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Components of Brief Alcohol Interventions for Youth in the Emergency Department

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Abstract

Background: Alcohol brief interventions (BIs) delivered by therapists are promising among underage drinkers in the emergency department (ED); however, integration into routine ED care is lacking. Harnessing technology for identification of at-risk drinkers and delivery of interventions could have tremendous public health impact by addressing practical barriers to implementation. The paper presents baseline, within BI session, and post-test data from an ongoing randomized controlled trial (RCT) of youth in the ED.

Methods: Patients (ages 14-20) who screened positive for risky drinking were randomized to: computer BI (CBI), therapist BI (TBI), or control. Measures included: demographics, alcohol consumption (AUDIT-C), process questions, BI components (e.g., strengths, tools) and

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AUTHOR CONTRIBUTIONS

Drs. Walton and Cunningham were responsible for the acquisition of data and take full responsibility for the integrity of the data. Drs. Walton, Cunningham, Chermack, Blow, Ehrlich, Barry, and Booth conceptualized the study and are investigators on the grant funding this work. Drs. Chermack Walton and Cunningham led the team developing the interventions. Dr. Walton and Cunningham are responsible for the statistical analysis plan and interpretation of the results. Dr. Walton wrote the initial draft of the manuscript. Drs. Chermack, Blow, Ehrlich, Barry, and Booth provided critical feedback regarding the results and revision of the manuscript. All authors contributed to and have approved the final manuscript.

psychological constructs (i.e., importance of cutting down, likelihood of cutting down, readiness to stop, and wanting help).

Results: Among 4389 youth surveyed (13.7% refused), 24.0% (n=1053) screened positive for risky drinking and 80.3% (n=836) were enrolled in the RCT; 93.7% (n=783) completed the post-test. Although similar in content, the TBI included a tailored, computerized workbook to structure the session whereas the CBI was a stand-alone, offline "Facebook" styled program. As compared to controls, significant increases were found at post-test for the TBI in 'importance to cut down' and 'readiness to stop' and for the CBI in 'importance and likelihood to cut-down'. BI components positively associated with outcomes at post-test included greater identification of personal strengths, protective behavioral strategies; benefits of change, and alternative activities involving sports. In contrast, providing information during the TBI was negatively related to outcomes at post-test.

Conclusions: Initial data suggest that therapist and computer BI's are promising, increasing perceived importance of reducing drinking. In addition, findings provide clues to potentially beneficial components of BIs. Future studies are needed to identify BI components that have the greatest influence on reducing risky drinking behaviors among adolescents and emerging adults.

Keywords

Brief Intervention; adolescents; emergency; computer; alcohol

INTRODUCTION

Early intervention strategies are critically important to reduce the growing epidemic of underage drinking. By age 18, 69% of adolescents in the U.S. have consumed alcohol; 54% of 12th grade and 13% of 8th grade students have been "drunk".[1] Alcohol use during adolescence increases the risk for developing an alcohol use disorder (AUD),[2,3] which occur in ~5% of adolescents (ages 12-17) and 16% of emerging adults (ages 18-25).[2,4,5]

The Emergency Department (ED) represents a unique point of access and a teachable moment to implement alcohol screening, brief interventions, and/or referral to treatment (SBIRT) approaches for youth. [6,7] Prior research on alcohol SBIRTs have largely been conducted among adult patients in the ED, generating positive effects for alcohol-related consequences but not consistently reducing consumption.[8-12] Similarly, among underage drinkers in the ED, therapist delivered BIs reduce alcohol consumption and/or consequences[13,14,13,15,16,17] Prior alcohol SBIRT studies for youth in the ED have not included universal screening; instead, they have included youth presenting to the ED with specific complaints (e.g., alcohol-related reasons, injuries).[13,14] In addition, implementation of BIs in real world ED settings has been limited due to lack of ED staff time and training.[18,19] Thus, recent recommendations for conducting SBIRT in the ED include using technology for screening and for intervention. [20,21]

Only a few studies of computer delivered BIs have been conducted among youth in the ED, with mixed results.[13,22] In contrast, numerous studies have examined computerized alcohol interventions (of varying dose/number of sessions) among college students.[23-25] A recent

meta-analysis of studies conducted with college students concluded that therapist interventions were more effective than computer interventions, even when controlling for dose.[26] Notably, greater variability was observed in computerized intervention content, whereas therapist intervention content was more homogenous.[26]

