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An Internet-Based Computer-Tailored Intervention to Promote Responsible Drinking: Findings from a Pilot Test with Employed Adults

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Abstract

This paper describes pilot test findings of an Internet-based, Transtheoretical Model-based, computer tailored intervention for adults who exceed national guidelines for low-risk drinking. In a pilot test, 166 adults recruited from worksites completed one session and evaluated the program. Pre and post assessments indicate intention to make behavioral changes. Importantly, 94.3% of participants indicated that they would recommend the program. Ratings were positive with the majority of participants 'agreeing' or 'strongly agreeing' with all 14 evaluation items. Feasibility was demonstrated by recruiting and engaging employed adults. This program is a cost-effective prevention program promoting responsible drinking to adults.

Keywords

Internet-based intervention; responsible drinking; employed adults

Introduction

Risky Drinking: Prevalence and Consequences

The National Institute of Alcohol Abuse and Alcoholism (National Institute of Alcoholism and Alcohol Abuse, 2009) defines risky drinking for men as consuming more than 14 drinks per week or more than 4 drinks on any day, and for women as consuming more than 7 drinks per week or more than 3 drinks on any day. Approximately 28% of the American adult population exceeds the low-risk drinking guidelines (NIAAA, 2009). However, only 10-15% of those who drink over the recommended guidelines are alcohol-dependent (Dawson, Grant, & Li, 2005). Risky drinking is responsible for more overall harm than alcohol dependence (Anderson, 1991). It accounts for approximately 79,000 deaths

annually, making it the third leading 'lifestyle' cause of death in the United States (Centers for Disease Control and Prevention, 2010).

Risky drinking has serious implications as it has been linked to copious physical and mental health conditions. At least 60 different physical conditions have been associated with risky drinking (Room, Babor, & Rehm, 2005), including liver cirrhosis, gastrointestinal cancers, stroke, heart failure (Dawson et al., 2005), heart disease and breast cancer (Bagnardi, Blangiardo, Vecchia, & Corrao, 2001; Lucas, Brown, Wassef, & Giles, 2005). Risky drinking is also highly-related to mental health conditions like major depression and anxiety (Grant et al., 2004; Rehm, Sempos, & Trevisan, 2003), and other problems such as motor vehicle crashes, accidents, violence, suicide, sexually transmitted diseases, and unplanned pregnancies (Blose & Holder, 1991; Dawson et al., 2005; Norstrom & Ramstedt, 2005; Town, Naimi, Mokdad, & Brew, 2006).

It has been estimated that alcohol use and abuse cost society about \$184 billion annually - \$24 billion for healthcare expenditures; \$134 billion for lost productivity and earnings due to alcohol-related illness, premature death, and alcohol-related crime; and \$26 billion for other impacts on society, including motor vehicle accidents, crime, and social welfare (Harwood, 2000). Employers bear a large portion of these costs. Nearly 80% of individuals who are at-risk alcohol consumers are employed (Substance Abuse and Mental Health Services Administration, 2008). Health care costs for them are twice as high as for other employees (NIAAA, 2009). Risky drinkers are more likely to experience occupational injuries and place others at increased risk of injury (Dawson, 2004; Ragland et al., 2002; Williams et al., 2008), and account for 500 million lost workdays annually (Joubran & Williams, 2005). Lost productivity accounts for more than 70% of all costs attributable to risky drinking (Harwood, 2000).

Secondary Prevention of Risky Drinking

Given the associated burden of risky alcohol use and cost effectiveness, there have long been calls for secondary prevention efforts to help risky drinkers reduce their alcohol intake to lower-risk levels or abstinence (Bothello & Richmond, 1996; Institute of Medicine, 1990). Brief interventions had traditionally been employed as a series of counseling sessions in a primary care or worksite setting with a trained professional. However, given the serious challenges and limitations that hinder the success of delivering brief counseling for problem drinkers in real world settings (Williams et al., 2008; Anderson & Larimer, 2002), the low implementation rate (Coffield et al., 2001), and the low service utilization rate (Cloud & Peacock, 2001), computer tailored interventions (CTIs) offer an attractive venue by which to deliver standardized and personalized guidance on alcohol use on a population basis.

