Available online at www.sciencedirect.com
SCIENCE DIRECT®
Pergamon
ADDICTIVE BEHAVIORS
Addictive Behaviors 28 (2003) 1141–1148

Short Communication

Common predictors of cigarette smoking, alcohol use, aggression, and delinquency among inner-city minority youth

Kenneth W. Griffin*, Gilbert J. Botvin, Lawrence M. Scheier, Margaret M. Doyle, Christopher Williams

Institute for Prevention Research, Department of Public Health, Weill Medical College, Cornell University, 411 East 69th Street, New York, NY 10021, USA

Abstract

The present study examined the prevalence rates and common predictors of substance use, aggression, and delinquency among inner-city minority youth entering middle school. A survey was administered to sixth grade students ($N = 5442$) from 42 New York City schools. Aggressive behaviors were reported most frequently, followed by delinquent behaviors, alcohol use, and cigarette smoking. Across all behavioral outcomes, social and environmental influences explained the largest proportion of variance, followed by individual characteristics and skills, bonding to conventional institutions, and demographic variables. For the majority of predictor variables, there was substantial overlap in patterns of prediction across outcomes. These findings indicate that several factors that correspond to the predominant psychosocial theories of adolescent development explain variation across different problem behavior outcomes among inner-city minority youth.

Keywords: Adolescence; Substance use; Aggression; Urban; Minority

1. Introduction

Several studies have shown that substance use, interpersonal aggression, and other problem behaviors tend to cooccur in the same individuals during adolescence (Donovan

* Corresponding author. Tel.: +1-212-746-1270; fax: +1-212-746-8390.
E-mail address: kgriffin@med.cornell.edu (K.W. Griffin).

0306-4603/02/$ – see front matter © 2002 Elsevier Science Ltd. All rights reserved.
doi:10.1016/S0306-4603(02)00225-3

& Jessor, 1985; Ellickson, Saner, & McGuigan, 1997), including inner-city minority youth (Farrell, Danish, & Howard, 1992). Furthermore, theoretical formulations suggest that a variety of problem behaviors typically initiated during early adolescence have similar etiologic factors (Jessor & Jessor, 1977). It remains unclear, however, the extent to which a common set of risk and protective factors that map conceptually to the predominant psychosocial theories of adolescent development can explain variation across different problem behavior outcomes during early adolescence, particularly among inner-city minority youth. The present study examined the degree to which a variety of predictor variables categorized into conceptually meaningful domains (demographic variables, bonding to conventional institutions, social and environmental influences, and individual characteristics and skills) accounted for variation in cigarette smoking, alcohol use, interpersonal aggression, and delinquent behavior in a sample of inner-city minority youth entering middle school.

2. Method

A total of 5536 sixth grade students from 42 New York City schools completed a survey soon after entering middle school. A multiethnic research team from outside the school administered surveys to students and emphasized the confidentiality of responses. After surveys ($n = 94$) with unusable data were eliminated, a regression imputation procedure was used to replace missing data for the remaining 5442 students (98% of original sample). The sample was 41% Black, 32% Hispanic, 9% White, 5% Asian, 2% American Indian, and 11% biracial or other. Approximately 50% of respondents were male, 54% received free lunch from school, and 30% lived in mother-only households.

2.1. Measures

Substance use was assessed by asking students how often they "smoke cigarettes" and "drink beer, wine, wine coolers or hard liquor" on a nine-point scale from *never* to *more than once a day*. Interpersonal aggression during the past month was assessed using five items (α=.85) from an aggression scale that measured the frequency of hitting, purposely tripping, pushing/shoving, yelling, or threatening to hurt others. Delinquent behavior during the past year was assessed using five items (from Elliot, Huizinga, & Menard, 1989, α=.73) measuring the frequency of destroying property (school and nonschool), shoplifting, stealing from others, and throwing objects.

