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Social Activity, School-Related Activity, and Anti-Substance Use Media Messages on Adolescent Tobacco and Alcohol Use

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Abstract

In this article, we present the effects of three hypothesized protective factors: social activities, school-related activities, and anti-substance use media messages on adolescent tobacco and alcohol use. Data were drawn from the “Monitoring the Future” (MTF) research project, which was conducted by the Institute for Social Research at the University of Michigan. The sample included 2,551 twelfth-grade students. The results of the structural equation model showed that exposure to media anti-drug messages had an indirect negative effect on tobacco and alcohol use through school-related activity and social activity. The results suggest that comprehensive ecological interventions encompassing media, family, and school can increase on the preventive effects of adolescent’s substance use.

Keywords

Adolescence; Substance use; Ecological model; Media; Social activity; School-Related Activity

Adolescent substance use can be a serious problem for the youth and their families and can create tremendous social and economic costs (Nissen, Hunt, Bullman, Maimo, & Smith, 2004; Skiba, Monroe, & Wodarski, 2004). The use of tobacco, alcohol, and illicit drugs are the leading causes of morbidity and mortality among adolescents (Johnston, O’Malley, Bachman, & Schulenberg, 2005a). Johnston et al. (2005a) found that more than half (53%) of adolescents in the U.S. have tried cigarettes by the end of their senior year in high school and 25% are currently smokers. They also found that 77% of adolescents have consumed alcohol by the end of their senior year. Because of the severe and widespread nature of adolescent substance use, there is a critical need for continued research into the predictors, patterns, and protective forces of adolescent substance use.

The importance of youth participation in social or school-related activities as a protective factor against substance use has been consistently presented by many scholars (Aleixandre, Perello de Rio, & Palmer, 2005; Shilts, 1991). When youths are involved in routine, unstructured socializing, without the presence of an authority figure, more opportunities for using substances are presented. Osgood, Wilson, O’Malley, Bachman and Johnston (1996) found strong associations between such socializing and criminal behavior, dangerous driving, heavy alcohol use and illicit drug use. Therefore, structured activities in schools and communities are important factors in mitigating substance use amongst adolescents.

Participation in school activities has been shown to serve as a protective factor against the use of substances. School-related activities include participation in a variety of social-academic organizations, such as student government, clubs, athletic teams, the arts, and the school newspaper/yearbook. Bryant, O'Malley, Bachman and Johnston, L. (2003) found that positive attitudes toward school by the youths served as protective factors, not only for high achieving students, but also for low achieving students. Specific findings were that school bonding, interest in school, and academic achievement were negatively associated with substance use.

School-related activities provide opportunities to socialize in structured ways, usually under adult supervision (e.g., coach, teacher, advisor), in an environment that focuses on achievement, growth and self-esteem. Towberman and McDonald (1993) found that the youth's level of bonding toward school and beliefs about their personal and social effectiveness were significantly correlated with drug experimentation and use, along with negative image and self-confidence. The findings of Moore and Werch's study (2005) showed that some of the school-based sports and physical activities were negatively associated with substance use among youths. There is evidence that youths who are expected to achieve academic success will be less likely to become involved with substance use. For example, college-bound adolescents are less likely to use substances than non-college bound adolescents (Johnston et al., 2005a). Also, academic expectations and academic achievement are highly correlated each other (Sanders, Field, & Diego, 2001). Youths who are involved in academic activities in educational settings are likely to be more invested in achieving academic success compared to those not involved in academic activities.

Participation in activities that takes place outside of school, such as going to the movies, concerts, driving around with friends, sports and volunteer work is also important aspect to consider (Shilts, 1991). Duncan, Duncan, Strycker and Chaumeton (2002) found that pro-social activities, such as physical activity, organized sports, organized non-sport activities, and volunteer and religious activities had protective effects on substance use and anti-social behaviors. Pate, Health, Dowda and Trost (1996) found that low physical activity, in general, was associated with cigarette and marijuana smoking as well as an array of other problematic health behaviors. Even students who reported spending a lot of time in arcades (DeWit & Silverman, 1995) and playing computer games (Durkin & Berber, 2002) had positive protective effects from substance use.

