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Violence Exposure and Substance Use in Adolescents: Findings From Three Countries

Robert Vermeiren, MD*‡; Mary Schwab-Stone, MD‡; Dirk Deboutte, MD, PhD*; Peter E. Leckman‡; and Vladislav Ruchkin, MD, PhD‡

ABSTRACT. *Objective.* To investigate relationships between exposure to community violence (witnessing and victimization) and reported substance use (cigarettes, alcohol, marijuana, and hard drugs) in a cross-national sample of adolescents, after controlling for the level of the adolescents' own violent behavior.

Method. A self-report survey was conducted in 3380 14- to 17-year-old adolescents in urban communities of 3 different countries: Antwerp, Belgium (N = 958); Arkan-gelsk, Russia (N = 1036); and New Haven, Connecticut (N = 1386).

Results. In all 3 countries, levels of reported smoking, alcohol use, marijuana use, and hard drug use showed increases with adolescent exposure to violence. Although positively related, substance use was increased less markedly in US adolescents who witnessed violence.

Conclusion. Current findings further emphasize the association between violence exposure and potential severe physical and psychosocial health problems in adolescents. In addition, the findings suggest that violence exposure and its consequences are a worldwide urban phenomenon. Cross-national differences were found, however, that warrant additional research, and prospective studies are needed to investigate the pathways from violence exposure to substance abuse. *Pediatrics* 2003; 111:535-540; *violence exposure, substance use, adolescents.*

ABBREVIATIONS. SAHA, Social and Health Assessment; OR, odds ratio; CI, confidence interval.

Although levels of crime have declined during the past decade in much of the United States, community violence is still an everyday reality for many youths. In some parts of the United States, in fact, community violence has reached epidemic proportions, as findings suggest that one-third or more of inner-city children have been directly victimized and almost all inner-city children have been exposed.¹⁻³ Although one may assume that inner-city youths from other Western countries also experience exposure to violence, no epidemiologic studies from outside North America have addressed this issue.

In addition to the physical harm that such expo-

sure can bring, the associated psychological and behavioral characteristics can be grave. Internalizing problems,⁴⁻⁸ low self-esteem,⁴ posttraumatic stress,⁸⁻¹⁰ externalizing behavior,^{4,7,11} and approval of aggression¹² are among the documented sequelae of violence exposure. Studies have also reported the use of alcohol and other drugs, presumably as self-medication, to cope with or block difficult feelings and memories of traumatization.^{13,14} Other studies have shown that the prevalence of past trauma is significant among chronic substance abusers. Deykin and Buka,¹⁵ for example, studied risk factors for posttraumatic stress disorder in 397 chemically dependent adolescents, finding that 24% of male and 45% of female patients had comorbid *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised* diagnoses of posttraumatic stress disorder and substance use disorders. Clark et al¹⁶ examined adverse life events and types of trauma in 256 adolescents, 183 of whom had a diagnosis of alcohol dependence. It was found that adolescents with alcohol dependence were 6 to 12 times more likely to have childhood histories of physical abuse.

Given the prevalence of exposure to community violence, it is important to understand possible relationships with substance use. It has been postulated that routine exposure to stress increases the propensity to drug intake¹⁷ and that the reward system of the brain (nucleus accumbens, amygdala) is crucial in the process of initial drug self-administration.¹⁸ Substance use has also been described to decrease subjective anxiety in humans and to alter the brain's behavioral inhibition system.¹⁹⁻²¹ Animal research has demonstrated that such alterations can lead to increased sociability and increased exploration of novel environments, as well as to impaired acquisition of conditioned emotional responses and increased aggression.^{19,20} Given the reward mechanism and the anxiety-reducing effects, it follows that the use of substances may serve as self-medication for distress, which also concurrently increases social ease and confidence. At the same time, self-medication may enhance the likelihood of additional violence exposure as these drugs can result in higher levels of aggression.

Given that committing violent acts itself suggests being exposed to violence,²² it is difficult to determine whether substance use is a response to violence exposure or is related to violent behavior (and forms a spurious relationship with exposure to violence).

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The current study attempted to clarify these relationships by examining the association between community violence and substance use when controlling for participation in violent behavior. The hypothesis of the current study is that witnessing violence and victimization relate to higher levels of substance use (cigarettes, alcohol, marijuana, and hard drugs) over and above the level of individual involvement in violent behavior.