Predictor variables were grouped into four categories or domains: (1) demographics, including gender, race/ethnicity, age, and family structure; (2) bonding to conventional institutions, including church and school attendance, school bonding (four items, α=.77), and parental monitoring (five items from Catalano et al., 1993, α=.77); (3) social and environmental influences, including friends' smoking and alcohol use, friends' delinquency (seven items from Capaldi & Patterson, 1989, α=.88), exposure to violent media (six items, α=.71), and perceived neighborhood risk (five items from Dembo, Allen, Farrow, Schmeidler, & Burgos, 1985, α=.86); and (4) individual characteristics and skills, including self-esteem (five

items from Rosenberg, 1965, α=.86), risk-taking (four items from Eysenck & Eysenck, 1975, α=.78), and skills related to decision-making (five items from Bugen & Hawkins, 1981, α=.89), cognitive mastery (five items, α=.88), assertiveness (nine items from Gambrill & Richey, 1975, α=.76), anger control (six items from Griffin, Botvin, Scheier, Diaz, & Miller, 2000, α=.81), and behavioral control (10 items from Kendall & Wilcox, 1979, α=.76). Variables were assessed using items from well-known scales cited above and/or those with established psychometric properties (Botvin, Griffin, Diaz, & Ifill-Williams, 2001; Epstein, Botvin, Diaz, Baker, & Botvin, 1997).

2.2. Results

Data analyses included an examination of (1) prevalence rates for each behavioral outcome; (2) the proportion of variance in each outcome explained by each predictor domain (without controlling for other domains); and (3) logistic regression models including the full set of individual predictors for each behavioral outcome.

2.3. Prevalence rates

The most commonly reported aggressive behaviors in the past month were yelling (84%), hitting (62%) or pushing/shoving (40%). The most frequent delinquent behaviors in the past year were damaging or destroying property (nonschool, 40%, and school, 17%) and shoplifting (19%). In comparison, only 7% of the sample had ever smoked a cigarette and 17% had ever used alcohol. Because rates of aggression and delinquency were higher than substance use, we focused on frequent aggression (6+ episodes in past month, 16% of sample) and frequent delinquency (2+ episodes in past year, 13% of sample) in subsequent analyses. As shown in Table 1, White boys and Black boys were most likely to report frequent aggression (24%), and Asian girls and White girls were least likely. American Indian boys were most likely to report frequent delinquency (30%), followed by Black boys (19%). American Indian youth were most likely to report lifetime smoking (14%) and lifetime alcohol use (25%). Asian youth were least likely to report each behavioral outcome.

2.4. Variance explained by predictor domains

The proportion of variance explained by each predictor domain was examined for each behavioral outcome using Nagelkerke's (1991) coefficient of determination, an analogue of the R^2 statistic for logistic regression. Across all outcomes, social and environmental influences explained the highest proportion of variance: 31% of aggression, 26% of delinquency, 22% of smoking, and 21% of alcohol use. The next most important domain was individual characteristics and skills (18% of aggression, 16% of delinquency, and 7% of alcohol use and smoking) followed by bonding to conventional institutions (11% of aggression, 10% of delinquency, 7% of smoking, and 3% of alcohol use). Demographics explained the smallest proportion of variance in each outcome (4% of aggression, 3% of delinquency and smoking, and under 1% of alcohol use). When variables from all four

Table 1
Prevalence rates for cigarette smoking, alcohol use, interpersonal aggression, and delinquency among inner-city minority youth ($N = 5442$)

	N	Lifetime smoking (%)	Lifetime alcohol use (%)	Frequent aggression (%)[a]	Frequent delinquency (%)[b]
Black	2209	6	18	19	15
Girls	1153	6	16	15	12
Boys	1056	6	21	24	19
Hispanic	1768	7	17	13	12
Girls	891	9	16	11	8
Boys	877	5	18	15	15
White	509	9	17	15	10
Girls	241	10	14	5	4
Boys	268	9	21	24	15
Asian	274	3	8	7	7
Girls	135	4	10	4	7
Boys	139	2	6	9	7
American Indian	99	14	25	17	20
Girls	45	11	27	18	9
Boys	54	17	24	17	30
Other/Biracial	583	8	18	15	13
Girls	275	5	14	12	10
Boys	308	11	21	18	15
Total sample	5442	7	17	16	13
Girls	2740	7	15	17	10
Boys	2702	7	19	19	16

[a] Six or more episodes of aggressive behavior reported in the past month.
[b] Two or more episodes of delinquent behaviors reported in the past year.

domains were included in the same model, the full set of predictors explained the most variance in interpersonal aggression (37%), followed by delinquency (33%), cigarette smoking (26%), and lastly, alcohol use (23%).