An additional gap in the literature related to alcohol BIs is the identification of essential components. For example, therapist-delivered feedback only is not as effective as BIs that include feedback plus other components.[15,27,28] Similarly, a review of alcohol BIs in the ED concluded that more intensive BIs (e.g., greater number, duration, or intensity of sessions) produced more favorable results;[29] given heterogeneity in study protocols, however, the investigators could not quantify the specific influence of these dosage factors on outcome.[29] Among college students, stronger reductions in alcohol consumption were noted for therapist interventions that included content related to risks and problems, protective behavioral strategies, normative comparisons, alcohol expectancies, and blood alcohol concentration (BAC) education, whereas ambivalence and decisional balance exercises produced poorer outcomes; computer intervention components associated with poorer outcome included decisional balance exercises, high risk situations, and values.[26,30] In terms of therapist behaviors, a review of motivational interviewing (MI) based substance use interventions concluded that behaviors positively related to engagement and outcome were MI consistency, whereas rapport building and use of empathy were not related to outcome.[31] A recent study examined open and closed ended questions asked by therapists during a BI; surprisingly, they found question type was not related to increases in readiness to change.[32]

This paper presents descriptive data regarding therapist and computer delivered BIs in an ongoing randomized controlled trial (RCT) of underage drinkers in the ED. Our BIs incorporated principles of motivational interviewing (MI),[33-35] as well as cognitive behavioral strategies,[36-41] based on self-determination theory.[14,15,42-44] MI-based interventions seek to increase intrinsic motivation to change, focusing on dimensions such as importance, likelihood, and readiness for change (cutting down, stopping) and perceived need for help.[45,46] Consistent with this conceptual framework, BIs' efficacy on reducing alcohol consumption would be precipitated by changes in psychological constructs thought to be precursors of behavior change, such as importance of cutting down, likelihood of cutting down, readiness to stop, and wanting help. Thus, the purpose of this paper is to examine changes at post-test in these psychological constructs by condition (TBI, CBI, control). Hypotheses were that the TBI and CBI would result in significantly greater increases in these psychological constructs relative to the control condition. Finally, exploratory analyses examined the associations between specific BI components, in relation to changes in psychological constructs at post-test. Data from this study provide novel information on how technology can assist in the delivery of BIs among adolescents and emerging adults engaging in risky drinking.

METHODS

Design and Setting

Project U Connect is an ongoing RCT being conducted among underage drinkers presenting to the University of Michigan Medical Center Emergency Department in Ann Arbor, MI.

The RCT includes 3 ED based conditions [Computer BI (CBI), Therapist BI (TBI), or control] and 2 booster conditions that occur 3-months after discharge. This paper presents baseline and post-test data from the ED phase of the study since the longitudinal follow-up phase is currently ongoing. Procedures were approved by the University of Michigan's Institutional Review Board (IRB). A Certificate of Confidentiality was obtained through the National Institutes of Health (NIH).

Protocol

Recruitment occurred between ~2-4PM and 2AM seven days a week, excluding major holidays (September 2010 - March, 2013), with initial sampling of midnight and day shifts, which was reduced due to low yield of participants. During these recruitment shifts, ED patients (aged 14-20) presenting for medical care were eligible to be approached for screening, regardless of chief complaint (e.g., injury, alcohol-related, other medical). Research assistants (RAs) used an electronic medical record to identify patients that were eligible for recruitment (see Figure 1 for details). Patients were ineligible for the study if they could not provide informed consent, including severe medical (e.g., intubated, unconscious) or psychiatric (i.e., insufficient cognitive orientation due to receiving medication or other mental health condition) conditions and those under age 18 without a parent or guardian present. Patients presenting with acute suicidal ideation or sexual assault were not included given these patients present in acute psychological distress. Patients who could not complete the computer assessment/BI (e.g., deaf, severe visual impairment, non-English speaking) or participate in follow-ups (e.g., homeless, international visitors returning to their home country within the year) were excluded. Finally, ED patients that were in respiratory isolation/negative pressure rooms (e.g., concern for tuberculosis) were excluded. Patients who were admitted to the hospital were approached on inpatient floors for 72 hours following their ED visit, with the exception of those remaining in intensive care units.

Eligible participants provided written consent (or assent and parent/guardian consent if age < 18 years) and self-administered the 15-20 minute screening survey via touchscreen web-tablet (see Measures for more details). Participants received a $1.00 gift for participation. Participants screening positive on the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C; age 14-17 ≥3; age 18-20 ≥4) were eligible for the RCT. Following obtainment of written consent (and assent and parent/guardian consent), RCT participants completed a 20-30 minute computerized baseline survey ($20 compensation) and were randomized to a condition via a computer algorithm, stratified by gender, age (14-17; 18-20), and meeting criteria for an alcohol use disorder: CBI, TBI, or control. Participants were allowed to complete the baseline survey and BI within 48 hours of their initial ED visit: 77.1% completed during that day, 14.4% completed within 48 hours, 8.6% did not complete; all participants received a 3.5 (SD=4.2) minute post-test.

Screening Measures

Demographics—Questions were taken from standardized surveys[47-49] (see Table 1).