CTIs, particularly those that are Internet-based, have the potential to address many of the challenges to delivering brief interventions for excessive alcohol use. CTIs are a best practice for behavior change science (Skinner, Campbell, Rimer, Curry, & Prochaska, 1999) as they are highly individualized to the participant's needs, yet maintain a standardized quality (Prochaska, Zabinski, Calfas, Sallis, & Patrick, 2000). Tailored communications have been shown to be more engaging, effective in building self-efficacy, and improving health-behaviors than non-tailored communications (Lustria, Cortese, Noar, & Glueckaluf, 2009) and useful in producing more acceptable and effective interventions (Noar, Benac, & Harris, 2007). As outlined by Hester and Miller (2006), CTIs require little or no clinician involvement, which can increase feasibility and cost-effectiveness; they can provide personalized feedback in a timely and visually engaging manner; they can deliver feedback more consistently based on assessment data and decision rules; they can store the data to chart changes over time; and they can be widely disseminated while preserving fidelity.

CTIs combine the advantages of a clinic approach (individualized interactions with the goals of a public health approach (targeting large population segments).

While CTIs have been utilized for some time, delivering such programs through the Internet is still in an early phase of development (Riper et al., 2008). CTIs have evolved from distributing tailored feedback via printed reports, to CD-ROM based multi-media programs, to computer kiosks, and now via the web. The web is identified as being the most powerful channel for delivering feedback, offering the most access to expert guidance, and holding promise for boosting efficacy of CTIs (Lustria et al., 2009; Riper et al., 2008). Web-based CTIs are particularly beneficial for intervening with high-risk drinkers because they offer anonymity (Marlatt, & Witkiewitz, 2002; Bewick, Trusler, Barkham, Hill, Cahill, & Mulhern, 2008) reduce fear of stigma (Marlatt, & Witkiewitz, 2002; Cheiten, & Waters, 1995) and increase self-disclosure (Parks, Pardi, & Bradizza, 2006; Sobell, Cunningham, & Sobell, 1996). CTIs can be more engaging, allowing participants to control their learning environment, move at their own pace, and allow access to sensitive information (Cheiten, & Waters, 1995; Fotheringham, Owies, Leslie, & Owen, 2000; Atkinson, & Gold, 2002; Wantland, Portillo, Holzemer, Slaughter, & McGhee, 2004). They can also potentially increase retention rates by increasing convenience and allowing doses of interventions as needed (Marcus, Nigg, Riebe, & Forsyth, 2000). Individuals with alcohol and drug abuse problems tend (Vernon, 2010) to report more information to computers than to human clinicians (Hester, Squires, & Delaney, 2005).

Existing Computer-Based Alcohol Use Programs

In recent years, Internet-based programs have been developed to address risky drinking. Two reviews of computer-based interventions addressing risky drinking among adults have been published (Bewick et al., 2008; Vernon, 2010). Across those reviews and our own review of the existing literature, six unique interventions for adults (not targeting college populations) have been developed and evaluated for effectiveness (*Check Your Drinking* (Cunningham, Wild, Cordingley, van Mierlo, Humphreys, 2010; Doumas & Hannah, 2008), *Behavioral Self-Control Program for Windows (BSCT-WIN)* (Hester & Delaney, 1997), *Drinker's Checkup* (Hester, Squires, & Delaney, 2005), *Down Your Drink* (Linke, Murray, Butler, & Wallace, 2007; Linke, Brown, & Wallace, 2004) *Drink Less* (Sobell Cunningham, & Sobell, 1996) and *Coping Matters* (Cunningham, Wild, Cordingley, van Mierlo, & Humphreys, 2009; Hester & Delaney, 1997). All of the interventions were delivered via the Internet to populations of adults who drink at risky levels with three being developed and tested outside of the US. Two were distributed via workplace environments, two were distributed to local community members, and two were distributed to general populations of Internet users. Only three programs offer tailored feedback. While all six programs were described as using elements of a particular theoretical foundation, only one, *Drinkers Check-up* (Hester et al., 2005), provided tailored feedback based on theoretical constructs. None of the existing interventions offered dynamically tailored feedback across multiple contacts nor normative (compared to peers) and ipsative (compared to one's previous assessment). Three of these six programs incorporated elements of the Transtheoretical Model of Behavior Change (TTM) in the content or assessments.

