 | .01 | .00 | .03** |
| Violence × monitoring × age | -.01 | .01 | -.03 | .00 | .01 | -.01 | -.00 | .01 | -.00 | -.03 | .01 | -.03 |

Note. To adjust for the number of analyses, terms significant at $p > .01$ are not noted. Unstandardized β weights, Standard Errors for β 's, and standardized β weights are presented from the step of the regression model at which they were entered. For problems with alcohol, Panama sample, $R^2 = .181, F(15, 4,553) = 68.20, p < .001$. For problems with drugs, Panama sample, $R^2 = .110, F(15, 4,527) = 38.28, p < .001$. For problems with alcohol, Costa Rican sample, $R^2 = .197, F(15, 5,203) = 86.47, p < .001$. For problems with drugs, Costa Rican sample, $R^2 = .262, F(15, 5,173) = 124.04, p < .001$. ** $p < .01$; *** $p < .001$.

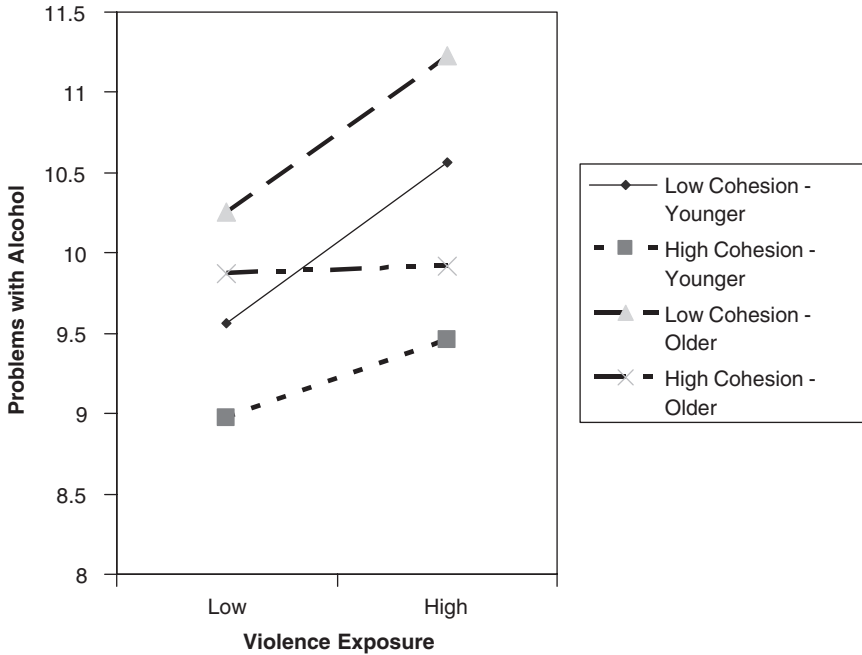


FIGURE 2 Interaction of violence exposure, family cohesion, and age predicting problems with alcohol.

relative to youth with low levels of family cohesion, youth with high levels of family cohesion showed few increases in problems with alcohol as exposure to violence increased. The interaction with age reflects the pattern that younger youth with high levels of family cohesion had a steeper slope than older youth with high levels of family cohesion. This indicates that family cohesion was a more robust protective factor for older, versus younger, youth.

DISCUSSION

The present study investigated associations between witnessing serious violence and the likelihood of drug use and abuse among adolescents from Panama and Costa Rica. A particular strength of the study was including problems with drugs and alcohol, in addition to use, as outcome variables. Consistent with our expectations, after controlling for age, sex, family structure, and parental and sibling problems with drugs and

alcohol, witnessing serious violence was associated with ever having been drunk or used tobacco, with the number of drugs other than alcohol and tobacco ever used, and with problems with drug and alcohol use. This result held even after family cohesion, parental monitoring, and interaction terms were considered. Family cohesion and parental monitoring were associated with less exposure to serious violence. Further, there were main protective effects of family cohesion and parental monitoring across all of the outcomes we investigated. Family cohesion and parental monitoring interacted with exposure to violence in predicting number of drugs used, problems with alcohol, and problems with drugs. For problems with drugs and alcohol, the protective effects of family cohesion were most evident for older youth.