2.5. Logistic regression of individual predictors

For each behavioral outcome, variables from all four predictor domains were entered into a logistic regression equation, and odds ratios and 95% confidence intervals for each individual predictor are shown in Table 2. There was substantial overlap in patterns of prediction across outcomes for the majority of predictor variables. For social and environmental influences, friends' delinquency was associated with greater smoking, aggression, and delinquency; exposure to violent media was associated with greater alcohol use, aggression, and delinquency; and perceived neighborhood risk was associated with more smoking and aggression. There was also some specificity in prediction: friends' alcohol use was associated only with more alcohol use. While friends' smoking was associated with greater smoking and delinquency, it was unexpectedly associated with less alcohol use; however, this appears to represent a suppressor effect because the zero-order correlation is positive ($r = .20$, $P < .001$).

Table 2
Odds ratios and 95% confidence intervals from logistic regression analyses predicting cigarette smoking, alcohol use, interpersonal aggression, and delinquency among inner-city minority youth ($N = 5442$)

	Lifetime smoking	Lifetime alcohol use	Frequent aggression	Frequent delinquency
	OR 95% CI	OR 95% CI	OR 95% CI	OR 95% CI
Demographic variables[a]				
Male	0.70 (0.55, 0.90)**	1.15 (0.97, 1.35)	1.51 (1.26, 1.83)***	1.55 (1.28, 1.88)***
Black	0.53 (0.39, 0.71)***	0.95 (0.78, 1.17)	1.30 (1.03, 1.63)*	1.29 (1.02, 1.64)*
Hispanic	0.71 (0.52, 0.96)*	0.90 (0.73, 1.12)	0.92 (0.72, 1.18)	1.13 (0.87, 1.45)
Two-parent family	0.76 (0.59, 0.96)*	0.88 (0.75, 1.04)	0.80 (0.67, 0.95)*	0.76 (0.63, 0.92)**
Age	1.47 (1.18, 1.82)***	0.99 (0.85, 1.15)	1.06 (0.89, 1.25)	0.98 (0.82, 1.17)
Bonding to conventional institutions				
Church attendance	0.97 (0.92, 1.02)	1.02 (0.99, 1.05)	0.99 (0.96, 1.03)	0.99 (0.96, 1.03)
School attendance	0.86 (0.78, 0.96)**	1.04 (0.96, 1.12)	0.92 (0.85, 1.00)*	0.93 (0.86, 1.02)
School bonding	0.97 (0.85, 1.12)	0.93 (0.85, 1.02)	0.82 (0.74, 0.91)***	0.91 (0.82, 1.01)
Parental monitoring	0.83 (0.72, 0.95)**	0.89 (0.80, 0.98)**	0.79 (0.71, 0.87)***	0.77 (0.69, 0.86)***
Social and environmental influences				
Friends' smoking	2.25 (1.98, 2.55)***	0.79 (0.71, 0.88)***	1.08 (0.97, 1.20)	1.15 (1.03, 1.28)*
Friends' alcohol use	0.92 (0.81, 1.05)	2.57 (2.32, 2.85)***	1.08 (0.97, 1.20)	1.06 (0.95, 1.18)
Friends' delinquency	1.16 (1.01, 1.34)*	1.07 (0.96, 1.20)	2.73 (2.44, 3.07)***	2.45 (2.18, 2.75)***
Violent media	1.10 (0.93, 1.30)	1.17 (1.04, 1.30)**	1.24 (1.09, 1.41)***	1.16 (1.01, 1.32)*
Neighborhood risk	1.16 (1.03, 1.30)*	1.05 (0.97, 1.14)	1.14 (1.04, 1.24)**	1.00 (0.92, 1.10)
Individual characteristics and skills				
Self-esteem	1.06 (0.91, 1.25)	1.04 (0.93, 1.17)	1.12 (0.99, 1.27)	0.96 (0.84, 1.09)
Risk-taking	1.12 (0.99, 1.27)	1.28 (1.17, 1.39)***	1.37 (1.24, 1.50)***	1.48 (1.34, 1.64)***
Decision-making	0.86 (0.76, 0.97)**	0.90 (0.82, 0.98)*	1.01 (0.92, 1.11)	0.90 (0.82, 1.00)*
Cognitive mastery	0.95 (0.81, 1.11)	1.06 (0.95, 1.19)	1.04 (0.92, 1.18)	0.96 (0.84, 1.09)
Assertiveness	0.92 (0.78, 1.07)	0.99 (0.88, 1.10)	1.01 (0.89, 1.14)	0.92 (0.81, 1.05)
Anger control	1.01 (0.89, 1.15)	1.02 (0.93, 1.11)	0.88 (0.80, 0.97)**	0.98 (0.89, 1.09)
Behavioral control	0.90 (0.70, 1.17)	0.99 (0.83, 1.17)	0.61 (0.51, 0.74)***	0.76 (0.62, 0.92)**

[a] Male, black, Hispanic, and two-parent family are dummy coded, 0 = no, 1 = yes.
* $P < .05$.
** $P < .01$.
*** $P < .001$.