Increased attention has been given to the role of religion in adolescent substance use. In particular, religious involvement has been considered an important protective factor from substance use (Duncan et al., 2002; Merrill, Folsom & Christopherson, 2005; Oman, Vesely, Aspy, McLery, Rodine & Marshall, 2004; Wallace & Forman, 1998; Wallace, Brown, Bachman & LaVeist, 2003; Wallace, Forman, Caldwell & Willis, 2003). In their study, Simm, Jordan-Green and Wolfman (2005) found that parents contributed their adolescents' non-use of substances to the importance of church involvement in the youths' lives. For example, DeWit and Silverman (1995) found that frequent church attendance functioned as a protective factor against substance use. Wallace, Forman, Caldwell and Willis (2003) found that religion was an important protective factor against alcohol and other substances for both Caucasians and African Americans. However, for Caucasians it was at the individual level, and for African Americans, it was at the group (social) level.

Media influence has also been identified as a predictor of adolescent substance use (Johnston, Terry-McElrath, O'Malley & Wakefield, 2005), although some argue that establishing the relationship between media influence and substance use is difficult because substance use develops over long periods and has multiple influential factors (Schilling &

McAlister, 1990). Media may influence substance use in different ways – both positively (decreased use of substances) or negatively (increased or initiation of use) (Schilling & McAlister, 1990). Media influences pro-substance use behavior (Wodarski, 1990) such as beer commercials, as well as anti-smoking/anti-drug/anti-drinking commercials and print advertisement. Johnston, et al. (2005b) who tested the effects of media over extended time periods found that youths who reported exposure to anti-substance use messages through the media had a lower probability of substance use.

There are some racial and gender differences in a youth's experience with substances. For example, Johnston et al. (2005a) found that African Americans had substantially lower rates of substance use – both licit and illicit – than Caucasians, and that Hispanics generally fell in the middle of the two groups, closer to Caucasians. However, at certain ages, Hispanic youth reported the highest rates of illicit drug use. In another study, African Americans reported a higher prevalence of nonuse of alcohol than did youths of other races/ethnicities (Oman et al., 2004). Prior studies also reported gender differences in tobacco and alcohol use among racial/ethnic groups. For instances, Wallace et al. (2005b) reported that both boys and girls have similar patterns in cigarette use showing highest use among Native Americans, somewhat lower among Caucasians, Hispanics/Latinas and African Americans, and lowest among Asian Americans. Males, in general, use more substances than females (Johnston et al., 2005a; Young, Corley, Stallings, Rhee, Crowley & Hewitt, 2002). Caldwell and Darling (1999) found differences between girls and boys in their 'partying' behavior, in that males were influenced by the behavior of their peers, and females were influenced by their belief of whether their friends viewed partying as important.

Conceptual Model

Figure 1 represents the conceptual model for this study. This model is borrowed from the ecological model (Bronfenbrenner, 1977) and ecological-mediational model (Lynn, McKay, & Atkins, 2003). The figure shows three different key linkages to be assessed: (a) media, school-related activity, and social activity have direct effects on tobacco and alcohol use; (b) media has a direct effect on school-related activity and social activity; and (c) school-related activity and social activity have a mediating function between media and tobacco and alcohol use.

The media, an important aspect of the macro system, presented in the model includes anti-smoking and anti-drug commercials or "sports" that are intended to discourage cigarette smoking and drug use, and anti-smoking and anti-drug ads on billboards or in magazines and newspapers. The two meso level of mediating paths represent the mechanisms of adolescents' extra-curricular and school activities. According to these mechanisms, the level of adolescents' school-related and social activities may affect tobacco and alcohol use. Our conceptual model also proposes that selected individual characteristics, such as sex, racial/ethnicity, and religious affiliation, may exert their influence on tobacco and alcohol use.

It was hypothesized that media, school-related activity and social activity have direct effects on adolescent's tobacco and alcohol use. Similar directional associations were also hypothesized between selected demographic variables (sex, race/ethnicity, religion) and tobacco and alcohol use. Finally, school-related and social activities may have mediating functions between media and tobacco and alcohol use.

