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Abstract

Research indicates brief web-based personalized feedback interventions are effective in reducing alcohol use and the negative associated consequences among college students. It is not clear, however, that this is an appropriate strategy for high school students. This study examined high school students' perceptions of a brief web-based personalized feedback program to assess the appropriateness of this approach for this age group. Results indicated that the majority of students found the program to be user-friendly and to have high utility. Additionally, students reporting alcohol use found the program more useful and indicated they would be more likely to recommend the program to other students relative to non-drinkers. Findings support the appropriateness of this approach for high school students, and suggest web-based personalized feedback may be more positively perceived by students who have initiated drinking.

Key Words: high school; alcohol; web-based; personalized feedback

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1. Introduction

According to national survey data, lifetime prevalence rates for alcohol use among 10th and 12th grade students are 56% and 70%, respectively, with 40% of students reporting alcohol use in the past 30 days by their senior year (Johnston et al., 2012). Also concerning is the prevalence of heavy episodic drinking during high school, with 14.7% of 10th grade students and 21.6% of 12th grade students reporting binge drinking in the past 2 weeks (Johnston et al., 2012). Additionally, underage drinking is associated with a variety of negative consequences for teens who report drinking (U.S. Department of Human Health and Services, 2007). These data indicate alcohol use increases substantially during high school, identifying a need to design prevention and intervention programs for high school students.

School-based programs using motivational enhancement and cognitive-behavioral principles are effective in reducing alcohol use among high school students (Conrod, Steward, Comeau & Maclean, 2006; O'Leary-Barrett, Macie, Castellanos-Ryan, Al-Khundhairy & Conrod, 2010; Sussman, Dent & Stacy, 2002). These interventions are based on social norming theory (Perkins, 1997) and motivational enhancement models (Miller & Rollnick, 2002). These models support giving students accurate feedback about peer drinking and risk-status relative to peers in order to reduce alcohol use (Larimer et al., 2001; Marlatt et al., 1998; Miller & Rollnick, 2002; Perkins, 1997; Perkins & Berkowitz, 1986). These interventions, however, are typically time intensive and require substantial training for proper implementation and fidelity, making them more suitable for interventions with students identified as high-risk relative to a universal

prevention or early intervention strategy. These factors require resources from schools which may make it difficult for schools to implement these programs.

One approach that may be particularly useful in the high school setting is the use of web-based interventions. Web-based programs are inexpensive, require minimal training, are easily standardized, and are easy to disseminate to large groups of students relative to in-person programs. Additionally, web-based programs may be particularly appealing to adolescents due to their format. A growing number of controlled studies indicate that web-based programs delivered to adolescents (Newton, Andrews, Teeson, & Vogl, 2009; Schwinn, Schinke, & Di Nola, 2010) or adolescents and their parents (Koning et al., 2009; Schinke, Cole, & Fang, 2009; Schinke, Fang, & Cole, 2009) offer a promising approach to reducing drinking among adolescents. The web-based interventions used in these studies, however, included 4-12 modules or sessions, with each session taking up to 40 minutes. As with in-person interventions, some schools may not be willing to carve out time in the curriculum to accommodate this length. Therefore, it is important to identify shorter web-based programs that may still be effective for this age group.

Research indicates successful school-based interventions include material designed to engage adolescents (Wagner, Tubman, & Gil, 2004). Additionally, understanding the persuasive elements of web-based interventions is important in promoting behavior change (Lehto & Oinas-Kukkonen, 2011) as individuals must be motivated to process the information presented. The Elaboration Likelihood Model (ELM) (Petty & Cacioppo, 1986) is a theoretical approach that may offer guidance in selecting the type of web-based intervention that may be most effective for adolescents. According to this model, information that is processed through central routes is processed more actively than information processed through peripheral routes. Central processing, including the formation of highly elaborated, accessible, well-integrated attitudes, leads

to stronger behavioral changes. Further, presenting information using language that is easy to understand and that increases motivation by including content that is perceived to be highly relevant increases elaboration (Petty, Barden, & Wheeler, 2009). Following this model, to be appropriate for the intended audience, intervention content should be perceived as user-friendly and personally useful. Brief web-based personalized feedback interventions targeting alcohol use provide information that is personally relevant in an easy to use format. Thus, this type of intervention should increase the likelihood of central processing, and thereby behavior change.