METHODS

Sample

Subjects were adolescents participating in an ongoing multisite international project that assesses risk and protective factors for adolescent adjustment. Because it was the aim to investigate different cross-national samples of inner-city youths, adolescents from Antwerp, Belgium; Arkangelsk, Russia; and New Haven, Connecticut, were selected. In New Haven, all public schools participated in the project; for Antwerp and Arkangelsk, schools (8 and 10 schools, respectively) were randomly selected from among the different school types and levels that exist in these cities. For the current study, all surveys administered to students 14 to 17 years old were analyzed.

Antwerp is a large city of 400 000 with a substantial inner-city population, situated in the north of Flanders (the Dutch-speaking part of Belgium). With respect to unemployment rate and education level, inhabitants of Antwerp are on average below the general socioeconomic level for this part of Belgium and minorities are more highly represented. Arkhangelsk is also a large city (450 000) in the north of Russia. The socioeconomic status of the majority of the population is estimated to be similar to the (low) Russian average; in addition, interindividual diversity is low. New Haven is a medium-sized city (125 000 inhabitants) in the northeastern United States with a high proportion of inhabitants who are minorities and of low socioeconomic status.

A total of 3380 subjects were eligible for comparison, 958 from Antwerp, 1036 from Arkhangelsk, and 1386 from New Haven. From the original 3-nation sample, 8.1%, 4.2%, and 8.2%, respectively, were excluded because of inconsistent or incomplete responses. In the US sample, 51.3% of the participants were female, compared with 61.1% in the Russian and 41.9% in the Belgian samples. Participants in the US sample were younger (15.0 ± 0.97) than those in the Russian (15.5 ± 0.91) or the Belgian samples (15.6 ± 1.12 ; $F[2,3321] = 95.3$; $P < .001$). The ethnic distribution in the Belgian sample was as follows: 73.5% Belgian origin, 11.4% Moroccan, 4.9% Turkish, and 10.3% from another origin; the ethnic distribution in Russian sample was as follows: all ethnic Russian; and the ethnic distribution in US sample was as follows: 58.7% black, 24.6% Hispanic, 14.3% white, and 2.3% others.

Instruments

Social and Health Assessment

The Social and Health Assessment (SAHA), developed by Weissberg et al²³ and adapted by Schwab-Stone et al,⁷ served as the basis for the survey. This survey includes both new scales developed specifically for the SAHA and scales available from the literature that have been used with similar populations. The following SAHA scales were used for this study.

Exposure to Violence: Witnessing and Victimization

Items from this scale were derived from the Screening Survey of Exposure to Community Violence developed by Richters and Martinez.⁵ Six victimization and 6 witnessing items were included, each holding a binary (yes/no) response format and asking for exposure during the previous 2 years. Victimization items were as follows: have you been 1) beaten up or mugged, 2) threatened with serious physical harm, 3) shot or shot at with a gun, 4) attacked or stabbed with a knife, 5) chased by gangs or individuals, and 6) seriously wounded in an incident of violence. Students were also asked whether they had witnessed the same 6 types of violence.

Substance Use

Items on alcohol use were derived from the Monitoring the Future Scale²⁴ and for cigarette use, marijuana use, and hard drug use from the School Health Study.²⁵ Cigarette use, henceforth referred to as smoking, was assessed by 3 items that asked whether the respondent had ever smoked cigarettes, how frequently the respondent had smoked during the last 30 days, and how many cigarettes he or she smoked daily during the last 30 days. Each item had a 4-point response scale, and all 3 were summed to obtain a total smoking score. Cronbach α for this scale were 0.93 (Belgium), 0.87 (Russia), and 0.85 (United States). Alcohol use was assessed by a total of 7 items that addressed lifetime consumption and consumption during the past 30 days. Six items addressed the use of 3 different alcoholic beverages (beer, wine, hard liquor; lifetime and last 30 days), and 1 assessed the frequency of binge drinking (last 30 days). Each item had a 4-point scale, and all 7 were summed to obtain a total alcohol consumption index. Cronbach α for this scale were 0.90 (Belgium), 0.89 (Russia), and 0.89 (United States). Marijuana use was assessed via 2 questions on lifetime use and use during the past 30 days. Both 4-point scales were summed to get a marijuana use index. Cronbach α for this scale were 0.89 (Belgium), 0.53 (Russia), and 0.81 (United States). For hard drug use, it was asked whether the respondent had ever used any drug from a list of illegal substances (stimulants, cocaine, heroin, and LSD). A straightforward binary yes/no hard drug use index was established.