The existing Internet-based alcohol interventions for adults that have been tested lack several elements important to behavior change research including vigorous methodology, adequate sample sizes, control groups, homogeneity of outcome measures, substantial theoretical foundation, tailoring based on theory, and dynamic tailoring across multiple sessions. Bewick et al. (2008) and Vernon (2010) both conclude that there is not enough evidence on the effectiveness of existing web-based alcohol interventions, though process outcomes suggest that web-based interventions are generally well-received (Bewick et al., 2008). Despite limitations, the existing Internet-based offerings have demonstrated some

success in decreasing drinking. For example, at the 12-month follow-up, participation in *Drinker's Checkup* resulted in a 3.62 average drinks per day reduction for the treatment group compared to 3.14 for the control group (Hester et al., 2005). Although the impact of the intervention was not apparent at the 12-month follow-up, *Check Your Drinking* resulted in a 30% reduction in quantity of drinking among treatment participants compared to controls at 3 and 6 month follow-ups (Cunningham et al., 2010; 2009)

Responsible Drinking

Responsible Drinking is a computer-delivered intervention that offers individually tailored and stage-matched feedback to help participants increase their readiness to limit their drinking to the low-risk guidelines. Based on the TTM (Prochaska & DiClemente, 1983), this program offers tailored-feedback to participants based on their responses to brief assessments throughout the program. Within the multi-construct TTM, the core construct is stage of change, delineated by the following five stages: Precontemplation (not intending to limit drinking in the next six months), Contemplation (intending to limit drinking in the next six months), Preparation (ready to limit drinking in the next month); Action (limiting drinking for less than six months), and Maintenance (limiting drinking for more than six months). Inherent to the TTM, the program also includes tailored feedback on decisional balance, which represents weighing the pros and cons of limiting drinking, processes of change which represent covert and overt activities used to limit one's drinking, and temptations (situational self-efficacy) which represents the degree to which an individual believes s/he has the ability to resist alcohol use-related stimuli (Prochaska, Velicer, DiClemente, & Fava, 1988; Velicer, DiClemente, Prochaska, & Brandenburg, 1985; Prochaska, Norcross, Fowler, & Follick, 1992; Prochaska & DiClemente, 1992; DiClemente, Prochaska, Fairhurst, & Velicer 1991).

What makes *Responsible Drinking* unique is its level of tailoring-- a level not seen to date in the existing Internet-based alcohol interventions for adults. *Responsible Drinking* is not just a stage-based program, as are most other behavior change interventions purported to be based on the TTM. The content is stage-matched and tailored based on the assessment of all relevant TTM constructs. Existing alcohol interventions have been described to be based on the TTM, but often feedback was only stage-matched and/or decisional balance and self-efficacy concepts were addressed in one-size-fits all feedback messages. This is the first alcohol risk reduction CTI to offer tailored feedback on all relevant TTM constructs for a particular stage of change. The two main goals of this project were to develop a prototype of the intervention and assess its acceptability, feasibility and initial progression of employed adults in a pilot test.

Methods

Program Description

Responsible Drinking is a computer tailored intervention for adults who exceed the recommended guidelines for low-risk drinking. The exclusionary criteria for participation are as follows: younger than 21 years-of-age, enrolled full-time in college, not employed, pregnant, not having consumed alcohol in the past 30 days, interested in, currently or ever having received treatment for substance abuse or dependence, ever having received physician recommendation to avoid or reduce alcohol use, reaching a score of 10 or higher on the Alcohol Use Disorders Identification Test (AUDIT-C), or not exceeding the low-risk guidelines as defined by NIAAA (men as consuming more than 14 drinks per week or more than 4 drinks in a day, and for women as consuming more than 7 drinks per week or more than 3 drinks in a day). Those with scores of 10 or higher on the AUDIT-C were deemed to be approaching a level of dependence, screened out and provided information on appropriate

referrals. *Responsible Drinking* is intended for people exceeding the low-risk drinking guidelines that fall below a level of dependent drinking. Those with signs of dependent drinking may need a more intensive intervention than what a CTI can offer. All of the above criteria were used for both recruitment for formative research activities and the pilot test.