Considerable variability exists in terms of types of program content, length and interactivity of web-based interventions, with some designed as multicomponent programs whereas others are brief online screening instruments with tailored feedback (Lehto & Oinas-Kukkonen, 2011). Consistent with the ELM, reviews of the literature indicate brief, web-based programs that include assessment and personalized feedback are more effective in reducing alcohol use than educational programs among college students (Larimer & Cronce, 2002; 2007). Of the several web-based personalized feedback interventions designed for college students, the eCHECKUP TO GO (San Diego State University Research Foundation, n.d.) may be a particularly useful intervention program for high school students. The program is short, easy to navigate, provides information designed to increase motivation, and costs $1000 per year for unlimited use. Additionally, several studies have demonstrated the efficacy of the eCHECKUP TO GO among college students (Alfonso, Hall & Dunn, 2012; Doumas & Anderson, 2009; Doumas, Haustveit, & Coll, 2010; Doumas, Kane, Navarro, & Roman, 2011; Doumas, Nelson, DeYoung, & Conrad, 2014; Doumas, Workman, Navarro & Smith, 2011; Doumas, Workman, Smith & Navarro, 2011; Hustad, Barnett, Borsari & Jackson, 2010; Lane & Schmidt, 2007;

Murphy, Dennhart, Skidmore, Martens, & McDevitt-Murphy, 2010; Salafsky, Moll & Glider, 2007; Steiner, Woodall & Yeagley, 2005; Walters, Vader & Harris, 2007).

More recently, the efficacy of eCHECKUP TO GO has been examined among high school students (Doumas, Esp, Turrisi, Hausheer, & Cuffee, 2014; Doumas, Hausheer, Esp, & Cuffee, 2014). Using a randomized controlled design, Doumas, Esp and colleagues (2014) demonstrated a reduction in alcohol use and the negative associated consequences among students receiving the eCHECKUP TO GO relative to a control group at a 3-month follow-up. Reductions in drinking and alcohol-related consequences among students in the intervention group, however, were not sustained at a 6-month follow up (Doumas, Hausheer, et al., 2014). Additionally, findings among high school students were not as robust as those found in the college literature. Therefore, the appropriateness of this intervention for this age group needs further examination as it was originally designed for college students.

The purpose of the present study is to examine high school students' perceptions of the eCHECKUP TO GO as an initial step toward assessing the program's appropriateness for this age group. The following aspects of the eCHECKUP TO GO were assessed: 1) student perception of intervention user-friendliness and 2) student perception of intervention utility. Differences in perceived user-friendliness and utility between drinking and non-drinking students were also examined. Based on the ELM, adolescents who have initiated drinking may perceive the intervention to have higher utility than non-drinkers as they may find the feedback more personally relevant than non-drinkers. Thus, it was hypothesized that students who report alcohol use would have higher utility ratings than non-drinkers, but there would be no difference in user-friendliness between the two groups.

2. Method

2.1. Participants

Participants were recruited as part of a larger study conducted at three public junior high schools in the Northwest. Participants in the current study were 9th grade students recruited from the two high schools assigned to the intervention condition. Parents of all 9th grade students at each school (N = 440; school A = 216; school B = 224) were sent consent forms. A total of 36.6% (n = 161; school A = 88; school B = 73) provided consent. Of these, 159 (56% male, 44% female) students agreed to participate in the study. Participant ages ranged from 13 to 16 ($M = 14.34$, $SD = 0.52$). Participants were primarily Caucasian (70.8%), with 8.4% Hispanic, 5.2% Asian, 4.5% American Indian/Alaskan Native, 3.9% African-American, 7.1% other.

2.2. Procedure

All study procedures were approved by the University Institutional Review Board. Convenience sampling was used to select the schools. The schools are located in a metropolitan region; students are primarily Caucasian and approximately 30% of the students qualify for free or reduced lunch. All 9th grade students registered at the school were eligible to participate. All parents of 9th grade students were contacted by the schools via letter by mail at their permanent addresses provided by the registrar's office. A parental consent form and a project-addressed, stamped envolope were enclosed in the letter. Parents were asked to return signed consent forms indicating permission for their adolescent to participate in the study. In addition, a phone number and email address were provided so that parents could ask questions prior to signing the consent form.

All students were recruited by the schools during class periods. At the start of the class, a member of the research team and a school counselor described the research and invited students

with parental consent to participate. Students with parental consent who elected to participate were assigned a unique pin number and the URL for participation. The pin number was used to track students as part of the larger study. Participants logged on to the survey website and were directed to a welcome screen describing the research and were asked to enter their PIN number. Once they entered the PIN, they were presented with the informed assent statement describing the study procedures and were asked to indicate their assent by clicking "Agree". As part of the assent procedure, students were given assuances of confidentiality. If participants indicated their willingness to continue, they were routed to a baseline survey, which was completed immediately. This survey was part of the larger study and contained questions regarding alcohol use, attitudes and beliefs about alcohol use, and perceptions of parental attitudes and parent-teen communication. The survey took approximately 15 minutes to complete. The next day, students had an additional class meeting in which the counselor attended the class and guided the students through logging onto the online intervention. Upon completion of the intervention, students completed a brief exit survey assessing impressions of the intervention. Students without parental consent and those who chose not to participate were given an alternative activity to complete during the class period.