For individual characteristics and skills, decision-making skills were associated with less smoking, alcohol use, and delinquency; risk-taking was associated with increased alcohol use, aggression, and delinquency; and behavioral control skills were associated with less aggression and delinquency. Anger control skills were associated with less aggression, and self-esteem, cognitive mastery, and assertiveness were not associated with any outcome. For bonding to conventional institutions, parental monitoring was protective for all four outcomes, and school attendance was protective for smoking and aggression. School bonding was associated with less aggression only, and church attendance was not associated with any outcome. For demographic variables, being male and Black were associated with less

smoking, greater aggression, and greater delinquency; and being from a two-parent family was protective for these outcomes. One notable difference was observed in the relationships between demographic and substance use variables in that each demographic variable significantly predicted smoking, whereas none predicted alcohol use.

3. Discussion

The present study examined how predictor variables grouped into several broad conceptual domains contributed to four different problem behaviors among inner-city minority youth. Participants were assessed during early adolescence as they entered middle school, a time when young people often initiate substance use and other problem behaviors (Kosterman, Hawkins, Guo, Catalano, & Abbott, 2000). Findings indicated that aggression and delinquency were most commonly reported, while substance use was comparatively infrequent. The latter finding is consistent with literature showing low prevalence rates of substance use among minority youth relative to white youth (Blum et al., 2000). Although there were a small number of Native Americans youth in the present sample, the finding that they smoked cigarettes and used alcohol considerably more than other youth confirms previous findings of elevated rates of risk behaviors among Native American youth (Blum, Harmon, Harris, Bergeisen, & Resnick, 1992).

The four predictor domains (demographics, bonding to institutions, social influences, and individual skills) when combined explained the most variance in aggression and delinquency. Furthermore, the ranking of predictor domains in terms of variance explained in the outcomes was identical for smoking, alcohol use, aggression, and delinquency. Social and environmental influences explained the most variance for each outcome, followed by individual characteristics and skills, bonding to conventional institutions, and lastly, demographic variables. The social/environment domain appeared to predict the most variance due to the role of friends' behavior, which had the strongest effects across outcomes. Friends' delinquency had the highest odds ratio for delinquency, aggression, and alcohol use. This supports the importance of peer influence and social learning theories in the etiology of adolescent problem behaviors (Snyder, Dishion, & Patterson, 1986) and is consistent with previous research showing that youth who associate with deviant peers are likely to adopt maladaptive attitudes, beliefs, and behaviors (Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979). The fact that demographics explained the smallest proportion of variance in each outcome replicates a recent finding that race/ethnicity, and family structure alone can provide only a limited understanding of adolescent risk behaviors (Blum et al., 2000).

For all the individual predictors included in the present study, only two were specific to a single outcome: being Hispanic was protective in terms of smoking, and anger control skills were protective in terms of aggression. Conversely, several variables within each predictor domain were associated with two or more behavioral outcomes. Parental monitoring, exposure to violent media, risk taking, decision-making skills, gender, race/ethnicity, and family structure each significantly predicted at least three of the four outcomes in this study. This suggests an important role of these variables in the etiology of multiple problem behaviors.

This study has several limitations that should be noted. The cross-sectional design precludes the ability to investigate causality or the temporal sequence among the variables. Furthermore, the interactive effects of predictors were not examined in this study. Finally, the study was based on students' self-report and therefore the significant relationships among the variables may partly reflect shared method variance. Despite these limitations, this study has illustrated several important points regarding substance use and related behaviors among inner-city minority adolescents. The finding that problem behaviors cooccur is consistent with previous research (Donovan & Jessor, 1985; Ellickson et al., 1997) and the fact that all predictor domains explained variance across outcomes suggests not only that these behaviors have similar etiologies, but that prevention programs that focus on skills building and social resistance skills should be augmented by additional components that take place at the family, community, and societal levels. Findings suggest that broad-based preventive interventions that address the etiologic factors common to different problem behaviors may be effective in preventing a variety of negative outcomes.