The prototype of *Responsible Drinking* included one baseline session which began with an overview of the research study, informed consent, and questions to determine eligibility. The program proceeded with alternating assessments and individualized feedback on level of drinking, problems related to alcohol consumption, and stage-matched behavioral guidance based on TTM constructs (including decisional balance, self-efficacy, and the most pertinent processes of change for their stage determined through a previous measurement development phase). Participants had opportunities to read testimonials, select change strategies they intend to try, and to insert comments in type-in boxes. After completing the computer-tailored session, the participant was linked to an 'e-Workbook,' an interactive website that offered participants stage-matched vignettes, activities, and behavioral strategies to implement.

Formative Research

Extensive formative work, consisting of focus groups, expert interviews, and program usability interviews, was conducted over nine months to ascertain the most relevant and appropriate change strategies for this population and to gain input on the look and feel, tone, and flow of the program. Focus group and usability interview participants were recruited via flyers posted in local retail stores, advertisements on Facebook and Craigslist, and through word of mouth. All individuals who responded to one of the recruitment advertisements were asked to complete an online survey to determine eligibility.

A first round of formative research with three focus groups with a total of 24 adults who met the program inclusion criteria was conducted. Feedback was gathered on the types of information, change strategies, and activities they believed program users would find most useful. In addition, during this phase of the formative research, seven experts were interviewed from varying backgrounds and specializations in substance abuse including private counseling, veterans' health, general medicine/primary care, and research. Consultants provided insight on the process of and successful strategies for limiting alcohol consumption. Focus group participants and consultants were shown an existing, evidence-based computer tailored smoking cessation program to give them a sense of the template of the future responsible drinking program. Participants and consultants were asked their opinions on how the alcohol program should be similar and different from the smoking cessation program.

A second round of formative research was conducted toward the end of program development prior to the pilot test launch with three focus groups with a total of 23 adults. Feedback was gained on the content and look and feel of the draft program and e-Workbook. All input from participants was reviewed by the research team and appropriate and feasible revisions were made.

The expert consultants also reviewed the draft program and e-Workbook. In one-on-one phone interviews, experts were asked to comment on what they liked and disliked, the degree to which the intervention content represented best practices, and on the materials' suitability for individuals with a range of cultural backgrounds and experiences with risky drinking.

Finally, seven 60-minute one-on-one usability interviews were conducted with participants who met the program inclusion criteria. Interviewees provided feedback on the 'look and

feel' of the computer-tailored program, its content, and the overall flow. This feedback was integrated in the final version for the pilot test.

Pilot Test

Participants—A total of 559 employed adults were recruited for participation in the pilot test from seven employers in four states. Of these, 6.3% of participants stopped the intervention prior to determining eligibility and 56.4% of participants screened-out. The majority of screen-outs (N=236) were a result of not consuming alcohol or not having exceeded the low-risk drinking guidelines in the past 30 days. Of the remaining eligible participants, 79.4% completed the intervention leaving 166 as the final sample size. Demographic data of the sample is presented in Table 1.

Measures

Stage of Change: One-item assessed readiness to limit drinking to the NIAAA gender-specific low-risk drinking guidelines. Participants responded whether they were not intending to limit their drinking in the next six months (Precontemplation), intending to limit their drinking in the next six months (Contemplation), ready to limit their drinking in the next month (Preparation), limiting their drinking for less than six months (Action). Given the exclusion criteria, a response option for Maintenance (having limited drinking for more than six months) was not included. Participants for which the Maintenance response option would be appropriate would have screened-out.

Acceptability Survey: A 14-item Likert scale-based questionnaire with 4 response options (ranging from Strongly Disagree to Strongly Agree) was used to gauge acceptability of the program. It was adapted from the National Cancer Institute's Educational Materials Review Form (1989) and the evaluation scale used by Rimer and colleagues (1994). Also, four open-ended questions were asked to gain participant feedback on what they liked the most and least about the CTI program and the e-Workbook.

Alcohol Use Disorders Identification Test-Consumption (AUDIT-C): A three-item scale was used to assess drinking severity and acted as an indicator of dependence (Dawson et al., 2005). The items assess frequency and amount of drinking, and each includes four response options.

The Short Inventory of Problems (SIP): A 15-item measure of physical, social, intrapersonal, interpersonal, and impulse related consequences of alcohol consumption during the last 30 days was used to assess problems related to alcohol use (Miller, Tonigan, & Longabaugh, 1995). The three item subscales address physical (harm to health or appearance), social responsibility (expectations and financial), intrapersonal (unhappiness, guilt), interpersonal (relationships with family and friends, reputation), and impulse control (risks, accidents) related consequences. For almost all items (14 out of 15), responses range from 0 (*Never*) to 3 (*Daily or Almost Daily*).

