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Effects of Early, Computerized Brief Interventions on Risky Alcohol Use and Risky Cannabis Use Among Young People

Geir Smedslund, Sabine Wollscheid, Lin Fang, Wendy Nilsen, Asbjørn Steiro and Lillebeth Larun

A Campbell Systematic Review
2017:6

Published: April 2017
Search executed:April 2016

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Title	Effects of early, computerized brief interventions on risky alcohol use and risky cannabis use among young people
Institution	The Campbell Collaboration
Authors	Smedslund, Geir Wollscheid, Sabine Fang, Lin Nilsen, Wendy Steiro, Asbjørn Larun, Lillebeth
DOI	10.4073/csr.2017.6
No. of pages	213
Last updated	7 April 2016
Citation	Smedslund G, Wollcheid S, Fang L, Nilsen W, Steiro A, Larun L. Effects of early, computerized brief interventions on risky alcohol use and risky cannabis use among young people. Campbell Systematic Reviews 2017:6 DOI: 10.4073/csr.2017.6
ISSN	1891-1803

Roles and responsibilities	Study selection, quality assessment and data extraction were performed by Geir Smedslund, Sabine Wollscheid, Asbjørn Steiro, Lin Fang, Wendy Nilsen and Lillebeth Larun. Smedslund wrote the first draft of the review and performed the statistical analyses, and all co-authors commented on this and contributed to the final draft of the review. All authors have approved of the manuscript.
Editors for this review	Editor: Brandy Maynard Managing editor: Catriona Shatford
Sources of support	Knowledge Centre for the Health Services, Norwegian Institute of Public Health, Norway
Declarations of interest	The authors have no vested interest in the outcomes of this review, nor any incentive to represent findings in a biased manner.

Corresponding author	Geir Smedslund Norwegian Institute of Public Health Postboks 4404 Nydalen 0403 Oslo Norway E-mail: geir.smedslund@fhi.no Full list of author information is available at the end of the article.

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The Campbell Collaboration
P.O. Box 4404 Nydalen
0403 Oslo, Norway
www.campbellcollaboration.org

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Plain language summary

Computerized brief interventions seem to reduce risky alcohol use among young people; no evidence of effect on cannabis consumption

Young people who abuse alcohol or cannabis are at risk of immediate and long-term health and legal consequences. There is some evidence of an impact on alcohol use. Findings are hampered by a lack of rigorous evidence, so further research is needed.

What did the review study?

Alcohol abuse and use of recreational drugs among young people are significant public health concerns. These should be addressed by effective interventions that provide assistance and counselling to drug and alcohol users.

A computerized brief intervention is any preventive or therapeutic activity delivered through online or offline electronic devices, such as a mobile phone, and administered within an hour or less, even a few minutes, of the substance abuse. Such interventions aim to reduce alcohol abuse or drug abuse in general. This review assesses research on the effectiveness of early, computerized brief interventions on alcohol and cannabis use by young people who abuse either one or both of these substances.

What studies are included?

The included studies employed randomized controlled trials and reported on any computerized brief intervention used as a standalone treatment aimed at reducing alcohol and cannabis consumption. The secondary outcome measured was reported adverse outcomes.

The studies were conducted in the United States, New Zealand, The Netherlands, Sweden, Australia, Germany, Switzerland and Brazil, with one study conducted in several countries (Sweden, Belgium, the Czech Republic and Germany).

The participants were consumers of alcohol or cannabis or both, and aged 15 to 25 years. A total of 60 studies with a sample size of 33,316 participants were included in the review.

What is the aim of this review?

This Campbell systematic review examines research on the effectiveness of early, computerized brief interventions on alcohol and cannabis use by young people who are high or risky consumers of either one or both of these substances. The review summarises findings from 60 studies from 10 countries. The participants were young people between the ages of 15 and 25, defined as risky consumers of alcohol or cannabis or both. The review included 33,316 participants.

What are the main findings of this review?

