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A test of the efficacy of a brief, web-based personalized feedback intervention to reduce drinking among 9th grade students

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HIGHLIGHTS

- We tested the efficacy of a brief, web-based alcohol intervention.
- Two junior high schools were randomized into intervention or control schools.
- Intervention participants reported less drinking and consequences than controls.
- Results provide support for a brief, web-based alcohol intervention.

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ABSTRACT

Alcohol use increases substantially during the transition from middle school to high school. This study tested a brief, web-based personalized feedback program aimed at reducing risk factors for drinking, alcohol use, and alcohol-related consequences among 9th grade students. At a 3-month follow-up, students in the intervention group showed positive results relative to those in the control group on variables associated with reduced risk, including positive alcohol expectancies and positive beliefs about alcohol. Students in the intervention group also reported a reduction in drinking frequency and alcohol-related consequences relative to those in the control group. There were, however, no differences in normative beliefs regarding peer drinking or quantity of weekly drinking between the two groups. Results indicate that a brief, web-based personalized normative feedback program delivered in the school setting is a promising approach to reducing alcohol use and the associated consequences among 9th grade students.

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1. Introduction

Underage drinking represents a significant problem in the United States, with 70% of students reporting alcohol use by the end high school (Johnston, O'Malley, Bachman, & Schulenberg, 2012). In addition, heavy drinking in high school is associated with multiple interpersonal, academic, legal, and neurocognitive consequences (Arata, Stafford, & Tims, 2003; Brown, Tapert, Granholm & Delis, 2000; French & Maclean, 2006). Further, research indicates that youth who drink heavily during their teen years continue this pattern into college (Kenney, LaBrie, & Hummer, 2010) and early adulthood (D'Amico, Elickson, Collins, Martino, & Klein, 2005) and are at risk for developing alcohol dependence (Hingson, Heeren, & Winter, 2006).

Alcohol use increases substantially during the transition from middle school to high school. According to national survey data, lifetime prevalence rates for alcohol use among 8th, 10th and 12th grade students are 33%, 56%, and 70%, respectively (Johnston et al., 2012). Additionally, 13% of 8th grade students report alcohol use in the past 30 days compared to 27% of students in the 10th grade and 40% of students in the 12th grade (Johnston et al., 2012). More concerning is the escalation in heavy drinking during this transition, with reports of binge drinking in the past 2 weeks increasing from 6.4% in the 8th grade, to 14.7% in the 10th grade, to 21.6% in the 12th grade (Johnston et al., 2012). Data indicate that the largest increase in alcohol use and heavy drinking occurs between 8th and 10th grades, identifying a need to design prevention and intervention programs for students transitioning to high school.

One explanation for the high rates of alcohol use and heavy drinking in high school is that this time period is associated with a high level of risky decision-making (Albert & Steinberg, 2011; D'Amico et al., 2005) and increased peer affiliation (Burrow-Sanchez, 2006). During this

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time, adolescents try new behaviors and may find themselves in risky situations as parental authority is tested (D'Amico & Fromme, 2000). Although adolescents have the capacity to evaluate the costs and benefits of their choices, adolescents often demonstrate poor decision making and judgment (Albert & Steinberg, 2011). Relative to adults, adolescents engage in higher rates of risky behavior, in part due to the desire to seek out novel and exciting experiences (Albert & Steinberg, 2011). Additionally, prefrontal cortex immaturity contributes to the risky decision making seen among adolescents, as the prefontal cortex plays a key role in behavioral and emotional regulation and risk evaluation (Steinberg, 2008). Risky behavior in adolescence is also associated with an imbalance caused by different developmental trajectories of reward and regulatory brain circuitry (Van Leijenhorst et al., 2010) and may be due to the combination of relatively higher inclinations to seek rewards and still maturing capacities for self-control (Steinberg, 2010).

Neuroimaging studies indicate that many social brain regions continue to develop during adolescence resulting in differences in responses to peer influence and social evaluation which are associated with an increased vulnerability to risky behavior when that is the norm (Burnett, Sebastian, Kadosh, & Blakemore, 2010). Adolescent risk-taking behavior is also more likely to occur in groups than that of adults (Chassin, Pitts, & Prost, 2002). In addition, perceptions of peer drinking (Arata et al., 2003; Bekman, Cummins, & Brown, 2010; D'Amico & McCarthy, 2006) and positive expectancies regarding alcohol (Goldberg, Halpern-Felsher, & Millstein, 2002) have been identified as risk factors for drinking in adolescence. These findings suggest that adolescent risk taking behaviors are socio-emotional in nature, indicating the need for prevention and intervention efforts that provide information that is socially and emotionally relevant to adolescents, as well as targeting normative beliefs and positive alcohol beliefs and expectancies.