Past 3 month Alcohol Use and Consequences—Those reporting past year alcohol use (Add Health[49]) were administered the AUDIT-C[50,51] typical consumption (frequency, quantity) and frequency of binge drinking (≥ 5 drinks).[52,53] Cut-off scores were based on prior work with adolescents: >3 ages 14-17; >4 ages 18-20.[52,53] The 18-item Rutgers Alcohol Problem Index (RAPI) was used to assess alcohol-related consequences[54-56] with ≥8 indicating a possible alcohol use disorder (AUDs); these participants remained in the study but were given treatment referrals.[56]

Baseline & Post-test Measures

Psychological Constructs—Because prior research shows that psychological constructs are related to subsequent reductions in alcohol use,[15,56,57] ten point visual analog scales or "rulers" were used at both baseline and post-test (after receiving assigned condition) to quantify various dimensions of interest in change (ranging from 1 "not at all" to 10 "very"). Based on theory and prior literature, dimensions included importance, intention, readiness, and need for help. Based on feedback from youth during piloting, we included the following four items: 1) Right now, how important is it to you to cut back your alcohol use?; 2) In the next 30 days, how likely are you to cut down on your alcohol use?; 3) Right now, how ready are you to stop using alcohol?; and, 4) In the next 30 days, how much do you want help for your alcohol use?.

Chart Review

ED Characteristics—Staff abstracted data from the electronic medical chart regarding number of past year ED visits, chief compliant, acute alcohol or drug intoxication, and discharge status.

U Connect BI Conditions

The TBI and CBI incorporated principals of MI[35] and were designed with piloting among youth to primarily address alcohol use, with mostly parallel content albeit some variations reflecting delivery mechanism, in three phases: Explore, Guide, Choose[58-60] (see Table 1).

TBI Description—TBIs were audiotaped, with feedback and retraining provided via bi-monthly supervision with a master's level licensed psychologist, supervised by the investigators. The TBI was facilitated by a computerized workbook that presented tailored feedback from the baseline, with screens containing prompts to structure the session. During Explore, the therapist built rapport by reviewing participants' goals/values and strengths; then, tailored normative statistics for binge drinking were presented with therapist's eliciting what participants thought of this information, rolling with resistance as necessary. During Guide, the therapist tried eliciting change talk by asking about alcohol and drug related consequences (if drug use was reported), reasons to avoid or reduce drinking/other drug use, considering benefits of change, and by building discrepancy between the participant's current actions and goals. Although the TBI primarily focused on alcohol use, other drug use was discussed during Guide in relation to avoiding consequences. Youth seldom indicate a clear commitment to change; thus, the therapist moved to the more pragmatic Choose phase, based on any small change desired, even if not today but in the future, often related to avoiding negative consequences related to alcohol use. During Choose, the therapist elicited

discussion of risky situations and tools to drink less or not at all (protective behavioral strategies),[30] take a day off of drinking (leisure activities), handle a bad day (coping), and avoiding driving under the influence (DUI)/ riding with intoxicated driver (RWID).

TBI Components Captured—The TBI was facilitated by a computerized workbook, allowing therapists to capture participants' choices for: reasons to avoid drinking/drugs, personal strengths, tools for drinking less or not at all, and tools for negative affect. In addition, 97.3% (249/256) of TBI sessions were coded (5 tapes were not collected due to technical difficulties and 2 participant's refused audio recording) using the MITI-3.[61] Table 4 shows descriptive data coded for therapist. Open ended questions and complex reflections are conceptualized to be preferable than closed ended questions and simple reflections. Giving information is typically considered non-MI adherent, although it can be delivered in an MI adherent manner if it is preceded by asking permission.

CBI Description—The interactive, tailored CBI was designed as an offline, Facebook styled program, delivered using touch-screen tablet computers with audio (via headphones). The participant could choose the order when they went through these sections: normative feedback, personal strengths, and better things to do. During Explore, participants chose a top friend to guide them through the CBI and 6 additional friends to be incorporated into the BI, reviewed goals/values, selected personal strengths, and reviewed normative statistics for drinking. During Guide, participants chose reasons to avoid drinking and drugs and benefits of drinking less or not drinking. Note that although the CBI primarily focused on alcohol use, other drug use was included during Guide in relation to avoiding consequences. During Choose, participants chose better things to do related to sports and leisure, reviewed risky situations, and chose tools for drinking less or not at all, and handling negative affect (e.g., chat room style posts followed by comments expressed by virtual friends, to which participants rate 'thumbs up' or 'thumbs down'). The final tool related to avoiding DUI/ RWID.

CBI Components Captured—Participants choices were screen captured including: reasons to avoid drinking/drugs, personal strengths, benefits of change, better things to do (sports and leisure), tools for drinking less or not at all, and tools for negative affect. In addition, participants selected a drinking goal (see Table 4).

Control—For the control, which was considered enhanced usual care, RAs reviewed a brochure listing resources (e.g., mental health and substance use services, leisure activities). This brochure was also given to participants in the BI conditions.