The interventions significantly reduce alcohol consumption in the short-term compared to no intervention, but the effect size is small, and there is no significant effect in the long-term. There are also shortcomings in the quality of the evidence.

Interventions which provide an assessment of alcohol use with feedback may have a larger effect that those which do not, but again, the evidence is weak.

The few studies on cannabis did not show significant effects in the reduction of cannabis consumption.

There was no evidence of adverse effects.

What do the findings in this review mean?

Generally, the alcohol interventions seem to work. However, all the studies included in the review had methodological shortcomings. Given the lack of rigorous evidence, this conclusion should be read with caution.

Only a few studies focused on cannabis, thus hampering any firm conclusion as to the intervention effectiveness.

While there is doubt as to the validity of the findings, computerized brief interventions should not be completely ruled out as they are easy to administer, low cost and have no adverse effects.

There is a need to conduct more high quality research, especially with regard to studies focused on cannabis use.

Executive Summary/Abstract

BACKGROUND

Young people's risky use of alcohol or recreational drugs, such as cannabis, remains a significant public health issue. Many countries have made substantial efforts to minimize the long-term consequences of alcohol and/or cannabis use at multiple levels, ranging from government policy initiatives to primary health care services.

In this review, we focused on the effects of brief interventions, provided by electronic devices (computerized brief interventions). A brief intervention is defined as any preventive or therapeutic activity delivered by a health worker, psychologist, social worker, or volunteer worker, and given within a maximum of four structured therapy sessions each lasting between five and ten minutes with a maximum total time of one hour. Brief interventions may work by making the clients think differently about their alcohol/cannabis use, and by providing them with skills to change their behavior if they are motivated to change.

A computerized brief intervention, in contrast, is not directly delivered by a human being, but may be delivered through online and offline electronic devices. Such interventions can reach large audiences at a low cost and can simultaneously simulate an 'interpersonal therapeutic component' by targeting recipients' feedback.

OBJECTIVES

To assess the effectiveness of early, computerized brief interventions on alcohol and cannabis use by young people aged 15 to 25 years who are high or risky consumers of either one or both of these substances by synthesizing data from randomized controlled trials.

SEARCH METHODS

We searched 11 electronic databases including MEDLINE, PsycINFO, EMBASE, Cinahl and The Cochrane Library in April 2016 for published, unpublished and ongoing studies using adapted subject headings and a comprehensive list of free-text terms. Additionally, we searched the reference lists of the included studies. We also have set up an EBSCO host alert notification (EPAlerts@EPNET.COM) that continuously surveys the Cochrane Library (including CENTRAL), Medline and Embase. We receive updated searches via email. This search is up to date as of May 2016.

SELECTION CRITERIA

We included all randomized or quasi-randomized controlled trials of any computerized brief intervention used as a stand-alone treatment aimed at reducing alcohol and/or cannabis consumption. Eligible comparators included no intervention, waiting list control or an alternative brief intervention (computerized or non-computerized). Participants were young people between 15 and 25 years of age who were defined as risky consumers of alcohol or cannabis, or both.

DATA COLLECTION AND ANALYSIS

Two researchers independently screened titles and abstracts against the inclusion criteria. Two researchers independently assessed the full texts of all included articles. We used standard methodological procedures expected by the Campbell Collaboration.

RESULTS

We included 60 studies that had randomized 33,316 participants in this review. **Study characteristics:** The studies were mostly from the United States and targeted high and risky alcohol use among university students. **Bias/quality assessment:** Some of the studies lacked clear descriptions of how the randomization sequence was generated and concealed. Many of the studies did not blind the participants. Some of the studies suffered from high loss to follow-up, and few studies had a pre-registered protocol. **Findings:** For alcohol, we found moderate quality evidence that multi-dose assessment and feedback was more effective than a single-dose assessment. We found low quality evidence that assessment and feedback might be more effective than no intervention. Assessment and feedback might also be more effective than assessment alone (low quality evidence). Short-term effects (< 6 months) were mostly larger than long-term (≥6 months) effects. For cannabis, we found that assessment and feedback might slightly reduce short-term consumption compared to no intervention. Adding feedback to assessment may have little or no effect on short-term cannabis consumption. Moreover, there may be little or no difference between assessment plus feedback and education on short-term and long-term cannabis consumption. **Adverse effects:** We did not find evidence of any adverse effects of the interventions.