Methods

Sample

The data for this study was drawn from the “Monitoring the Future” project, which, as mentioned, was conducted by the Institute for Social Research at the University of Michigan. The MTF survey involves a nationally represented survey of each U.S. high school senior class, beginning in 1975. About 135 high schools across the United States (approximately 112 public and 23 private) were participated. The response rate is about 83% of all seniors, with absentees being accounted for nearly all of the non-respondents. Schools are requested to participate for two consecutive years; thus, each year half of the schools are participating for the first time and half are participating for the second time. When a sampled school is unwilling to participate, a replacement school is selected, controlling for factors such as population density, geographic region, size, racial composition, and other relevant factors. MTF sampling procedures do not result in a rigorously representative sample within each state in the study. The samples are drawn so as to be nationally representative, including all geographic regions, levels of population density, types of schools, and so on; more precisely, the design is such that the samples are representative of each of the four major geographic regions (Northeast, North Central, West, and South).

The datasets of each year are organized by the form number (questionnaire version). We used form six of 2003 (12th grade) data for this study. The sample included 2,551 twelfth-grade participants where 63.1% were white and 12.1% were African-American. Nearly half of the sample was female (49.4%).

Measurement

The students completed self-administrated, machine-readable questionnaires during a normal class period. Wallace et al. (2003a) noted that “Absence on the day of data collection was the primary reason that students missed completing the data; it is estimated that less than 1% of students refused to complete the questionnaire (p.227).” Student response rates averaged around 84%.

The dependent variables focused on the proportion of students who used tobacco and alcohol during the last 30 days. Religion was measured with an item: ‘How religion is important to your life.’ The response categories for this measure are 1= not important, 2= little important, 3= pretty important, and 4= very important. The key independent measures are media, social activities, and social-related activities. Media exposure to anti-substance use messages were measured by three questions: (1) ‘In recent months, about how often have you seen such anti-smoking commercials on TV, or heard them on the radio?’ (2) ‘In recent months, about how often have you seen anti-smoking ads on billboards or in magazines and newspapers?’ and (3) ‘In recent months, about how often have you seen such anti-drug commercials on TV or heard them on the radio?’ The response categories for this measure are 1= not at all, 2= less than once per month, 3= 1–3 per month, 4= 1–3 per week, 5= daily or almost, 6= more than once a day. Internal consistency reliability (Cronbach’s α) for the 3-item scale was .79.

Social activities were measured by five questions: ‘How often do you do each of the following?’ A: Go to the movies, B: Go to rock concerts, C: Ride around in a car (or motorcycle) just for fun, D: Participate in community affairs or volunteer work, E: Actively participate in sports, athletics or exercising. The response categories for this measure are 1= never, 2= few per year, 3= 1–2 per month, 4= once per week, 5= daily. A higher index score indicated high extra-curricular activities. Internal consistency reliability (Cronbach’s α) for the 5-item scale was .82.

School-related activities were measured by five questions: ‘To what extent have you participated in the following school activities during this school year?’ A: School newspaper or yearbook, B: Music or other performing arts, C: Athletic teams, D: Academic clubs (e.g., science, math, language), E: student council or government. The response categories for this measure are 1= not at all, 2= slight, 3= moderate, 4= considerable, 5= great extent. A higher index score indicated high school activities. Internal consistency reliability (Cronbach’s α) for the 5-item scale was .77.

Results

Bivariate Correlations

The correlation matrix for the main study variables and indicators is presented in Table 1. The mean and standard deviation for main variables and indicators are shown in Table 2. All indicators of independent variables are positively correlated with tobacco and alcohol use. Contrary to predictions, students who were actively involved in social activities and school-related activities showed higher tobacco and alcohol use. More frequent exposure to anti-substance use media messages was also significantly correlated with higher tobacco and alcohol use.

Structural Equation Models

The fit of the initial model of tobacco and alcohol use was fair (chi-square (113) =1,113, CFI = .94, RMSEA = .06). The chi-square was significant, this likely is due to the large sample size (N = 2551). In addition, because other fit indicators suggested an acceptable level of fit, we accepted this model as the final model.

For the measurement model of tobacco and alcohol use, the standardized regression coefficients showed a moderately strong relationship between each latent concept and its indicators. The standardized regression coefficients between media and its indicators range from .84 to .97. The standardized regression coefficients between social activity and its indicators range from .46 to .63. The standardized regression coefficients between school-related activity and its indicators range from .61 to .71. The standardized regression coefficients between tobacco and alcohol use and its indicators range from .54 to .56.