2.3. Measures

2.3.1. Drinker status

Frequency of drinking was assessed using the Quantity/Frequency/Peak questionnaire (QFP; Dimeff et al., 1999; Marlatt et al., 1998). Participants were asked "In general, how often do you have any drink containing alcohol, whether it is wine, beer, hard liquor, or any other alcoholic beverage?" An 8-point scale with options ranging from 0 (Do not drink alcohol at all) to 7 (Every day) was provided. Sixty-eight percent of students endorsed "do not drink at all" and were

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classified as non-drinkers ($n = 108$). Correlations among this frequency item and other items of alcohol use on the survey from the larger study ranged from r = .78 - .83.

2.3.2. Appropriateness of the intervention

Appropriateness of the intervention was assessed using an exit survey comprised of 7 items. These items were ranked on a 4-point scale from 1 (Strongly Disagree) to 4 (Strongly Agree). Items were subjected to a principle components factor analysis to identify factors underlying the exit survey. An oblique rotation was used to allow for correlation among the items. Eigenvalues showed that the first component (utility of program) explained 45% of the variance, the second component (user-friendliness of program) explained 21% of the variance, and the remaining components had eigenvalues below one. A two factor solution which explained 66% of the variance was selected. User-friendliness items were: "The program was easy to use"; and "The program was easy to read" ($\alpha = .71$). Utility items were: "The program was interesting"; "The program was useful"; "The program was helpful"; "I learned something from the program"; and "I would recommend the program to others" ($\alpha = .84$).

2.4. The eCHECKUP TO GO

The eCHECKUP TO GO is a 30-40 minute web-based intervention based on social norming theory and motivation enhancement models that can be implemented within a classroom period. The program includes two sections: 1) online assessment and 2) personalized feedback. The program is designed to change perceptions of peer drinking norms, alcohol beliefs, and alcohol expectancies by providing personalized feedback regarding alcohol use, feedback regarding individual risk factors for developing alcohol-related problems, and accurate information about alcohol and myths related to alcohol use. The eCHECKUP TO GO is available through the San Diego State University Research Foundation. Although originally

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designed for college campuses, the program is also available for high school use. The high

school program is identical to the college program with the exception of the normative data.

Participating high schools are asked to provide normative data from their students which is then

incorporated into the eCHECKUP TO GO program. The program is customized for the

participating school, including providing normative data for the specific school, referrals for the

local community, and designing the website using school colors and logos. Other than this

customization, the program was not modified in any way for this study.

2.4.1 Online Assessment

The online assessment consists of basic demographic information (e.g. sex, age, weight,

living situation, class standing) and information on alcohol consumption and drinking behavior.

The assessment includes questions about alcohol and tobacco use, positive aspects of drinking

and negative consequences of alcohol use, risk-factors associated with drinking, perceptions of

prevalence of peer alcohol, marijuana, and tobacco use, a "quiz" on beliefs about the effects of

alcohol on physical performance and how the body processes alcohol, activities one may like to

spend more time doing, and motivation and confidence in one's ability to change drinking

behavior.

2.4.2 Personalized Feedback

Immediately following the assessment, individualized graphed feedback is provided.

This section provides a summary of the student's quantity and frequency of drinking, a personal

BAC chart, and pie graphs depicting the cost of alcohol and cigarettes. The number of

cheeseburgers equivalent to alcohol calories consumed, the student's risk of blackout, tolerance

level, family risk, and risk related to age of initiation of alcohol are presented graphically.

Normative feedback includes pie graph comparisons of perceptions of peer drinking, marijuana

use, and tobacco use to actual peer. Additionally, the percentage of students drinking less than the student respondent is also given. The feedback section also includes the student's responses and correct answers to the "quiz" on physical performance and a list of goals generated from the assessment questions and ways to meet those goals. During the feedback portion of the program, the student is also asked to indicate willingness to engage in potential strategies to reduce drinking (e.g. avoid drinking games, space my drinks out over time, alternate alcoholic and non-alcoholic drinks). The student is then given a list of the strategies selected that can be used as steps to change drinking behavior. A list of resources and referral information for local agencies is also provided.

2.6. Statistical Analyses

3. Results

Frequency data was combined into dichotomous variables. "Strongly Disagree" and "Disagree" were combined to form a Disagree category and "Strongly Agree" and "Agree" were combined to create an Agree category. These frequency categories were used in chi square analyses to examine differences in perception of user-friendliness and utility of the intervention and alcohol use between students reporting alcohol use and non-drinkers. All analyses were conducted at $p < .05$.

3.1 Perception of User-Friendliness and Utility of the Intervention

The majority of students reported they found the program was easy to use (94%) and easy to read (94%). Similarly, the majority of the students surveyed reported the intervention was useful (79%), interesting (73%), helpful (72%), that they learned something (84%), and that they would recommend the intervention to others (74%).