Data Analysis

Data were analyzed using SAS Version 9.3 (SAS Institute, Inc., Cary, NC). Descriptive data is presented for the sample and for the BI components. To examine initial efficacy of the BIs on psychological constructs at post-test, generalized estimating equations (GEEs) were used to examine group (TBI vs. control and CBI vs. control) by time (baseline to post-test) interactions for: importance to cut down, likelihood to cut down, readiness to stop, and wanting help. An *intent to treat* approach was used, including those who did not receive the

assigned BIs (n=47). Finally, partial correlations were conducted to examine the influence of specific TBI/CBI components in relation to changes in psychological constructs at post-test, controlling for baseline values.

RESULTS

Enrollment

Overall, 9228 patients ages 14-20 presented to the ED during recruitment times. Among these, 2696 (29.2%) were automatically ineligible based on predetermined exclusion criteria, primarily related to inability to provide informed consent due to medial or psychiatric severity (See Figure 1). The remaining patients 6532 (70.8%) were eligible to approach and 5096 (78.0%) were approached. Patients not approached were considered missed (1436, 21.9%); thus, 4389 youth were screened (13.9% refused) (Figure 1). Comparisons of refusals at screening showed that males were more likely to refuse than females (15.1%, 13.0%, respectively; $\chi^2(1)= 4.76$ $p<.05$) and other races were more likely to refuse than Caucasians and African-Americans (35.0% versus 9.6% and 7.7%, respectively; $\chi^2(2)= 393.20$, $p<0.001$). Among screened participants, 1053 (24.0%) met criteria for risky drinking and 836 (80.3%) were enrolled in the RCT. Comparisons between participants and refusals prior to baseline showed no gender differences (male 17.0%, female 16.6%); however, Caucasians and other races were more likely to refuse than African-Americans (17.7% 19.5% vs. 3.7% respectively; $\chi^2(2)=11.015$; $p<.01$). No other data could be obtained on refusals without written consent. Most participants (95.7%) received their assigned condition prior to discharge which did not differ for the TBI and CBI; 93.7% of those randomized completed the post-test. Examination of characteristics of participants by condition showed no significant differences so study totals are shown in Table 2.

TBI and CBI Descriptions

Although designed to be similar in length, the TBI was significantly longer (mean = 45.4 minutes; SD=19.0; range 15.9-167.5; median = 40.5) than the CBI (mean = 34.7 minutes; SD=19.6; range 18.4-229.3; median= 28.9) ($t = 6.34$, $p<0.001$). The variation in length likely reflects partial completions, varying levels of interaction, and interruptions due to medical procedures. Overall, 85% participants reported that they liked the program at least somewhat, very much, or extremely (CBI = 75%; TBI = 94%); the TBI was received significantly better than the CBI ($\chi^2(2)= 67.40$; $p<.001$). For the TBI, counts of MI adherent behaviors support the fidelity of therapist delivery (Table 4). For the CBI, a high frequency of interaction with the CBI was observed, as indicated by the large number of items selected within domains (Table 5).

Post-test Outcomes

As compared to the control, GEE analysis showed that participants in the BIs showed significant increases in importance to change (TBI and CBI $p<.001$). In addition, the CBI showed significant increases in likelihood to cut-down ($p<.05$) whereas the TBI showed significant increases in for readiness to stop ($p<.001$). No significant changes were observed for wanting help (Tables 3-4; Figures 2-5).

Changes from Baseline /Post-test based on BI Content

Partial correlations conducted between changes in psychological constructs and content of the TBI and CBI (controlling for baseline values) are listed in Tables 3 and 4. For the TBI, personal strengths and tools for drinking less or not at all were significantly, positively related to changes in all four psychological constructs at post-test; in contrast, reasons to avoid drinking/drug use and tools for handling negative affect were not significant. Regarding therapist behaviors, none of the MI adherent behaviors were significantly correlated with changes at post-test in psychological constructs; however, as hypothesized, giving information was negatively correlated with importance of cutting down, likelihood of cutting down, and readiness to stop. Three sections of the CBI were significantly related to psychological constructs at post-test (i.e., importance of cutting down, likelihood of cutting down, and readiness to stop): benefits of change, better things to do (sports), and tools for drinking less/not at all. In addition, strengths were significantly related to changes in importance of cutting down and wanting help. Choosing a drinking goal that included greater changes in behavior (e.g., reducing, stopping) was significantly related to changes in all four psychological constructs at post-test. Reasons to avoid drinking/drug use and tools for negative affect were not significant.