Procedure—Pilot test participants were recruited from seven different employers including a university, research firm, an accounting firm, a wellness center and several restaurants. At most organizations, participants were recruited via a mass email or e-newsletter that was distributed to all employees. Restaurant managers did not necessarily have the email addresses of all employees; therefore, at those locations participants received a printed recruitment flyer attached to their pay stub. All employees aged 21 or over at each organization received the invitation for participation which detailed the requirements, incentive, contact information for the research staff, and the URL to access the program. For all places of employment except the restaurants, reminder emails were sent to employees

approximately one week after the initial invitation. In addition, at most recruitment sites, flyers were posted in common areas at the employment sites, such as lunch and break rooms.

Invited employees interested in participating accessed the program URL, provided consent, and answered questions to determine eligibility. Those who were deemed eligible based on the inclusion criteria automatically proceeded to the program. Participants completed a 20-25 minute intervention session and then evaluated the program through an acceptability survey. Upon completion of the session, participants were given an email address to request their incentive (a \$25 check card) which was mailed within 5-7 business days.

All data were stored in a password protected electronic database, residing on a secure server, using non-identifying sequential numeric identification numbers. Data were entered into Statistical Package for the Social Sciences version 16.0 for analyses. All procedures were approved by an Institutional Review Board.

Results

Sample Characteristics

The majority of participants reported exceeding the gender-specific daily drinking limit only (63.3%), with 32.5% exceeding both the daily and weekly limit and only 4.2% exceeding only the weekly limit. On average, males reported 4.25 (SD = 4.8) days per month on which they exceeded the daily limit and reported on drinking, on average, 11.58 (SD = 7.7) drinks per week. Females reported 3.44 (SD = 4.1) days per month on which they exceeded the daily limit and reported on drinking, on average, 7.09 (SD = 5.2) drinks per week. On the AUDIT-C, participants reported an average score of 4.77 (SD 1.8, range 1-9).

Participants were classified into four stages of change which are presented in Table 1. There weren't any differences found in stage of change by gender, race, or percentage exceeding weekly and daily limits.

The SIP-R used to assess for problems related to drinking, yielded an average total score of 4.99 (SD=.63, range 0-45) and the number of problems indicated by a subscale score above cut-off of 0.52 (SD=.96, range 0-5). There were no significant differences in the total score on the SIP-R or the number of problem areas indicated by subscale scores by stage of change, gender, or race. It is important to note that subscale cut-offs were normed on a sample of inpatient dependent drinkers. While the SIP-R is a commonly used measure for high-risk drinkers, normative cut-offs have not been established for high-risk drinkers who fall below dependent levels of drinking.

To further investigate responses to the SIP-R items, the frequency of responses for each SIP-R item was examined. Nine items were endorsed by more than 20% of the sample, and some problems such as "I have not eaten properly," "I have been unhappy," and "I have done impulsive things that I regretted later" were endorsed by nearly half of the sample. Only one item, "I have had an accident while drinking or intoxicated" resulted in fewer than 10% of participants endorsing that they experienced that problem to some extent in the last 3 months. One problem, "I have had an accident while drinking or intoxicated" were endorsed by very few participants (5.4%),

Acceptability Findings

The mean responses to all 14 evaluation items and the percent of participants agreeing or strongly agreeing to all evaluation items are presented in Table 2. The accessibility of the program was one of its most valuable characteristics with a majority of participants 'strongly agreeing' or 'agreeing' that the program was easy to use (97.8%), and that the questions

(92.5%) and feedback (95.6%) were easy to understand. Most importantly, 94.3% of the participants indicated that they would recommend the program to others. There were no differences found in evaluation ratings by stage, gender, or race.

Acceptability of the program was further confirmed by the qualitative feedback participants offered to open ended questions. For example, participants wrote in regards to tailored feedback section: "The feedback was positive and easy to include in one's life" and "I liked that the responses were tailored to you personally and based on the answers you already provided instead of being vague generalizations." In regards to the e-Workbook, participants responded: "Easy to use and packed with great advice"; "Makes you reflect back and gives good ideas"; and "Very informative and related to my real life. I loved the money spent part-- a real eye opener". Participants reported on things that could be improved, including adding more interactivity to the CTI and adding activities to the e-Workbook. These recommendations can be addressed in Phase II research.