Figure 2 represents the standardized structural coefficients of the relationship among latent variables. Our results indicate that exposure to media messages had indirect effects on tobacco and alcohol use through social activity and school-related activity. Higher media exposure to anti-tobacco and anti-drug campaigns were associated with higher social (.22) and school-related activities (.08), which in turn were associated with increased adolescent tobacco and alcohol use (.32 and .12 respectively). To investigate whether these two variables (i.e., social activity and school-related activity) have a function as mediators between media exposure and tobacco and alcohol use, separate tests were conducted and reported later in a different section of this article. Contrary to predictions, higher media exposure to anti-tobacco and anti-drug campaigns was associated with higher tobacco and drug use (.32). Sex and race/ethnicity were significantly associated with tobacco and alcohol use (.27 and .11 respectively), but no significant association exists between religion and tobacco and alcohol use.

Mediation Model

The mediation models of tobacco and alcohol use were tested using Baron and Kenny’s (1986) procedure. A series of regression equations was developed for each path in the model. First, social activity was tested as a mediator between media exposure and tobacco and alcohol use. The beta weight when media exposure was regressed alone on tobacco and

alcohol use was .41. When extra-curricular activity was included in the equation, the resulting beta weight was .34. The small difference between the beta weights for each equation and still significant direct association between media exposure and tobacco and alcohol use suggest that media exposure is only partially mediated by social activity and operates mainly through its direct effects on tobacco and alcohol use.

The same procedure was used to test for mediation effects of school-related activity on tobacco and alcohol use. The beta weight when media exposure was regressed alone on tobacco and alcohol use was .41. When school activity was included in the equation, the resulting beta weight was .35. Again, the small difference between the beta weights for each equation and still significant direct association between media and tobacco and alcohol use suggest that media is only partially mediated by school-related activity and operates mainly through its direct effects on tobacco and alcohol use.

Discussion and Implications

This study investigated the effect of social activities, school-related activities and anti-substance use media messages on adolescent's tobacco and alcohol use. We also investigated the degree to which two protective factors, social activities, and school-related activities, may act to mediate the effects of media messages on adolescent's substance abuse. Results confirm that exposure to anti-substance use media messages, social activities and school-related activities have direct effects on adolescent's tobacco and alcohol use. Contrary to other findings (Shilts, 1991), participants in this study who had higher levels of social activities and school-related activities showed relatively higher tobacco and alcohol use. These findings stand in contrast to recent studies that yielded results indicating that some school- or home-based sports and physical activities were negatively associated with substance use (Bryant et al., 2003; Moore & Werch, 2005). The difference in the findings may be related to possible peer effects that are related to those activities. Moreover, if illicit substances such as cocaine and marijuana were studied, we may have seen different results, given that alcohol and cigarettes are legal (for adults) and more accessible than illegal substances. Our findings also suggest that anti-drug commercials and print advertisements positively affect drug abuse, also in a contrast to our prediction and findings of other studies. The difference in the findings may be related to a possible boomerang effect. Fishbein et al. (2002) cautioned that anti-drug advertising may produce unintended effects on teenagers' attitudes and behaviors. Hornik et al. (2003) noted that anti-drug advertising was significantly correlated with increased interest and future intent to use marijuana in subgroups of teens. Meta-analysis of 72 outcome assessments of various anti-substance use media interventions across the world conducted by Derzon and Lipsey (2002) revealed mixed outcomes. Czyzewska and Ginsburg (2007) asserted that mixed outcomes of anti-drug advertising appear to depend on the selection of variables included in the assessment (e.g., relevant knowledge, attitudes or behaviors), targeted substance and specific characteristics of media messages, targeted audience, and campaigns context. Future research should examine whether the boomerang effect to anti-drug public statement announcements is specific to that substance or reflects a generalized tendency among youth to respond with reactance to any preventive messages targeting substance use. This study also found that school-related activities and social activities have no mediating function between media messages and adolescent tobacco and alcohol use. Thus, we conclude that media messages, school-related activities, and social activities independently affect adolescent's tobacco and alcohol use.