The findings linking exposure to violence and substance use are consistent with studies of North American youth, as well as youth living in Russian and Belgium. There are a number of potential reasons why these associations were observed. First, witnessing serious violence may be stressful for youth, and this stress may drive youth to seek relief in substance involvement. There was a modest ($r = .14$) but significant association with witnessing serious violence and depressed mood in our data, bolstering the case for this argument.

A second explanation for the observed associations between witnessing serious violence and substance use might be that a third factor common to both is accounting for the relationship. For example, youth who witness violence might also live in neighborhoods where drug use is common, and therefore both modeled and available. Alternatively, associating with deviant peers might result in both higher levels of witnessed violence and higher drug use. These explanations should be investigated in future work.

A second purpose of the study was to examine the role of parental monitoring and family cohesion among Central American adolescents exposed to violence. Family cohesion and parental monitoring were both negatively associated with risk of exposure to serious violence as well as with drug use and with problems with drugs and alcohol. Consistent with prior developmental and clinical research (e.g., Chilcoat & Anthony, 1996), youth from families who were cohesive and caring and who had parents who knew what was going on in their lives were less likely to have witnessed serious violence, ever have used alcohol, tobacco, or drugs, or to have had problems with drugs and alcohol. Interactions between violence exposure and cohesion and monitoring were not observed for drunkenness or tobacco use, but were observed for number of other drugs used and for problems with alcohol and drugs. The general pattern of these findings indicated that family cohesion and parental monitoring exerted

a “protective-stabilizing” effect (Luthar, Cicchetti, & Becker, 2000) on number of drugs used other than alcohol and tobacco, and problems with drugs and alcohol. This pattern indicates that as risk increases (in this case, exposure to serious violence), youth with high levels of a protective factor show smaller increases in levels of a problematic outcome compared with youth with low levels of a protective factor.

Interactions with age were only present for the problems with alcohol and drugs, and only for family cohesion. The general pattern of findings indicated that family cohesion and parental monitoring were effective as protective factors for younger and older adolescents. When problems with drug and alcohol use were considered specifically, family cohesion had a slightly more beneficial effect on older versus younger youth. The fact that family cohesion mattered more for older adolescents with respect to drug and alcohol problems may reflect low variance in these problems among the younger teens in the study. Prior level of problems with drugs and alcohol may interact with family cohesion to affect current drug and alcohol problems. Given the cross-sectional nature of this study, this hypothesis could not be investigated.

There are several potential reasons why family cohesion was protective in this sample. In families that are highly cohesive, parents and guardians may convey a sense of concern for their offspring—a sense that they matter. This sense that someone is invested in them may make youth think twice before engaging in behaviors that are not desirable. A sense of mattering to someone is one of the most consistently identified protective factors in resilience research and research on the effects of community violence (Garbarino, 1999).

Second, as with other studies, the youth in the present study who reported high levels of family cohesion may have had their needs for safety and security met more effectively than youth with less of a sense of family cohesion. Sandler, Miller, Short, and Wolchik (1989) theorized that support works by meeting youths’ needs for safety and security and by bolstering their sense of self-esteem or control. Needs for safety and security may be challenged by violence exposure. Parents, because of their status in adolescents’ lives, may be particularly effective at lessening adolescents’ fears about possible future threats, therefore reducing the need for stress reduction through substance involvement, or curtailing the levels of problems substance abuse may cause. This may be especially true in Costa Rica and Panama, countries that place a high value on family unity and cohesion (Garcia-Coll et al., 1994; Zamorano & Claudia, 1998). Several studies with youth in the United States have shown that a positive relationship with parents attenuated the relation between violence exposure and a range of mental health symptoms (Boney-McCoy & Finkelhor, 1995;

Kliewer, Lepore, Oskin, & Johnson, 1998). As Kliewer et al. (2001) have argued, in competent families where support is freely given and communication is open, parents may help youth cognitively process ("work through") stress associated with witnessing violence. Again, this may lessen the need to reduce negative affect associated with violence exposure by using drugs or alcohol.