Indicators of Preliminary Behavior Change

While the overarching goals of this pilot test were to test acceptability and feasibility, additional efforts were made to assess preliminary behavior change. Proxy measures of behavior change, specifically, the assessment of the advantages of reducing one's alcohol consumption and intention to make such a change were measured by questions placed at the beginning of the pilot session with corresponding questions at the end of the session. There were significant differences from the reported drinking levels (pre) to the intended level of drinking during the next month (post). Participants reported intending to drink 2.9 drinks fewer per week at the end of the session, $t(152)=-6.90$, $p<.001$. In addition, participants reported intending to reduce the number of days in the next month that they exceed the daily limit by 2.5 days, $t(152)=-6.46$, $p<.001$. While there was a positive change pre to post in the assessment of the pros of limiting drinking (0.38 increase), it was not significant, $t(156)=1.27$, $p>.05$.

Discussion

The findings establish the acceptability and feasibility of *Responsible Drinking* for intervening with those who exceed the low-risk drinking guidelines. A goal for acceptability was to demonstrate that participants provided an overall rating of 3 (*agree*) or higher to the evaluation items. This aim was achieved with an overall rating across all evaluation items of 3.15 (SD=.08). For almost all of the items (13 out of 14), 87% to 97% of participants rated the items with "agree" or "strongly agree". These acceptability ratings far outweigh pilot results of other Internet-based alcohol interventions in which 30-60% of respondents rated evaluation items positively (Matano et al., 2007; Cunningham, Humphreys, & Koski-Jannes, 2000). The only one item that didn't receive an average score of 3 was, "I enjoyed using the program" (mean = 2.92). In hindsight, this may be a poor evaluation item in that the enjoyment of using the program is less important than the ease of use, the ability to bring about change, and the likelihood of recommending the program to others. While we want people to find the program beneficial and useful, it may be difficult for them to "enjoy" using a program that focuses on a behavior that they may find uncomfortable or a struggle to change. Importantly, there were no differences found in evaluation ratings by stage of change, gender, or race. *Responsible Drinking* was rated just as positively by those not ready to change as those who had already begun limiting their drinking.

In addition to the strong acceptability data, preliminary behavior change was indicated by a significantly increased intention to make behavior changes. A strength of the pilot test was a within session pre and post assessment of the advantages to limiting drinking and a post assessment of intention to reduce drinking which was compared to baseline drinking levels.

Participants reported intention to drink fewer drinks per week and to exceed daily limits on fewer days in the following month. Demonstrating intention as a behavior marker for change in a pilot test enhances confidence that the full program when tested in a clinical trial will lead to meaningful impact.

The feasibility goal was reached with nearly 80% of eligible participants completing the program. In addition, there were no obstacles to disseminating a behavior change program via the web through various employers. Recruitment was achieved within a few weeks time. Other than approving the study, employers and their staff had little to no involvement with recruitment or implementation. Additionally, employees were able to receive individualized feedback in a private, convenient, and non-threatening format. Upon an effectiveness evaluation, *Responsible Drinking* can be disseminated broadly and easily through various distribution channels including employers, primary care, health insurers, and wellness companies. The ultimate goal is for this program to be added to Pro-Change Behavior Systems, Inc.'s *LifeStyle Management Suite* of behavior change programs. The URAC Gold winning LifeStyle suite is successfully distributed across the country by various dissemination partners.

Responsible Drinking offers two important advances to the existing alcohol literature base and program development—theoretical and dynamic tailoring and a population based approach. This is the first alcohol risk reduction CTI to offer tailored feedback on all relevant TTM constructs for a particular stage of change. In addition, within the planned enhancement to the program for effectiveness testing, *Responsible Drinking*, will be the first alcohol CTI to offer dynamically produced unique feedback across multiple sessions and one that offers not only normative (compared to peers) but also ipsative (compared to self) feedback on how the participant has progressed or regressed on TTM variables since their last intervention session. The final program will provide follow-up sessions, in addition to the baseline session tested in this pilot test. In follow-up intervention sessions, comparisons will be made between time points as individuals make stage transitions. Participants will receive feedback on how their responses compare to the responses of individuals in the normative group and to their own previous responses. This level and type of tailoring is supported by recent reviews of CTIs (Krebs, Prochaska & Rossi, 2010; Lustria et al., 2009; Noar et al., 2007) but has yet to be employed in existing alcohol risk interventions.