Violent Behavior

This scale assessed the occurrence and frequency of the adolescent's own involvement in violent behavior during the past year. Students responded on a 5-point frequency scale. The violent behavior score was obtained by summing the 4 items (starting a fist fight, participating in gang fights, hurting someone badly in a fight, and carrying a weapon) of the SAHA antisocial behavior scale that correspond best with this construct. This scale had Cronbach α values of 0.81 (Belgium), 0.74 (Russia), and 0.77 (United States). Several studies have demonstrated the validity of self-reports for assessing violent behavior in adolescents.^{26,27}

Procedure

The translation of these scales into Dutch and Russian followed established guidelines, including appropriate use of back translations.²⁸ The translations were made by 3 people, followed by discussion of the translated questionnaires with colleagues. Also, questionnaires were pretested in an adolescent sample. Finally, an independent interpreter made back translations, which were compared with the originals.

The relevant institutional review boards or the school system boards, as well as the individual schools, provided approval of the survey. Students and their parents were informed of the planned date of the survey administration and were offered the opportunity to refuse participation. In each sample, all students were surveyed unless they declined to participate or their parents had objections (<1%). Before starting the assessment, students signed assent forms, in which confidentiality was ensured. Students completed the survey in class during a regular school day. Trained administrators of the survey read all questions aloud while students followed along with their copies of the survey, reading questions to themselves and circling responses in the booklet.

Data Transformation and Statistical Analyses

For clustering exposure to violence variables (6 witnessing and 6 victimization items), a within time principal components factor analysis with varimax rotation was performed. The results of this factor analysis were similar across countries; therefore, factor analysis results for the total group are described. Three different factors that accounted for 48% of the variance were identified. All items loaded satisfactorily (>0.4) on their respective factors. Factor 1, which accounted for 21% of the variance, included all witnessing items. Factor 2, which accounted for 14% of the variance, included 3 victimization items (been attacked/stabbed with a knife, been seriously wounded in an incident of violence, been shot or shot at with a gun), and factor 3, which accounted for 13% of the variance, included the remaining 3 victimization items (been chased, been threatened with serious physical harm, and been beaten up or mugged). Because of the difference in severity

between factor 2 and factor 3, factor 2 is called severe victimization and factor 3 is called moderate victimization.

The variables smoking, alcohol use, and marijuana use were dichotomized by taking the 75th percentile within each country as the cutoff point (0 = lower 75%, 1 = upper 25%). This procedure was chosen because the selection of a fixed cutoff point for all countries resulted in unequal groups and some cells with low numbers. In Russia, the total prevalence of marijuana use was below 25%, so all users (12%) were selected. As hard drug was already a binary variable, no transformation was needed.

Statistical analyses were performed with SPSS (version 10.0; SPSS, Inc, Chicago, IL). For analyzing associations with binary dependent variables, logistic regression analyses were conducted, whereas continuous variables were analyzed with analyses of covariance tests. Age, gender, minority status, and the individual's involvement in violent behavior served as controlling variables because of the differences between samples on these factors. When appropriate, odds ratios (ORs) and 95% confidence intervals (CIs) or *F* values and degrees of freedom (*df*) are reported in the text as indicators of association. *P* < .05 is considered significant, whereas *P* values between 0.1 and 0.05 are described as trends.

RESULTS

Exposure to Violence by Country

Table 1 shows that witnessing 1 or 2 events and moderate victimization is similar across countries, although the United States is somewhat (approximately 10%) lower in witnessing only 1 or 2 events. Conversely, pronounced differences are noticeable in witnessing >2 events and severe victimization. Both conditions are more than twice as prevalent in the United States when compared with Belgium, which, in turn, has a rate approximately twice that of Russia.

Reported Substance Use by Country

When age, gender, and minority status are adjusted for, both smoking and alcohol use are higher in Belgium and the United States than in Russia, whereas marijuana use is highest in the United States (Table 2). Compared with Belgium and the United States, Russian youths have significantly lower mean scores on all forms of reported substance use. Although hard drugs are more often used in the Belgian (13.0%) sample than in the US (8.1%) and the Russian (3.4%) samples, with adjustment for age, gender, and minority status (stepwise logistic regression), the Belgian and the US samples did not differ statistically, whereas youths from both of these samples were significantly higher in hard drug use than Russian adolescents (US vs R: OR: 6.63 [4.02–10.92], *P* < .001; B vs R: OR: 3.84 [2.55–5.78], *P* < .001).