DISCUSSION

Data from this study fills an important gap in the literature by describing the use of technology to deliver therapist and computer BIs among youth in the ED. Overall, preliminary data collected at post-test suggest that U Connect therapist and computer BI's are promising, being received positively and increasing psychological constructs which are conceptualized as precursors of changes in alcohol use. For example, compared to the control condition, participants in the CBI showed significant increases in importance and likelihood to cut-down whereas those in the TBI showed significant increases in importance to cut down and readiness to stop. Intrinsically, a therapist has greater ability to discuss severity of alcohol use and elicit reasons for stopping while minimizing resistance, an issue that is not as easy to tailor in the CBI. For both BIs, no significant changes were observed for wanting help, with means reflecting youth were *not at all* ready. This null finding likely reflects the level of alcohol involvement of the sample, with one in five youth screening positive for an alcohol use disorder, indicating most did not need formal treatment. Also, the changes observed in the precursors of behavior change (e.g., importance) although promising were small (e.g., means less than 5 out ten at post-test), likely reflecting the low problem severity of sample (adolescent risky drinkers). Future papers will examine the magnitude of change in these psychological constructs in relation to behavioral outcomes.

The use of MI adherent strategies by therapists was not significantly related to changes in psychological constructs at post-test, which is consistent with some prior work.[31,32] These findings may reflect the fairly consistent use of MI strategies across participants, and subsequent restricted range. Although therapists were trained to ask permission before giving information, it appears this technique may be counterproductive; thus, future BIs may want to consider minimizing giving information, such as during tailored feedback components. Future qualitative studies examining participant interactions during the BI,

which was not coded in our study, could provide additional valuable information. In particular, it may be important to examine participant interaction (i.e., change talk, engagement) given that prior studies suggest these behaviors predict better outcomes.[31]

BI components that were consistently related changes in psychological constructs at post-test included greater identification of personal strengths and protective behavioral strategies. Emphasizing personal strengths is a central part of strengths based case management strategies[62] as well as MI;[46] however, typically a discussion of strengths have not been incorporated into BIs.[60] Our finding supporting the use of protective behavioral strategies during BIs is consistent with prior work among college students showing the relationship between binge drinking and consequences is moderated by use of these strategies (e.g., more strategies is related to fewer consequences).[30] In addition, analyses suggested that several components of the computer BI (which were not measured in the therapist BI) may be important to include in BIs. Specifically, choosing to increase time spent with activities that involve sports, as opposed to other leisure activities, was positively associated with changes in psychological constructs at post-test; it may be that it is easier for other leisure activities to include alcohol consumption than sports activities. Not surprisingly, choosing a drinking goal that involved greater changes in behavior (e.g., reducing, stopping) and identifying more benefits of change were significantly related to greater changes in psychological constructs. These findings are consistent with notions regarding the importance of eliciting commitment talk as part of MI. In contrast, selection of reasons to avoid drinking and drug use, which is typically part of a decisional balance exercise, was not related to changes in precursors of behavior change; this finding is consistent with prior studies conducted among college students.[26] Finally, although tools related to handling negative affect were not significantly related to post-test changes, it is possible that this component may be important for subgroups that use alcohol to cope with negative affect. Subsequent papers will use this within session data to predict drinking outcomes.

In this study, a computerized workbook was used to enhance the fidelity of the therapist BI, to remind therapists about key content and to focus youth on the therapeutic task, which is challenging in the hectic ED setting. A limitation of the computer workbook format in the TBI was that it did not entirely capture all the information data discussed in order to avoid interrupting the therapeutic process (i.e., not wanting to stop the session to code discussion content). Although the TBI sessions were audio-recorded, only 20% were coded for fidelity; future qualitative efforts will involve coding audio-tapes of TBI sessions for participant interaction. Although the BIs were designed to be similar, in practice youth completed the CBI more quickly than the TBI which may reflect increased time spent in discussion in the TBI. In contrast, the CBI was entirely delivered via technology. Staff merely pushed a button to start the program, which was completed independently by youth. Further, the CBI was facilitated by a virtual friend who was selected by the youth, using an offline Facebook style platform, which was liked by most youth, albeit not as much as talking to a live person.

Limitations

Findings from this study are limited given that only post-test data is currently available in this ongoing RCT. Although precursors of behavior change (measured at post-test) may

provide insight into mechanism of change, effects were small (mean scores at post-test remained low) and efficacy can't be established without behavioral outcome data, which will be the topic of future papers from this study. Nonetheless, given limited data on components of technology-enhanced computer and therapist BIs, this data makes an important contribution to the literature. Also, data was collected from a single ED site with limited generalizability to other patient groups (e.g., adults, other race/ethnicity compositions, those excluded) or settings (primary care, college campuses). Although attempts were made to conduct universal screening in the ED, practical and ethical constraints resulted in excluding young patients for a variety of reasons, including medical severity, limiting generalizability. Data from this study is limited to self-report; however, several methods were used to increase validity including use of computerized assessments, assurances of confidentiality, and validated measures.[63] Findings are limited in that not all the same data was captured in the therapist and computer BIs, reflecting content related variations based on delivery mechanism.