Implications for policy, practice and research

Computerized brief interventions are easy to administer, and the evidence from this review indicates that such brief interventions might reduce drinking for several months after the intervention. Additionally, there is no evidence for adverse effects. This means that brief, computerized interventions could be feasible ways of dealing with risky alcohol use among young people. The evidence on cannabis consumption is scarcer, suggesting the need for more research.

1 Background

1.1 DESCRIPTION OF THE CONDITION

Risky use of alcohol or recreational drugs among young people remains a prominent public health issue (UN, 2003; UNODC, 2010). The United Nations Office on Drugs and Crime (UNODC) has argued for a public health approach to prevent alcohol and recreational drug abuse using interventions that provide assistance and counselling. This approach provides services at an early stage to drug and alcohol users who are at risk (UN, 2003). Many countries have made substantial efforts at multiple levels ranging from government policy initiatives to primary health care services in an attempt to minimize the long-term consequences of alcohol and cannabis use. A study of over 50,000 individuals from 17 countries indicates that high drug use is not related to more stringent policies (Degenhardt, 2008), suggesting the need to implement other methods to prevent risky alcohol or recreational drug use. For example, Roche and Freeman (Roche, 2012) have illustrated the advantages of implementing screening and of brief, early interventions for young people with alcohol and drug problems. However, the effects of such interventions are unclear.

1.2 TRENDS AND CONSEQUENCES OF ALCOHOL AND CANNABIS USE AMONGST YOUNG PEOPLE

1.2.1 Trends and consequences of alcohol use amongst young people

Alcohol misuse presents a substantial societal burden due to the costs related to health care, prevention, crime, law enforcement and welfare assistance, as well as the costs resulting from reduced productivity and increased mortality (Thavorncharoensap, 2009). The World Health Organization (WHO) Global Survey on Alcohol and Health found a trend towards increased drinking during 2001-2005 (WHO, 2011) and 2006-2010 (WHO, 2014). In addition, harmful use of alcohol is now the leading risk factor for death and disability for people aged 15–49 (WHO, 2014). According to WHO projections of alcohol use up until 2025, alcohol per capita consumption is expected to increase unless effective policy responses can reverse this trend (WHO, 2014).

Risky and harmful drinking patterns such as binge drinking and drinking to intoxication have also increased over time among young people (Lancet, 2008; NIAAA, 2013). However, an increase in drinking was not found in the comprehensive NatCen study in the UK (Fuller, 2015). This study

found that the proportion of pupils who had ever tasted alcohol was stable at around 60 percent during 1988 to 2003, but from 2003 to 2014, this proportion decreased to less than 40 percent.

Small to moderate levels of alcohol might not be harmful, but high consumption of alcohol is directly related to risky behaviours such as intoxicated driving (Cherpitel, 2003) and interpersonal violence (Foran, 2008). Binge drinking can also have both short- and long-term negative impacts on an individual's health. For instance, Lopez-Caneda et al. (2013), found an association between binge drinking and anomalous neural activity related to working memory processes, and college students who binge drink have been shown to have a higher risk of developing alcohol dependence (Jennison, 2004).

1.2.2 Trends and consequences of cannabis use amongst young people

Cannabis is the most widely used and trafficked illicit drug worldwide (UNODC, 2012). Cannabis is a general term to describe the psychoactive preparations of the plant *Cannabis sativa*. While marijuana refers to the cannabis leaves or other crude plant material, the term hashish describes the drug produced by drying the resin exuded by the marijuana plant (Brecher, 1972). Cannabis is commonly smoked, with or without being mixed with tobacco, but can also be consumed orally. The United Nations Office on Drugs and Crime (UNODC) has estimated that between 2.9 to 4.3 percent of the world population aged 15-64 (between 129 and 191 million people) used cannabis at least once in 2008 (UN, 2010a).