Exposure to Violence and Substance Use

A series of hierarchical logistic regression analyses were performed to analyze the strength of relationships between exposure to violence and the likelihood of substance use. As dependent variables, the

dichotomized (upper 75th percentile) smoking, alcohol use, and marijuana use scores were used, as well as the binary hard drug use variable. Step 1 of the regressions included the demographic control variables age, gender, and minority status and the violent behavior score (because of skewness a logarithmic transformation was done). Step 2 included each of the 3 factored violence clusters (witnessing, moderate victimization, and severe victimization) separately. Categorization was needed because of the skewed distribution of the exposure variables and to derive meaningful ORs. The witnessing score was divided into 3 categories (0 = no witnessing, control; 1 = score 1 or 2; and 2 = score > 2), whereas both victimization scores were dichotomized (0 = not reporting any of the listed items and 1 = reporting at least 1 of the listed items).

Witnessing Violence

In all countries, increasing severity of witnessing violence was associated with a gradual increase (unadjusted) in the percentage of adolescents falling above the 75th percentile on the scale for smoking, alcohol use, and marijuana use (Table 3). The same pattern of gradual increase was also present for hard drug use. For the United States, the number of witnessing adolescents using substances was constantly lower when compared with both other samples.

Logistic regression analyses were conducted adjusting for demographic variables (age, gender, and minority status) and the level of the individual's involvement in violent behavior. Compared with the control (not witnessing) group, having witnessed 1 or 2 events carried ORs for reported substance use of 1.0 or greater, and 7 of 12 have CIs that do not include 1.0. Compared with the not witnessing group, witnessing >2 events conferred higher ORs, generally with values >2 (the exception was smoking in the United States). In all countries, witnessing >2 events was strongly related to reported alcohol use and marijuana use, with ORs ranging from 2.1 to 4.4. Reported hard drug use in the United States showed a trend toward being related to witnessing 2 or more events, whereas the ORs in Belgium and Russia are highly significant, with values of 4.5 and 5.2, respectively. It is interesting that in the United States, all ORs for witnessing 1 or 2 events included 1.0, whereas those for witnessing >2 events were consistently lower than in other countries.

Victimization

Moderate victimization was associated with an increased number of adolescents falling above the 75th percentile for reported smoking, alcohol use, and marijuana use, whereas severe victimization showed even higher percentages (unadjusted; Table 4). The same pattern could be observed for moderate and severe victimization and hard drug use.

Logistic regression analyses for victimization were also conducted when adjusting for demographic variables (age, gender, and minority status) and the level of the individual's involvement in violent behavior. Compared with the not victimized groups, both moderate and severe victimization in all 3 coun-

TABLE 1. Violence Exposure by Country

	Belgium	Russia	United States
Witnessing			
1–2 events	365 (38.1%)	387 (37.4%)	380 (28.1%)
>2 events	225 (23.5%)	130 (12.5%)	746 (53.8%)
Victimization			
Moderate	285 (29.7%)	273 (26.4%)	400 (28.9%)
Severe	73 (7.6%)	31 (3.0%)	246 (17.8%)

TABLE 2. Substance Use (Mean [SE]) by Country

	Belgium	Russia	United States	Post Hoc	<i>F(df)</i>
Smoking	4.8 (0.10)	4.3 (0.11)	4.7 (0.10)	a*; c‡	7.6 (2, 3374)‡
Alcohol use	10.0 (0.18)	9.1 (0.21)	10.3 (0.19)	a‡; c‡	7.8 (2, 3374)‡
Marijuana use	2.2 (0.06)	0.9 (0.07)	2.8 (0.06)	a‡; b‡; c‡	200.9 (2, 3374)‡

SE indicates standard error. a, Belgium-Russia; b, Belgium-United States; c, Russia-United States.

* $P < .5$.

+ $P < .01$.

‡ $P < .001$; adjusted for age, gender, and race.