To date, there is limited research on interventions specifically targeting high school students (Spoth, Greenberg, & Turrisi, 2008). Recent reviews of the literature indicate that brief interventions using motivational interviewing are effective in reducing adolescent substance use (Barnett, Sussman, Rohrbach, & Spruijt-Metz, 2012; Jensen et al., 2011; Tevyaw & Monti, 2004). However, a close examination of the studies reviewed indicates limited research examining interventions specific to 9th grade students. Although, the extant research on school-based programs for high school students indicates that programs using motivational enhancement and cognitive–behavioral principals are effective in reducing alcohol use (Conrod, Stewart, Comeau, & Maclean, 2006; O'Leary-Barrett, Macie, Castellanos-Ryan, Al-Khudhairy, & Conrod, 2010; Sussman, Dent, & Stacy, 2002), these types of programs are time intensive, require extensive training, and may be difficult for schools to implement. Successful school-based interventions include factors such as a sound theoretical foundation, demonstrated fidelity, and material designed to engage adolescents (Wagner, Tubman, & Gil, 2004). Thus, it is important to assess the efficacy of theory driven programs that can be easily standardized, have good program fidelity, require minimal training, and contain information that is presented in a way that will be appealing to and well-received by adolescents.

More recently, innovative approaches to implementing brief interventions have been developed. Web-based interventions may be particularly useful in the high school setting as online programming has the potential both to reach a wide audience and be an engaging medium for students who enjoy "surfing the net". Graphics used in web-based interventions may also appeal to adolescents, thus increasing their interest in reading the feedback (Tevyaw & Monti, 2004). Additionally, a web-based program is well-suited for the school setting as many of the difficulties associated with implementing traditional brief interventions can be reduced by the use of technology (Moyer & Finney, 2005). Specifically, web-based programs are inexpensive and require minimal training, thereby reducing the resources required of schools to adopt the program. Web-based interventions are also easy to disseminate to large groups of students within the existing framework of the educational setting. Additionally, web-based interventions can be infused into the school curriculum and can improve program fidelity (Schinke, Di Noia, & Glassman, 2004).

A growing number of controlled studies indicate that web-based programs delivered to adolescents (Newton, Andrews, Teesson, & Vogl, 2009; Schwinn, Schinke, & Di Noia, 2010) or adolescents and their parents (Koning et al., 2009; Schinke, Cole, & Fang, 2009; Schinke, Fang, & Cole, 2009) are effective in reducing drinking and alcohol-related consequences in adolescents. Although research indicates that web-based interventions are promising for this age group, the majority of these studies examined online interventions with adolescent females only (Schinke, Cole, & Fang, 2009; Schinke, Fang, & Cole, 2009; Schwinn et al., 2010). The web-based interventions used in these studies were also lengthy, including 4–12 modules or sessions, with each session taking up to 40 min. Additionally, only two of these studies evaluated a school-based program (Koning et al., 2009; Newton et al., 2009). School-based interventions have several potential advantages over clinic-based interventions (Wagner et al., 2004). The school is an identifiable setting where the program can be disseminated and can reach all adolescents. Further, the school represents a unique setting for prevention and intervention because it combines personal, social, and academic forces that affect a student's life and substance use choices. Thus, further research is needed to examine the efficacy of a brief, school-based online intervention targeting both males and females.

The purpose of the present study is to test the efficacy of a brief, web-based intervention program based on social norming and motivational enhancement models on reducing risk-factors for drinking, alcohol use, and alcohol-related consequences among 9th grade students. To our knowledge, this is the first study to examine a brief, web-based personalized feedback intervention implemented through the school for 9th grade students. We hypothesized that students receiving the web-based intervention would report 1) lower levels of risk-factors for drinking (normative beliefs about peer drinking, positive expectancies, and positive beliefs about alcohol), 2) lower rates of drinking (frequency of drinking and quantity of weekly drinking), and 2) lower rates of alcohol-related consequences relative to those in the control condition.

2. Method

2.1. Participants

Participants were recruited from two junior high schools in the Northwest. All 9th grade students with parental consent who were present during the baseline assessment ($N = 538$) were given an opportunity to participate in the study. Of these, 513 (52% female, 48% male) students agreed to participate in the study. Participant ages ranged from 13 to 16 ($M = 14.21$, $SD = 0.47$). Participants were primarily Caucasian (74.5%), with 9.9% Hispanic, 5.5% Asian, 4.2% African-American, 3.6% American Indian/Alaskan Native, 1.5% Hawaiian/Other Pacific Islander, and 0.8% other.

2.2. Procedure

Convenience sampling was used to select the two schools. The two schools that agreed to participate were randomly assigned by coin toss to either the intervention group or control group (usual alcohol and drug education). All 9th grade students registered at the two schools were eligible to participate. All parents of 9th grade students were contacted by the school via letter by mail at their permanent addresses provided by the registrar's office. Enclosed in the letter was a project-addressed, stamped decline postcard. If a parent did not want their child to participate in the research project, they were asked to print their name and student's name and return the postcard indicating their option to decline. In addition, a phone number and email address were provided so that parents could decline their children's participation via phone or email. If the parent did not send in a decline postcard,

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