The use of marijuana and hashish in young people increases with age (Mosher, 2004). Cannabis use has increased in the US since 2007 in the 13 to 18 year age group and daily marijuana use reached a 30-year peak among high school students aged 17-18 years in 2011 (Johnston, 2012). Moreover, in 2015, the rate of daily marijuana use among 12th graders (students aged 17-18) in the US surpassed that of daily tobacco use for the first time (NIDA, 2015).

Regular cannabis use among young people presents a social burden due to costs arising from increased mental health problems (Degenhardt & Hall, 2012) and a higher risk for school dropout (Silins et al., 2014). Although there appears to be no standard measure for 'low' or 'high' frequencies of cannabis use, we define 'high users of cannabis' according to the literature as users with at least weekly consumption of the drug (Lev-Ran, 2013). It has been reported that regular cannabis use among young people may have a negative impact on their cognitive functioning (Ramaekers, 2004; Ramaekers, 2006), and on the developing brain (Pope, 2003). The current literature suggests a positive association between frequency of cannabis use and the risk of developing a mental illness, especially psychotic disorders (Løberg, 2012). On the other hand, there is some evidence that cannabis use can have a positive impact on creativity (Schafer, 2012), and is helpful in the treatment of certain ailments such as cancer (Robson, 2001) and multiple sclerosis (Iskedjiana, 2007).

Common adverse consequences of both alcohol (Jennison, 2004; Karam, 2007; Miller, 2007) and cannabis (Anderson, 2011; Hall, 2009) use include unprotected sexual behaviour and risky driving behaviour. In addition, the use of alcohol (Odgers, 2008) and cannabis (Behrendt, 2009) during

youth is associated with the development of substance abuse disorders in later life. Thus, there is a need for early interventions to reduce or eliminate the use of alcohol and cannabis among young people in order to prevent them from falling into a downward spiral that may lead to substance abuse related behaviours and ailments in adulthood as well as societal costs related to health care services.

1.3 DESCRIPTION OF THE INTERVENTION

Brief interventions have the singular focus of targeting problematic behaviour in a systematic and specific manner (O'Leary, 2004). For the purpose of this review, brief interventions are defined as follows: any preventive or therapeutic activity (delivered by a health worker, psychologist, social worker, or volunteer worker) given within a maximum of four structured therapy sessions, each of short duration (Miller, 1992) that lasts between five and ten minutes with a maximum total time of one hour (Babor, 1994). In practice, it is difficult to measure the duration of time for which the participants are exposed to the computerized intervention, but we have chosen to proceed with this definition. Previous reviews suggest that this definition of 'brief interventions' can be effective in reducing the burden of alcohol (Rehm, 2004), and cannabis use (Bernstein, 2009).

The National Institute for Health and Clinical Excellence (NICE) differentiates between two main types of brief interventions, namely *Structured Brief Advice* and *Extended Brief Interventions*. Structured Brief Advice can be used with time constraints (e.g., 5 minutes) as a first step for adults (aged 18 and over) who have been classified as high-risk drinkers. In contrast, most Extended Brief Interventions can be classified as short versions of Motivational Interviewing (NICE, 2010). Examples of Extended Brief Interventions are the 'Motivational Enhancement Therapy', originally developed as a four-session intervention in 'Project MATCH' in the US (Miller, 1992), and 'Drinker's check-up' (Hester, 2005; Miller, 1988; NICE, 2010), consisting of assessment, feedback, and decision-making modules.