TABLE 3. Substance Use and Witnessing Violence

	Unadjusted Prevalence (%)			Adjusted OR (95% CI)	Adjusted OR (95% CI)
	0	1–2	>2	0 Versus 1–2	0 Versus >2
Smoking					
Belgium	13.0	27.4	41.3	1.95 (1.30–2.92)+	2.66 (1.65–4.27)‡
Russia	15.8	26.1	48.5	1.51 (1.07–2.12)*	2.84 (1.80–4.48)‡
United States	13.2	18.5	26.3	1.33 (.83–2.12)	1.43 (.92–2.24)
Alcohol					
Belgium	15.8	24.9	35.1	1.56 (1.05–2.32)*	2.30 (1.42–3.71)+
Russia	14.3	28.4	47.7	2.01 (1.42–2.83)‡	3.30 (2.08–5.22)‡
United States	12.8	20.3	34.5	1.55 (.97–2.47)	2.20 (1.41–3.42)+
Marijuana					
Belgium	13.6	26.0	44.0	1.75 (1.16–2.63)+	3.01 (1.86–4.85)‡
Russia	5.4	14.7	33.1	2.46 (1.50–4.04)‡	4.43 (2.47–7.95)‡
United States	12.0	18.5	33.0	1.44 (.88–2.36)	2.08 (1.31–3.30)+
Hard					
Belgium	3.8	11.5	30.7	2.11 (1.10–4.06)*	4.51 (2.27–8.97)‡
Russia	1.7	2.1	13.8	1.00 (.37–2.65)	5.18 (2.07–12.95)‡
United States	2.4	5.4	11.4	1.85 (.72–4.74)	2.45 (1.00–6.00)

* $P < .05$.

+ $P < .01$.

‡ $P < .001$.

0, no witnessing, control; 1 to 2, witnessing 1 or 2 events; >2, witnessing >2 events.

Prevalences are unadjusted and ORs are adjusted for demographic variables (age, gender, and race) and violent behavior.

tries carried ORs for reported substance use >1.0 (although not all significant). Moderate victimization was significantly related to hard drug use in all 3 countries, with ORs around 2.0, whereas the ORs for the other substance use categories fell between 1.2 and 1.8. In all countries, severe victimization was related to hard drug use, with ORs ranging from 1.7 to 3.4, and also to smoking, with ORs from 1.6 to 3.2. In the United States, severe victimization was also related to alcohol use (OR: 2.0), and in Belgium and Russia, there was a relationship with marijuana use (OR: 2.9 and 3.8, respectively).

DISCUSSION

The current cross-national self-report survey investigated the relationship between exposure to violence and reported substance use in a sample of 14- to 17-year-old students, after controlling for demographic differences and the level of violent behavior. Adolescents exposed to violence showed higher self-reported levels of smoking, alcohol use, marijuana use, and hard drug use with increasing exposure, regardless of substantial differences in level of substance abuse and violence exposure between countries. Although positively related, substance use was less markedly increased in US adolescents who witnessed violence.

The assessment of cross-national community samples from diverse socioeconomic and ethnic regions

with different levels of violence exposure and substance use may seem to complicate the interpretation of the findings but may also be considered as a strength of the study. Similar results, regardless of geographic location, suggest the existence of common and generalizable relationships between exposure to violence and substance use. Because of the cross-sectional nature of the current study, however, the interesting question of whether similar pathways are involved across countries could not be addressed.

Because different forms of exposure might lead to diverse substance use outcomes, prospective surveys that investigate pathways that lead to substance use in adolescents exposed to violence are needed. Longitudinal research has shown that, when controlling for levels of aggression, witnessing violence is more strongly related to externalizing problems, whereas victimization has stronger ties with internalizing problems.⁷ A similar dynamic may underlie the psychopathology that influences the nature and the severity of substance use. Particularly important is the role of antisocial behavior as a mediating variable. Only prospective studies can demonstrate whether antisocial behavior predisposes to both violence exposure and substance use or whether it acts as an intervening variable between exposure to violence and substance use. Also, gender differences may occur, as it has been shown that girls are much more