Conclusions

Findings suggest that therapist and computer BIs are promising for increasing psychological constructs at post-test that are conceptualized as precursors of behavior change. Preliminary data suggest that potentially important BI components include identification of personal strengths and protective behavioral strategies, whereas providing information may be counterproductive. In addition, identification of benefits of change, alternative activities involving sports, and a drinking goal may be beneficial during computer-delivered BIs. Although these factors may be salient mechanisms influencing the efficacy of BIs, caution is recommended given that outcomes were measured at post-test. Future studies are needed to identify essential BI components that produce the greatest change in drinking behaviors during the transition from adolescence to young adulthood.

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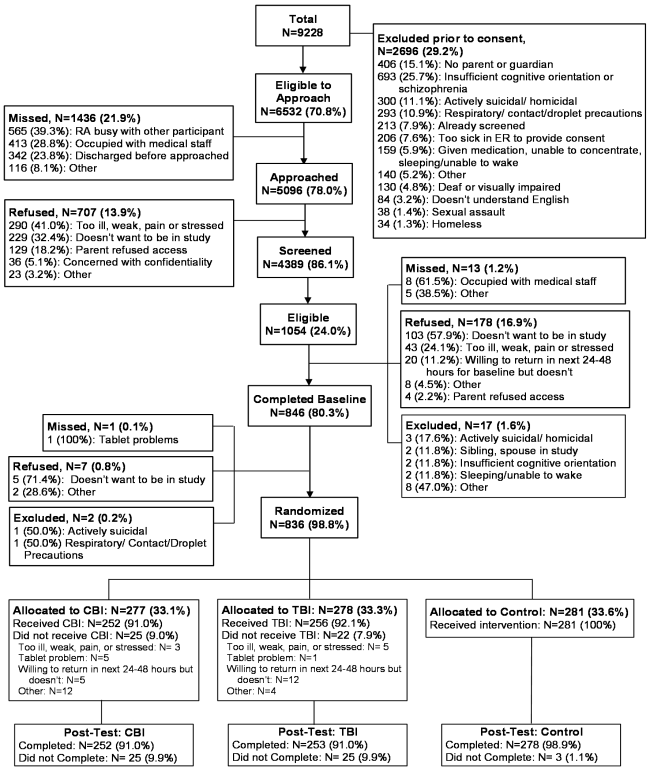

Figure 1.
Project U Connect Flow Chart (September 2010 – April 2013)