References

Akers, R. L., Krohn, M. D., Lanza-Kaduce, L., & Radosevich, M. (1979). Social learning and deviant behavior: A specific test of a general theory. *American Sociological Review*, *44*, 636–655.

Blum, R. W., Beuhring, T., Shew, M. L., Bearinger, L. H., Sieving, R. E., & Resnick, M. D. (2000). The effects of race/ethnicity, income, and family structure on adolescent risk behaviors. *American Journal of Public Health*, *90*, 1879–1884.

Blum, R. W., Harmon, B., Harris, L., Bergeisen, L., & Resnick, M. D. (1992). American Indian-Alaska native youth health. *Journal of the American Medical Association*, *267*, 1637–1644.

Botvin, G. J., Griffin, K. W., Diaz, T., & Ifill-Williams, M. (2001). Drug abuse prevention among minority adolescents: Post-test and one-year follow-up of a school-based preventive intervention. *Prevention Science*, *2*, 1–13.

Bugen, L. A. & Hawkins, R. C. (1981). *The coping assessment battery: Theoretical and empirical foundations.* Paper presented at the meeting of the American Psychological Association, Los Angeles, CA.

Capaldi, D. M., & Patterson, G. R. (1989). *Psychometric properties of fourteen latent constructs from the Oregon Youth Study.* New York: Springer-Verlag.

Catalano, R. F., Hawkins, J. D., Krenz, C., Gillmore, M., Morrison, D., Wells, E., & Abbott, R. (1993). Using research to guide culturally appropriate drug abuse prevention. *Journal of Consulting and Clinical Psychology*, *61*, 804–811.

Dembo, R., Allen, N., Farrow, D., Schmeidler, J., & Burgos, W. (1985). A causal analysis of early drug involvement in three inner-city neighborhood settings. *International Journal of the Addictions*, *20*, 1213–1237.

Donovan, J. E., & Jessor, R. (1985). Structure of problem behavior in adolescence and young adulthood. *Journal of Consulting and Clinical Psychology*, *53*, 890–904.

Ellickson, P., Saner, J., & McGuigan, K. A. (1997). Profiles of violent youth: Substance use and other concurrent problems. *American Journal of Public Health*, *87*, 985–991.

Elliott, D. S., Huizinga, D., & Menard, S. (1989). *Multiple problem youth: Delinquency, substance use, and mental health problems*. New York: Springer-Verlag.

Epstein, J. A., Botvin, G. J., Diaz, T., Baker, E., & Botvin, E. M. (1997). Reliability of social and personal competence measures for adolescents. *Psychological Reports*, *81*, 449–450.

Eysenck, H. J., & Eysenck, S. B. G. (1975). *Manual of the Eysenck personality questionnaire*. London: Hodder & Stoughton.

Farrell, A. D., Danish, S. J., & Howard, C. W. (1992). Relationship between drug use and other problem behaviors in urban adolescents. *Journal of Consulting and Clinical Psychology*, *60*, 705–712.

Gambrill, E. D., & Richey, C. A. (1975). An assertion inventory for use in assessment and research. *Behavior Therapy*, *6*, 550–561.

Griffin, K. W., Botvin, G. J., Scheier, L. M., Diaz, T., & Miller, N. (2000). Parenting practices as predictors of substance use, delinquency, and aggression among urban minority youth: Moderating effects of family structure and gender. *Psychology of Addictive Behaviors*, *14*, 174–184.

Jessor, R., & Jessor, S. L. (1997). *Problem behavior and psychosocial development: A longitudinal study of youth*. San Diego, CA: Academic Press.

Kendall, P. C., & Wilcox, L. E. (1979). Self-control in children: Development of a rating scale. *Journal of Consulting and Clinical Psychology*, *47*, 1020–1029.

Kosterman, R., Hawkins, J. D., Guo, J., Catalano, R. F., & Abbott, R. D. (2000). The dynamics of alcohol and marijuana initiation: Patterns and predictors of first use in adolescence. *American Journal of Public Health*, *90*, 360–366.

Nagelkerke, N. J. (1991). A note on a general definition of the coefficient of determination. *Biometrika*, *78*, 691–692.

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton: Princeton University Press.

Snyder, J., Dishion, T. J., & Patterson, G. R. (1986). Determinants and consequences of associating with deviant peers during preadolescence and adolescence. *Journal of Early Adolescence*, *6*, 29–43.