Additionally, by using interactive technologies, an Internet-based platform, and matched content to each stage of change, *Responsible Drinking* offers the widest net to reach populations of risky drinkers. Most interventions are developed for and relevant to people in preparation—those ready to take action. The theoretically driven, individualized approach provided by the TTM assesses individuals' readiness and appropriately intervenes to facilitate forward stage movement. This type of progression can lead to more effective and sustained change. Importantly, intervention feedback unique for all stages of change—precontemplation, contemplation, preparation, action, and maintenance—was developed. Content was written for those in precontemplation or contemplation, being sensitive to the fact that many people are unaware that their drinking is at a risky level or are unmotivated to change their drinking behavior because of a lack of problems related to alcohol use at the present time. In addition, stage-matched content was written for those in action and maintenance. Despite the significant problem of relapse across all health behaviors, particularly alcohol use, intervention content often is not developed to help people sustain the behavior change. Intervention content will be created for those in action and maintenance, for example, to help with reducing temptations in difficult situations (self-efficacy), for ongoing reinforcement management, and for recognizing and preparing for triggers of regressing back to previous stages of change.

This study has limitations characteristic of many pilot studies. The sample was relatively small and homogenous, as the pilot was only conducted with employed populations from four states. Recruitment for the planned effectiveness trial will be conducted on a national sample and one that reflects the racial and ethnic proportions of the United States Census.

With the severe burden of risky drinking on an individual as well as a population level, it is imperative that innovative interventions be developed for adults who consume alcohol at risky levels. The range of problems related to alcohol use reported by this pilot sample further highlights the need to intervene with those below dependent levels of drinking. The Internet platform of *Responsible Drinking* offers a non-intrusive and feasible venue by which to promote responsible drinking to adults who exceed the low-risk guidelines across all stages of readiness to change. If proven effective, the *Responsible Drinking* intervention can be disseminated as an efficient, low-cost, population-based approach to impact risky alcohol consumption.

With acceptability and feasibility achieved, the next step is to complete and enhance the development of the CTI and e-Workbook for multiple time points. A second phase Small Business Innovation Research grant has been submitted to NIAAA to finish development and test the program in a randomized effectiveness trial. The grant proposal includes development of mobile health technologies, specifically the capability to send text messages to engage and retain users and the capability to have the intervention components viewed optimally on a mobile browsing interface. This innovation will enhance the user experience, increase engagement and use of the program, and offer more flexible delivery options—all of which serve to ultimately increase acceptability, effectiveness, reach, and impact of the program. A demonstration of the pilot prototype can be viewed at <http://www.prochange.com/alcoholdemo>.

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TABLE 1

Demographics (N = 166)

	(%)
Gender	
Male	31.3
Female	68.7
Ethnicity	
White	90.4
Black, African-American	1.8
Asian	2.4
American Indian/Alaskan Native	0.6
Combination	3.0
Other	1.8
Hispanic	
Not Hispanic	5.4
Hispanic/Latino	94.6
Employment Status	
Full-time	90.4
Part-time	9.6
Stage of Change	
Precontemplation	34.3
Contemplation	19.3
Preparation	20.5
Action	25.9

Age (range: 21–68); Mean = 38.78; SD = 11.5.

TABLE 2
Means, Standard Deviations, and Response Scores of Evaluation Items

Item	N	M(SD)	% Responding (Agree/ Strongly Agree)
The program was easy to use	154	3.58	96.9
The questions were easy to understand	147	3.38	92.5
I would feel comfortable recommending this program to others	150	3.45	94.3
The personal feedback was easy to understand	152	3.44	95.6
The program gave me something new to think about	141	3.28	88.7
I like the way the program looked	148	3.33	93.1
The program was designed for people like me	117	2.92	73.6
I enjoyed using the program	139	3.11	87.4
The program was useful	143	3.18	89.9
The program gave sound advice	152	3.36	95.6
The program could help me be healthier	144	3.26	90.6
The program could help me make changes	140	3.16	88.1
The program was easy to navigate	153	3.43	96.2
I learned new information by using this program	134	3.58	84.3