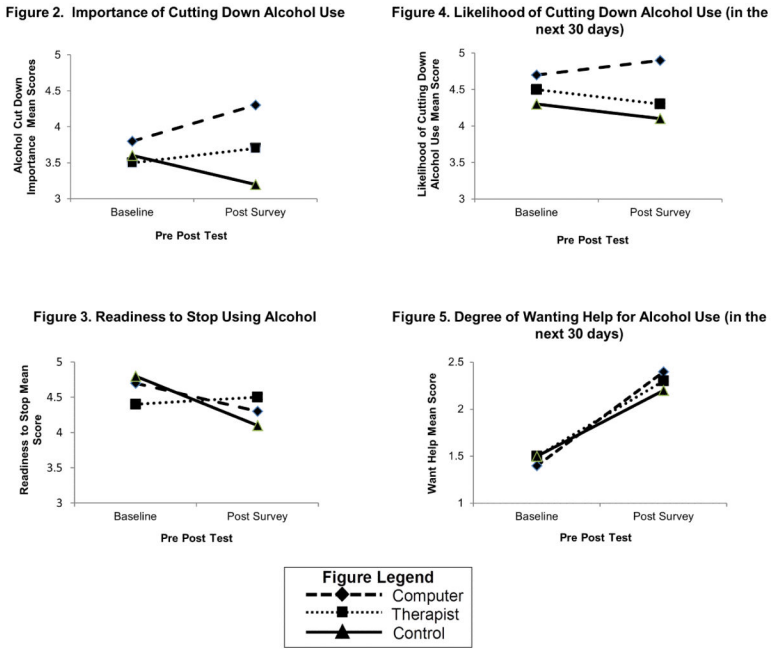

Figure 2- 5.
Change Scores on Ruler Items from Baseline to Post Test

TABLE 1

Brief Intervention Components

Key Element	Computer	Therapist
EXPLORE		
Introduction: Agenda Setting	• Selects 'Top' friend (Peer) to guide during BI & 6 other friends	• Therapist introduction & rapport building • Identify purpose of session
Goals	• BI goals listed and affirmed by Peer ○ Rate goals on level of importance ○ Friend affirms goal selections	• BI goals listed, additional goals • Affirm goals, discuss steps to reach goals • Summarize
Personal Strengths	• Identifies personal strengths	• Identify personal strengths • Affirms, explores how will help reach goals • OARS; Strategic Summaries
Normative Statistics / Personalized Feedback	• Gender/age appropriate drinking graphs • Slider (0 to 100%), guess % of people their age that drink • See % of people their age who drink	• Explore current level of use • Review pie graph of % of people their age not drinking / not binge drinking ○ Therapist: "What do you make of that?" • Discuss how currently, or in future, impacts goals
GUIDE		
Reasons to Avoid Drinking & Drugs (if drug use reported)	• Reasons to reduce/avoid drinking/drugs: ○ Legal, School/Work, Family/Friends, Health/Injury, Losing Control displayed as *iTunes* album covers • Peer affirms PT's selections	• Explore 'not so good' things: alcohol and drug consequences (if use drugs) • Psycho-education: Dangers of mixing substances • Reasons to reduce/avoid drinking/ drugs: ○ Legal, School/Work, Friends/ Family, Health/Injury, Losing Control • Make connection with goals
Benefits (of drinking less or not at all)	• Select at least 5 flairs (buttons) that represent benefits to drinking less or not at all	• Elicit Change Talk; DARN-C • Address Discrepancies; Goals • Summarize benefits; affirmations
CHOOSE		
Better Things To Do	• Select at least 5 magnets that represent activities/hobbies without alcohol • Affirmation for other activities/hobbies	• Explore other ways to have fun that do not involve alcohol and/or other substances

Key Element	Computer	Therapist
		• Affirmations for finding other ways to have fun
Risky Situations	• Select scenarios likely to drink (triggers): where, who with, when (time, day), how much and mood • Summary of triggers • Elicits triggers of risky drinking	• Explore past/future potentially risky situations • What has worked in the past ○ Affirmations, Future talk, Summary • Normalizing struggles and/or ambivalence
Tools	• Friends in chat room discuss strategies to reduce/avoid drinking and trouble • Videos: (~1 minute each) youth talk about strategies • Choose strategies	• Identify tools for the following situations: • Drinking less- if they decided to reduce • Refraining from drinking all together • Coping- handling negative affect (a bad day)
DUI/RWID	• Indicate likelihood of risky driving/riding in car • Choose safe ways to get home • Psycho-education: Quiz on zero tolerance law	• Identify risky driving situations • Explore personal experiences • Problem solve safe ride options • Psycho-education: Drinking/ substance use & driving: Reduced coordination, reaction time, and zero tolerance law
Drinking Choices & Summary	• Assesses readiness for change • Choose Drinking goal • About Me Book reviewed: ○ Personalized summary book • About me booklet emailed/mailed	• Sliders for confidence/ importance/ readiness for change • Change plan- if ready. If not, how would they know if alcohol became a concern? • Summary & identify next step • About me booklet emailed/mailed

Note. BI = Brief Intervention; PT = Participant; MI = Motivational Interviewing; DARN-C = (technique used in MI) Desire, Ability, Reasons, Need, Commitment; OARS = (technique used in MI) Open-ended questions, Affirmations, Reflective listening, Summarizing

TABLE 2

Background Characteristics

Background Characteristics	Total (N=836) n (%) / M(SD)
Demographics	
Gender (Male)	431 (51.6%)
African American	79 (9.5%)
Caucasian	664 (79.4%)
Other Race	93 (11.1%)
Hispanic Ethnicity	46 (5.5%)
Mean Age	18.6 (1.4)
Receipt of Public Assistance	168 (20.1%)
Failing Grades (D, F)	67 (8.0%)
Drop Out of School	36 (4.3%)
Live with Parent	361 (43.4%)
ED Characteristics (medical chart)	
Number of ED Visits (past year)	1.8 (1.9)
Chief Complaint Medical	533 (63.8%)
Unintentional Injury	270 (32.3%)
Acute Alcohol or Drug Intoxication	75 (9.0%)
Intentional Injury	33 (4.0%)
Discharged from ED	726 (86.8%)
Substance Use (Past 3 Months)	
Binge Drinking	814 (97.4%)
RAPI ≥ 8	164 (19.6%)
AUDIT-C Score	6.0 (2.0)

Note. M = Mean; SD = Standard Deviation; ED = Emergency Department; RAPI = Rutgers Alcohol Problem Index; AUDIT-C = Alcohol Use Disorders Identification Test Consumption

TABLE 3

Baseline and Post-test Psychological Constructs for BI Conditions Compared to Control