TABLE 4. Substance Use and Victimization

	Unadjusted Victimization Moderate (%)		Adjusted OR (95% CI)	Unadjusted Victimization Severe (%)		Adjusted OR (95% CI)
	-	+		-	+	
Smoking						
Belgium	20.2	36.8	1.56 (1.11–2.18)*	22.9	52.1	1.85 (1.06–3.22)*
Russia	18.7	37.7	1.78 (1.28–2.49)†	22.6	61.3	3.21 (1.42–7.27)†
United States	18.7	29.3	1.21 (.88–1.67)	18.6	36.0	1.56 (1.08–2.24)*
Alcohol						
Belgium	20.1	32.6	1.32 (.93–1.87)	22.3	42.5	1.80 (1.00–3.24)
Russia	18.9	37.4	1.79 (1.29–2.50)†	22.9	51.6	2.04 (.92–4.54)
United States	20.9	40.5	1.68 (1.25–2.27)†	21.9	48.2	1.96 (1.39–2.77)‡
Marijuana						
Belgium	19.5	39.6	1.78 (1.26–2.50)†	22.6	60.3	2.94 (1.65–5.25)‡
Russia	9.6	20.1	1.33 (.86–2.07)	11.3	45.2	3.77 (1.60–8.90)‡
United States	20.7	36.0	1.21 (.88–1.65)	21.4	42.1	1.29 (.89–1.85)
Hard						
Belgium	8.0	24.9	2.19 (1.42–3.37)‡	10.3	46.6	3.35 (1.82–6.16)‡
Russia	2.1	7.0	2.15 (1.03–4.52)*	3.0	16.1	3.17 (1.02–9.85)*
United States	5.1	15.5	1.97 (1.26–3.07)†	5.9	18.2	1.71 (1.05–2.80)*

* $P < .05$.

† $P < .01$.

‡ $P < .001$.

–, no victimization; +, victimization.

Prevalences are unadjusted and ORs are adjusted for demographic variables (age, gender, and race) and violent behavior.

likely to seek solace in drugs after trauma²⁹ and that psychological consequences of traumatization may develop differently for girls than for boys.^{10,30}

Compared with Belgium and Russia, exposure to violence in US adolescents showed weaker associations with substance use (indicated by lower ORs). This difference is also observed when absolute differences in prevalence are considered, especially considering differences in base rate levels of violence exposure. Several reasons may account for this observation. First, between-country differences in levels of substance use are present, and also ethnic and socioeconomic disparities may bring about divergent patterns of substance use. Second, as the prevalence of exposure to violence was different across countries, distinct developmental pathways may result in dissimilar cross-sectional findings. Whereas witnessing in the United States is widespread and affects adolescents from all levels of the society, in Belgium and Russia, witnessing may be more restricted to adolescents who are at high risk for antisocial behavior and substance use. Last, cultural differences in perception of substance use may have influenced the results. Substance use, especially smoking, alcohol use, and marijuana use, is much less accepted in the United States when compared with Belgium, where even marijuana use is tolerated.

Clinical Implications

First, as the current cross-national findings suggest that inner-city adolescents from different regions endure frequent exposure to violence, the development and implementation of specific prevention and interventions programs should be encouraged internationally. Similarly, it should be investigated whether adequate prevention programs that target exposure to violence can help to reduce substance use. Second, prevention and treatment initiatives that target substance use and dependence should focus on the role

of community violence as part of their intervention. School-based intervention programs should screen for the presence of both conditions in all at-risk adolescents, whereas clinicians should assess the prevalence of violence exposure in substance-abusing adolescents on a regular basis. Understanding the role of traumatization in these patients may help to guide treatment approaches.

Limitations

Limitations of the current study should be noted. First, all data were derived by self-report. Whereas this may be seen as a limitation, others have reported that self-report surveys are a valid source of information, particularly when used for assessing antisocial behavior.²⁶ Also, adolescents themselves may be considered the best informants for reporting exposure to violence, violent behavior, and substance use, as adults are often not aware of such undesirable behavior and experience. Second, as mentioned before, the cross-sectional nature of the study does not permit exploration of developmental pathways that explain the relationship between exposure to violence and substance abuse. Third, apart from using minority status as a socioeconomic proxy variable, a similar cross-national comparison of socioeconomic differences could not be performed. As it is likely that socioeconomic status interrelates with the investigated variables, future research should address this problem. Fourth, the assessment of substance abuse targeted different periods. Although current and lifetime use was asked for smoking, alcohol use, and marijuana use, hard drug use was investigated only lifetime. Also, marijuana use in Russia had a weak α value. Nevertheless, it was decided to report results for marijuana use in Russia because similar trends were shown. Fifth, although almost all students within the selected schools and the selected classes participated in the studies, some were not investi-

gated. As we have no information on the nonparticipants, it cannot be reported to what extent this group is different from the participants. Last, many other cross-cultural differences, such as the attitudes toward substance use, the implementation of country-specific prevention programs, and so forth may have influenced the results. However, the similar patterns that were shown between samples should encourage future cross-cultural research on this and related topics.

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