This study's findings are tempered by measurement limitations in the MTF data, such as lack of information regarding the context of reported tobacco and alcohol use and issues related to the accuracy of adolescent self-report. For instance, we don't know the level of

structure, organization or presence of authority figure(s) in relation to the adolescents' social and school-related activities. In addition, examining the number of media message exposure incidents is not sufficient. The content and context of the messages are also important. However, these preliminary results can serve as a springboard for continuing research that further elucidates the dynamics of risk and protection related to youth tobacco and alcohol use.

Improved measures and techniques that will promote honest self-reports from youths are needed (Skiba, Monroe & Wodarski, 2004). Research efforts should include further exploration into unstructured vs. structured leisure time, including the importance of group perception of self and related perceptions of security (see Bogumil, 2001). The role of religion should be explored further, given that across several studies, religion was found to serve as a protective factor. Research should include racial differences as well as the difference between religion and spirituality. Hodge, Cardenas and Montoya (2001) found interesting differences between the effects of religion, which involves belief, participation in rituals and practices (and authority figures) and spirituality, which involves internal process. Finally, future research would benefit from an increased understanding of the contexts and more comprehensively integrated approaches including cultural factors, personal traits, peer relationships and dynamics, and factors from multiple levels: family, school, and community.

Clearly, prevention efforts are needed that incorporate youth's entire set of systems: family, school, community, and the media (Skiba, Monroe & Wodarski, 2004). Youths should be encouraged to participate in both school-related activities as well as social activities, but as our results indicate, participation in activities alone may not serve as a protective factor against substance use. The number and type of activities in which youths participate may not be as important as the quality of those programs, and the degree to which adults are involved with those programs. Schools can do more to help youths protect themselves. Schools are natural settings to promote change through education about substance use and in helping youths develop skills in responsible decision-making (Wodarski, 1990). Early prevention efforts that promote the message that student should delay the initiation of alcohol use, for example, may deter the use of other substances and deter delinquency (Barnes et al., 2002). The effectiveness of this strategy, as well as the role of other harm reduction strategies and programs should be explored further (Erickson, 1997), especially since evidence has shown such programs to be effective for high school students (but not for junior high school students) (Poulin & Nicholson, 2005). Finally, there needs to be improved community partnerships between service agencies (Nissen et al., 2004) as well as improved collaboration between school health and substance abuse treatment systems (Wood, Drolet, Fetro & Synovitz, 2002); and with families and other providers.

Different interventions are also needed that reflects the changing face of substance use. These include interventions that: 1) respond to changes in social trends related to substances, like the availability of drugs; 2) incorporate information learned about age, gender, and racial differences; and 3) include program evaluation to ensure that programs are effective and of high quality (Skiba et al., 2004).

Although it is impossible to know the effects of media exposure under optimal conditions, fundamental changes in use of drugs and alcohol will probably not come about from extensive media campaigns alone. Social workers should advocate for anti-substance use media messages that are realistic and meaningful to youths, a process in which youths should be involved and consulted in early stages. This is especially relevant given that youths perceive media messages as being exaggerated in nature (Johnston et al., 2005b).

Finally, youths can play other important roles in substance use prevention through participation in research and public education efforts.

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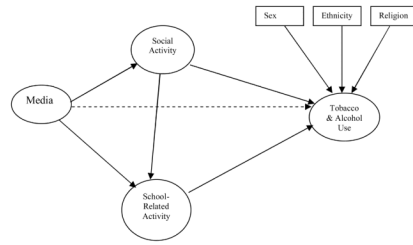


Figure 1.
Conceptual Model of Adolescent Tobacco and Alcohol Use.

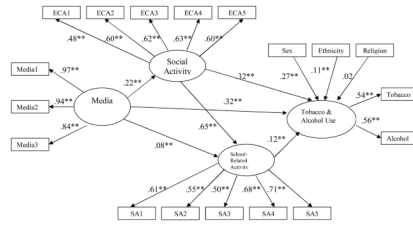


Figure 2.
 An Ecological Mediation Model of Adolescent Tobacco and Alcohol Use (Standardized Regression Weights).
 ** Significant at $p < .01$.