3.2 Differences in Perceptions between Drinkers and Non-Drinkers

Table 1 presents percent agreement with user-friendliness and utility items by drinker status. Results of the chi square analyses indicated more drinkers than non-drinkers found the intervention useful, $\chi^2(1) = 4.67$, $p < .05$, and would be more likely to recommend the intervention to others, $\chi^2(1) = 5.27$, $p < .05$. There was also a statistical trend indicating drinkers were more likely to report that they learned something from the intervention relative to non-drinkers, $\chi^2(1) = 3.53$, $p < .06$. There were no significant effects between the two groups in perceptions of user-friendliness (easy to read, easy to use) and perceiving the intervention as interesting or helpful.

4. Discussion

This study represents an initial step in assessing the appropriateness of the eCHECKUP TO GO for high school students. According to the ELM framework, interventions that contain content that is perceived as easy to understand and personally relevant should produce higher levels of elaboration and lead to greater behavioral change than traditional educational material. Results of this study indicate high school students perceive the eCHECKUP TO GO to be both user-friendly and useful. Specifically, the majority of students agreed with statements indicating the program was easy to use, easy to read, useful, interesting, and helpful. Additionally, the majority of students agreed that they learned something from the program and would recommend it to others.

As hypothesized, findings from this study also indicated that this program may be more useful for students who report alcohol use. Although there were no differences between the drinkers and non-drinkers in perception of user-friendliness of the program, students who reported drinking perceived the program to be more useful ($p < .05$) than non-drinkers. They

also agreed with the statements that they learned something ($p < .06$) and that they would recommend the program to other students ($p < .05$) more than non-drinkers. One explanation for this finding is that the personalized feedback was perceived as more relevant to students who had initiated drinking relative to non-drinkers. For example, normative feedback for non-drinkers would indicate that no students drink less than them, whereas normative feedback for drinkers would indicate that at least 30% of students (approximate percentage of abstainers) are drinking less. Similarly, feedback pertaining to alcohol-related risk would likely be neutral for non-drinkers, but potentially negative for those reporting alcohol use. Consistent with the ELM framework, the content of eCHECKUP TO GO may be perceived as more personally relevant for students who have initiated drinking, and, thus, be more appropriate for this subgroup of students.

There were, however, no differences between drinkers and non-drinkers on perceptions of the program as interesting or helpful. Among drinkers, of the indicators used to assess utility, finding the program interesting was the item agreed to by the least amount of students. This is important as research indicates successful school-based interventions include factors that include material designed to engage adolescents (Wagner et al., 2004). Additionally, the ELM suggests engaging students in the content is essential to the formation of highly elaborated, accessible, well-integrated attitudes which are associated with behavioral change. Thus, examining ways to make the eCHECKUP TO GO more interesting may be an important next step in adapting this intervention for high school students.

Although this study adds to the literature by providing support for the appropriateness of the eCHECKUP TO GO for high school students, there are limitations. First, due to a primarily Caucasian sample form the Northwest region, generalizability is limited. Additionally, in

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examining user-friendliness and utility of the intervention as indicators of appropriateness, this study represents only a first step toward identifying the appropriateness of the eCHECKUP TO GO for high school students. Further research is needed to assess how this program may be tailored to better suit the needs of high school students. In particular, future research should examine how to make this program more interesting and engaging for this age group. Focus groups conducted with students could be used to gain a better understanding of what the students found more or less interesting about the program, particularly in the personalized feedback section.

Results of this study have important implications for developing prevention and intervention programs for high school students. First, this study suggests that the eCHECKUP TO GO is an appropriate intervention in this age group. Web-based programs are well-suited for school-based implementation as they are inexpensive, require minimal training, and can be implemented with high a high degree of fidelity. Additionally, they are easy to disseminate to large groups of students within course curricula. Findings also indicate the program was perceived to have higher utility by drinkers relative to non-drinkers. Thus, this program may be more appropriate for students who have already initiated drinking, as they may find the content more personally relevant, suggesting the program may be more useful as an early intervention than prevention strategy.

Acknowledgements

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Table 1

Percent of Students Endorsing "Agree" on User-Friendliness and Utility of the Intervention by Drinker Status

	Drinkers ($n = 51$)	Non-Drinkers ($n = 108$)
User-friendliness		
Easy to Use	97.5	92.6
Easy to Read	92.5	95.1
Utility		
Interesting	77.5	70.4
Learned Something	92.5	79.0
Recommend	87.2	67.5

Highlights

- Appropriateness of a brief, web-based alcohol intervention for high school students was examined.
- The majority of students found the program to be user-friendly and have high utility.
- Students reporting alcohol use found the program more useful relative to non-drinkers.
- Results support the appropriateness of this approach for high school students.