Third, parents in families that are cohesive are also likely to monitor their children to a greater extent, which is confirmed by the modest positive association between family cohesion and monitoring. Parents who monitor their offspring may be able to anticipate and prevent opportunities for drug use more effectively than parents who do not know what is going on with their sons or daughters. However, as violence exposure increased, family cohesion was less effective, particularly when the number of other drugs used was the outcome considered. This may be due in part to the multiple reasons youth use drugs. Stress relief, opportunity, and association with deviant peers all contribute to drug use. As violence exposure increased, both stress and association with deviant peers could have increased, thus reducing the effectiveness of monitoring as a protective factor. It is interesting to note that family cohesion and parental monitoring were only moderately correlated, suggesting that these variables represent distinct protective factors in the family.

With respect to differences between Panama and Costa Rica, despite the significant differences in both violence exposure and drug use (which on the whole were small), the *patterns* of association observed in this study were more similar than different. This suggests that despite the unique features of culture and patterns of migration in these two countries, the way in which risk and protective processes operate to influence youth substance use transcend these differences.

Limitations

Although the present study used a large sample size, the design was correlational and the data were collected at one point in time. The nature of the questions asked in this research precludes use of experimental designs; thus, causal relationships between violence exposure, monitoring and family cohesion, and drug use cannot be established. However, longitudinal studies may be helpful in the future by providing information on trends associated with violence exposure as well as a better understanding of the temporal ordering of variables. There are several plausible alternative explanations for the associations observed here, including neighborhood effects. Unfortunately, these could not be addressed in the

current data set. Additionally, as is the case with much large-scale epidemiological research, several of the constructs were indicated by one item. Unfortunately, this was a trade-off in the current study. The time and resources needed to assess over 9,000 adolescents constrained the number of items in the survey. Other limitations include the measurement of lifetime use of substances only, rather than also including past year and past month use.

Future Research

In addition to using longitudinal designs and combining data sets to obtain more power to detect interaction effects, researchers may want to focus on the conditions under which particular aspects of parenting behavior or family functioning protect youth exposed to violence from maladaptive outcomes. Not all parenting behavior or dimensions of family life work the same way to affect youth's adjustment. For intervention purposes, it is useful to know both when and how processes operate to reduce adjustment difficulties, including substance use. Future research might also consider the unique and interactive effects of witnessing violence in the family and in the community. The current study focused on violence witnessed in the community. It may be the case that parental monitoring and family cohesion are much less protective if violence is witnessed in the family.

REFERENCES

- Aiken, L., & West, S. G. (1991). *Testing and interpreting interactions in multiple regression analysis*. Newbury Park, CA: Sage.
- Bachman, J. G., Johnston, L. D., & O'Malley, P. M. (1996). *Monitoring the future project after twenty-two years: Design and procedures (monitoring the future occasional paper 38)*. Ann Arbor, MI: The University of Michigan, Institute for Social Research.
- Berenson, A. B., Wiemann, C. M., & McCombs, S. (2001). Exposure to violence and associated health-risk behaviors among adolescent girls. *Archives in Pediatric Medicine, 155*, 1238–1242.
- Boney-McCoy, S., & Finkelhor, D. (1995). Psychosocial sequelae of violent victimization in a national youth sample. *Journal of Consulting and Clinical Psychology, 63*, 726–736.
- Brook, J. S., Brook, D. W., De La Rosa, M., Whiteman, M., Johnson, E., & Montoya, I. (2001). Adolescent illegal drug use: The impact of personality, family, and environmental factors. *Journal of Behavioral Medicine, 24*, 183–203.
- Chilcoat, H. D., & Anthony, J. C. (1996). Impact of parental monitoring on initiation of rug use through late childhood. *Journal of the American Academy of Child and Adolescent Psychiatry, 35*, 91–100.