Computerized brief interventions include both online and offline interventions (e.g., CD-ROM, software, web sites and downloadable applications [apps]) delivered via electronic devices such as personal computers, tablets and smart phones. The main advantage of a computerized brief intervention is that it can reach large audiences at a low cost and simultaneously simulate an 'interpersonal therapeutic component' by targeting recipients' feedback. Moreover, computerized brief interventions appeal to younger people who have been growing up with digital media, so-called 'digital natives'. Many studies targeting young people such as high school and university students use computerized interventions (Carey, 2011; Carey, 2009; Carney, 2011; White, 2010). As young people are underrepresented among users of standard face-to-face alcohol and other drug specialist services, electronic devices might be effective media for reaching this population (White 2010). In one study, 53 percent of Internet users aged 18-29 had searched online for information on a specific disease and medical problem (Fox, 2013), and 14 percent had searched specifically for information on alcohol and drug problems (Fox, 2006). Computerized interventions often consist of two feedback components: *targeted* feedback and *tailored* feedback (Miller, 2002). Whereas the term 'targeted feedback' refers to feedback according to the needs of a whole group, for example, to young people with risky alcohol and cannabis use, the term 'tailored feedback' refers to feedback that is individualized and tailored to a single-person's needs (Kreuter, 2000).

'Automated' computerized interventions may be combined with a brief session of counselling given by a real time 'counsellor' such as a psychologist or social worker at the other end of the electronic link (Kristjansdottir, 2013). In the case of early, computerized brief interventions, software programs can be used instead of health care professionals or other staff to screen effectively for substance use. This type of screening process is more anonymous and may thus encourage participants to give information that is more honest. Interventions that are consistent and of high quality can be provided via computers, tablets, or smart phones (including using the internet) and can give information tailored to the individual participant (Moyer, 2004).

Many computerized brief interventions consist of assessment, feedback and decision-making modules. The assessment module aims to classify the user as either a low, medium, high or a very high-risk drinker and provides recommendation on whether he or she might benefit from a more formal treatment program. The feedback module gives information on the user's score after each assessment and responds to the client's general reaction to such feedback. Initially, the decision-making module allows users to specify their level of readiness to change. Those who declare themselves ready to change get a menu of goal options. After deciding which goal option to follow, users are led through exercises to develop a plan of change, and are provided with references to additional web links, self-help groups and materials, and a list of therapists. Those who do not show a readiness to change get the option of receiving some basic information before ending the program (Moyer, 2004).

1.3.1 Impact of potential moderators that might amplify the effect of computerized brief interventions for certain subgroups

Gender and education might influence the effect of computerized brief interventions. For example, males and young adults with a higher level of education use digital devices more than females and young adults with a lower level of education (OECD, 2008). Males and adults with a higher level of education may therefore be more likely to benefit from computerized interventions because their experience is likely to have led to more efficient use of digital media.

1.4 HOW THE INTERVENTION MIGHT WORK

Brief interventions are suggested to work through two main mechanisms: (1) by making the clients think differently about their alcohol/cannabis use, and (2) by providing them with skills to change their behaviour if they are motivated to change.

It has been suggested that the assessment component of brief interventions alone might lead to behavioural change (Bien, 1993), particularly in emergency department settings (Longabaugh, 1995). In addition, studies drawing on time-line follow-back assessments have shown some reductions in the use of alcohol and other substances over time (LaBrie, 2006; Suffoletto, 2012).

1.5 WHY IT IS IMPORTANT TO DO THE REVIEW

Previous reviews and meta-analyses using "motivational interviewing" (MI) (Smedslund, 2011), internet-based interventions (Tait, 2010) and online alcohol interventions (White, 2010) have studied the effects of computerized brief interventions delivered as stand-alone or in combination with face-to-face interventions. First, Smedslund et al. (2011) focused on the effect of 'motivational interviewing' in general on substance abuse among persons who abused or were dependent upon substances, and included all individuals who met this criterion without limitation to age. Second, in their examination of the effect of fully automated internet-based interventions, Tait and Christensen (2010) limited their review to studies targeting young people under the age of 25 with problematic substance use. Moreover, they did not explicitly differentiate between specific substances, and focused solely on computerized brief interventions. Third, White et al. (2010) included studies on the effect of online-alcohol interventions more generally, without limitation to age and time range.