Variable	Baseline M(SD)	Post-Test M(SD)	% Change	Group by Time Interaction Effect (p-value)
Important to Cut Down				
Computer BI	3.7 (2.9)	4.3 (3.0)	+16.2%	<0.0001
Therapist BI	3.5 (2.7)	3.7 (3.0)	+5.7%	0.0007
Control	3.6 (2.7)	3.2 (2.8)	−11.1%	
Likely to Cut Down				
Computer BI	4.7 (3.2)	4.9 (3.3)	+2.1%	0.0290
Therapist BI	4.5 (3.3)	4.3 (3.3)	−4.4%	0.9738
Control	4.3 (3.1)	4.1 (3.2)	−4.7%	
Ready to Stop				
Computer BI	4.7 (3.1)	4.3 (3.1)	−8.5%	0.0886
Therapist BI	4.4 (3.1)	4.5 (3.3)	+2.2%	<0.0001
Control	4.8 (3.2)	4.1 (3.1)	−14.6%	
Want Help				
Computer BI	1.3 (2.4)	2.2 (2.3)	+40.9%	0.5864
Therapist BI	1.5 (2.6)	2.4 (2.5)	+60.0%	0.9636
Control	1.4 (2.6)	2.2 (2.5)	+47.1%	

Note. M = Mean; SD = Standard Deviation

TABLE 4

TBI: Descriptive Data from Screen Captures, Coding of Audio tapes, and Partial Correlations between TBI Components and Post-Test Psychological Constructs (controlling for baseline levels).

Component	% / M (SD)	Partial Correlations with Post-test			
		Importance of Cutting Down	Likelihood of Cutting Down	Readiness to Stop	Wanting Help
Screen Captures					
Reasons to Avoid	18.1 (10.3)	−0.01	−0.01	−0.09	−0.06
Benefits of Change	----------	----------			
Personal Strengths	7.5 (2.9)	0.13*	0.14*	0.17**	0.14*
Better Things To Do: *Sports*	----------	----------			
Better Things To Do: *Leisure*	----------	----------			
Tools: Drinking Less/Not at all	1.8 (0.8)	0.20**	0.15*	0.21**	0.12
Tools: *Negative Affect*	2.0 (0.9)	0.08	0.06	−0.02	−0.00
Drinking Goal	----------	----------			
Coding of Audio-Tapes: MITI-3					
Evocation[a]	4.6 (0.6)	0.03	0.03	0.02	−0.02
Collaboration[a]	4.7 (0.6)	0.02	0.01	−0.05	−0.07
Autonomy/Support[a]	4.6 (0.7)	−0.01	0.00	−0.04	−0.03
Direction[a]	4.6 (0.7)	−0.00	0.00	−0.04	−0.03
Empathy[a]	4.7 (0.6)	0.05	0.06	0.02	−0.06
Adherence[b]	6.4 (2.7)	−0.02	0.01	−0.07	0.03
Non-Adherence[b]	0.3 (1.1)	−0.10	−0.05	−0.02	−0.09
Closed Ended Question[b]	4.1 (3.4)	0.02	0.03	0.08	0.03
Open Ended Question[b]	15.8 (5.1)	−0.11	−0.10	−0.06	0.00
Simple Reflection[b]	4.4 (3.1)	−0.10	−0.09	0.00	0.01
Complex Reflection[b]	12.7 (4.5)	−0.03	−0.02	−0.03	0.00
Total Reflection[b]	17.1 (4.7)	−0.09	−0.07	−0.03	0.01
Giving Information[b]	3.2 (2.0)	−0.15*	−0.17**	−0.21*	−0.07

Note. TBI = Therapist-delivered Brief Intervention.:

* p<0.05;

** p<0.01

[a] sub-scale ordinal values: 1 (low) – 5 (high);

[b] sub-scale interval values: count of therapist behaviors.

TABLE 5

CBI: Descriptive Data from Screen Captures and Partial Correlations between CBI Components and Post-Test Psychological Constructs (controlling for baseline levels).

	Screen Captures	Partial Correlations with Post-test			
Variable	**% / M (SD)**	**Importance of Cutting Down**	**Likelihood of Cutting Down**	**Readiness to Stop**	**Wanting Help**
Reasons to Avoid	21.4 (10.2)	0.02	0.03	−0.01	−0.00
Benefits of Change	10.8 (8.8)	0.17*	0.15*	0.15*	0.06
Personal Strengths	9.4 (3.0)	0.13*	0.03	0.04	0.16**
Better Things To Do: *Sports*	3.2 (2.2)	0.17*	0.20*	0.15*	−0.06
Better Things To Do: *Leisure*	5.7 (2.6)	0.05	−0.03	0.03	−0.07
Tools: Drinking Less/Not at all	2.8 (0.5)	0.19**	0.19**	0.17**	0.06
Tools: *Negative Affect*	2.0 (0.2)	0.06	0.09	0.04	0.01
Drinking Goal:		0.52***	0.48***	0.42***	0.33***
No change	14.2%				
Not now but may in next few months	9.3%				
Prevent negative consequences	35.2%				
Reduce drinking	28.7%				
Quit drinking	12.6%				

Note. CBI = Computer-delivered Brief Intervention

* p<0.05;

** p<0.01;

*** p<0.001