- Clark, D. B., & Winters, K. C. (2002). Measuring risks and outcomes in substance use disorders and prevention research. *Journal of Consulting and Clinical Psychology, 70*, 1207–1223.
- Cooley-Quille, M., Turner, S. M. m., & Biedel, D. C. (1995). Emotional impact of children's exposure to violence: A preliminary study. *Journal of the American Academy of Child and Adolescent Psychiatry, 34*, 1362–1368.
- Dowdy, B. B. (1995). Predictors of general and dating-related conflict among parents and middle adolescents: The active role of the adolescent. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 55*(10-B), 4620.
- Garbarino, J. (1999). *Lost boys: Why our sons turn violent and how we can save them*. New York: Free Press.
- Garcia-Coll, C. T., Meyer, E. C., & Brillion, L. (1994). Ethnic and minority parenting. In M. H. Bornstein (Ed.), *Handbook of parenting: Vol. 2. Biology and ecology of parenting* (pp. 189–209). Mahwah, NJ: Erlbaum.
- Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (1995). *National survey result on drug use from the monitoring the future study, 1975–1994: Volume I. Secondary school students (NIH Publication No. 95-4026)*. Rockville, MD: National Institute on Drug Abuse.
- Kerr, M., & Stattin, H. (2000). What parents know, how they know it, and several forms of adolescent adjustment: Further support for a reinterpretation of monitoring. *Developmental Psychology, 36*, 366–380.
- Kilpatrick, D. G., Acierno, R., Saunders, B., Resnick, H. S., Best, C. L., & Schnurr, P. P. (2000). Risk factors for adolescent substance abuse and dependence: Data from a national sample. *Journal of Consulting and Clinical Psychology, 68*, 19–30.
- Kliewer, W., Lepore, S. J., Oskin, D., & Johnson, P. D. (1998). The role of social and cognitive processes in children's adjustment to community violence. *Journal of Consulting and Clinical Psychology, 66*, 199–209.
- Kliewer, W., Murrelle, L., Mejia, R., Torres, Y., & Angold, A. (2001). Exposure to violence against a family member and internalizing symptoms in Colombian adolescents: The protective effects of family support. *Journal of Consulting and Clinical Psychology, 69*, 971–982.
- Kung, E. M., & Farrell, A. D. (2000). The role of parents and peers in early adolescent substance use: An examination of mediating and moderating effects. *Journal of Child and Family Studies, 9*, 509–528.
- Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical valuation and guidelines for future work. *Child Development, 71*, 543–562.
- Lynch, M. (2003). Consequences of children's exposure to community violence. *Clinical Child and Family Psychology Review, 6*, 265–274.
- Moos, R., & Moos, B. (1994). *Family environment scale manual* (2nd ed.). Palo Alto, CA: Consulting Psychologists Press.
- Murrelle, L., Prom, E., Aggen, S., Warner, E., Sieire, M., Ramírez, M., & Mezzich, A. (2001, June). Psychological dysregulation and drug involvement among Panamanian youths. Poster presented at the annual meeting of the College on Problems of Drug Dependence, Scottsdale, AZ.
- Pan American Health Organization (1996). *Adolescent program health situation analysis (mortality database from Pan American Health Organization Technical Health Information System)*. Washington, DC: PAHO.
- Roth, J., & Brooks-Gunn, J. (2000). What do adolescents need for healthy development? Implications for youth policy. *Social Policy Report, 14*, 3–19.
- Rothman, K. J., & Greenland, S. (1998). *Modern epidemiology* (2nd ed.). Philadelphia: Lippincott-Raven Publishers.

- Sandler, I. N., Miller, P., Short, J., & Wolchik, S. A. (1989). Social support as protective factor for children in stress. In D. Belle (Ed.), *Children's social networks and social supports* (pp. 277–307). New York: John Wiley and Sons.
- Simantov, E., Schoen, C., & Klein, J. D. (2000). Health-compromising behaviors: Why do adolescents smoke or drink? *Archives of Pediatrics and Adolescent Medicine*, *154*, 1025–1033.
- Sullivan, T. N., Kung, E. M., & Farrell, A. D. (2004). Exposure to violence and drug use initiation in early adolescence: Parent monitoring and family support as protective factors. *Journal of Clinical Child and Adolescent Psychology*, *33*, 488–498.
- Tarter, R. E., Kirisci, L., & Mezzich, A. (1996). The drug use screening inventory: School adjustment correlates of substance abuse. *Measurement and Evaluation in Counseling and Development*, *29*, 24–34.
- Vermeiren, R., Schwab-Stone, M., Deboutte, D., Leckman, P. E., & Ruchkin, V. (2003). Violence exposure and substance use in adolescents: Findings from three countries. *Pediatrics*, *111*, 535–540.
- Weaver, K., & Maddaleno, M. (1999). Youth violence in Latin America: Current situation and violence prevention strategies. *Revista Panamericana de Salud Publica*, *5*, 338–343.
- Zamorano, V., & Claudia, C. (1998). Family solidarity . . . Family solidarity? Some ideas on the weight of an idea. *Estudios Sociologicos*, *16*, 711–729.