Table 1

Correlations for main study variables and indicators.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 13 | 14 | 15 | 16 | 17 | 19 | 20 | |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|--|
| 1. Sex | 1 | | | | | | | | | | | | | | | | | | |
| 2. Race | .27** | 1 | | | | | | | | | | | | | | | | | |
| 3. Relgn | .24** | .34** | 1 | | | | | | | | | | | | | | | | |
| 4. Med 1 | .44** | .19** | .24** | 1 | | | | | | | | | | | | | | | |
| 5. Med 2 | .41** | .20** | .24** | .92** | 1 | | | | | | | | | | | | | | |
| 6. Med 3 | .37** | .18** | .22** | .82** | .79** | 1 | | | | | | | | | | | | | |
| 7. SA 1 | .16** | .10** | .10** | .16** | .15** | .14** | 1 | | | | | | | | | | | | |
| 8. SA 2 | .13** | .03 | .05* | .11** | .12** | .11** | .46** | 1 | | | | | | | | | | | |
| 9. SA 3 | .14** | .09** | .06** | .14** | .14** | .13** | .24** | .36** | 1 | | | | | | | | | | |
| 10. SA 4 | .08** | .08** | .10** | .07** | .09** | .05** | .27** | .37** | .35** | 1 | | | | | | | | | |
| 11. SA 5 | .17** | .06** | .08** | .12** | .13** | .11** | .24** | .35** | .35** | .25** | 1 | | | | | | | | |
| 13. SRA1 | .18** | .07** | .09** | .12** | .11** | .12** | .19** | .23** | .25** | .16** | .30** | 1 | | | | | | | |
| 14. SRA2 | .16** | .05* | .10** | .13** | .14** | .13** | .19** | .24** | .24** | .10** | .27** | .32** | 1 | | | | | | |
| 15. SRA3 | .07** | .10** | .10** | .11** | .11** | .10** | .24** | .24** | .18** | .14** | .22** | .31** | .18** | 1 | | | | | |
| 16. SRA4 | .16** | .00 | .12** | .15** | .15** | .15** | .21** | .28** | .24** | .16** | .37** | .41** | .39** | .30** | 1 | | | | |
| 17. SRA5 | .16** | .06** | .05* | .14** | .15** | .14** | .23** | .28** | .27** | .20** | .34** | .44** | .38** | .37** | .49** | 1 | | | |
| 19. Tob | .22** | .13** | .09** | .17** | .16** | .14** | .19** | .18** | .25** | .20** | .10** | .23** | .16** | .16** | .16** | .22** | 1 | | |
| 20. Alcol | .28** | .15** | .14** | .28** | .27** | .25** | .12** | .12** | .24** | .13** | .07** | .13** | .08** | .10** | .08** | .13** | .30** | 1 | |

* p < .05;

** p < .01.

Note: Relgn: Religion; Med: Media; SA: Social Activity; SRA: School-Related Activity; Tob: Tobacco Use; Alcol: Alcohol Use.

Table 2

Means and standard deviations of main study variables and indicators.

| | Mean | SD |
|-------------------------------|-------------|-----------|
| 1. Sex | .98 | 2.38 |
| 2. Race | -2.11 | 3.97 |
| 3. Religion | -0.15 | 5.12 |
| 4. Media 1 | 3.10 | 3.70 |
| 5. Media 2 | 2.26 | 3.49 |
| 6. Media 3 | 2.25 | 3.99 |
| 7. Social Activity 1 | 4.54 | 1.15 |
| 8. Social Activity 2 | 2.63 | 1.20 |
| 9. Social Activity 3 | 1.48 | 1.17 |
| 10. Social Activity 4 | 3.57 | 1.68 |
| 11. Social Activity 5 | 2.14 | 1.46 |
| 12. School-Related Activity 1 | 1.46 | 1.47 |
| 13. School-Related Activity 2 | 2.04 | 1.90 |
| 14. School-Related Activity 3 | 2.53 | 2.01 |
| 15. School-Related Activity 4 | 1.61 | 1.58 |
| 16. School-Related Activity 5 | 1.44 | 1.48 |
| 17. Tobacco | 1.32 | 1.80 |
| 18. Alcohol | 1.40 | 2.94 |