In general, these reviews have focused either on the universal prevention of problematic substance use, or on the treatment and rehabilitation of individuals who have established substance dependency. Most focus solely on computerized interventions, are limited to college students, and thus exclude other groups of young people who are not attending college.

The current review investigated whether stand-alone early, computerized brief interventions prevent the development of established alcohol and/or cannabis problems in young people aged 15-25 years showing risky behaviour but without established (diagnosed) substance abuse. Despite being a vulnerable age for those behaviours, this age group has not been systematically studied before.

2 Objectives

The objective of this review was to assess the effectiveness of early, computerized brief interventions on alcohol and cannabis use by young people aged 15 to 25 years who are high or risky consumers of either one or both of these substances by synthesizing data from randomized controlled trials.

3 Methods

3.1 CRITERIA FOR CONSIDERING STUDIES FOR THIS REVIEW

3.1.1 Types of studies

We included studies where units (e.g., persons, therapists, institutions) were allocated randomly or quasi-randomly to an early, computerized brief intervention and at least one other comparator condition. We included both efficacy studies (where the treatment was studied under ideal conditions) and effectiveness studies (where the treatment was studied under real-world conditions) where early, computerized brief interventions were used as a stand-alone treatment. Eligible comparators were no intervention, waiting list control or an alternative brief intervention, which may be computerized or delivered face-to-face.

We included only the following types of controlled trials:

- RCTs – randomized controlled trials where participants are randomly allocated to intervention and control group(s) by, for example, drawing lots or automatic algorithms.
- Cluster RCTs where groups of individuals are randomly allocated to intervention and control group(s).
- QRCTs – quasi-randomized controlled trials where participants are allocated to intervention and control group(s) by a non-random process, such as person's birth date, or the date of the week or month

We excluded studies using non-randomized procedures for allocation (such as self-selection).

3.1.2 Types of participants

Eligible participants were young people between 15 and 25 years of age who were defined as high or risky consumers of alcohol or cannabis, or both. We included studies of university students and of senior high school students even if no further information on age was provided. In the first year of college, you are a freshman, and freshmen are typically 18 years old. In the second, third and fourth year you are called sophomore, junior and senior, respectively. We excluded studies that stated only that the participants were 'young'.

Risky consumption of alcohol was defined in this review as either (a) consuming at least five (for males) or four (for females) drinks during any one drinking session, or (b) consuming more than fourteen (for males) or more than seven (for females) drinks a week (NIAAA, 2013). In the US, a

standard drink was defined as one that contains about 0.6 fluid ounces or 14 grams of ‘pure’ alcohol.

High or risky consumption of cannabis may be defined in different ways; whereas some scholars view risky consumption of cannabis as daily or near-daily use (Fischer, 2011), others use a broader definition to include those who consume cannabis at least once a week (Webb, 1996). In this review, we defined risky cannabis use among young people as the frequent consumption of cannabis at least once a week in the past month. As the focus of our review was on interventions to reduce risky alcohol and cannabis use, we excluded studies that did not exclusively focus on high-risk users.

Existing studies on the effect of computerized brief interventions on risky drug use have usually defined young people in a range 15 to 25 years (Bingham 2010; Voogt, 2011; Voogt, 2012), and we limited our target group accordingly. Studies with interventions aimed at reducing the use of other types of substances simultaneously (e.g. cocaine) were excluded unless the findings on risky alcohol or cannabis use were analyzed separately. If a study included young people over 25 years of age, we included it if the mean age was 25 years or less. If a study included young people under 15, we required that the mean age was not less than 15 years.

These inclusion criteria were chosen carefully, taking into account that the definition of ‘young people’ and the debut age for using alcohol and cannabis can vary between countries and cultures.

3.1.3 Types of interventions

For the purposes of this review, we defined ‘early intervention’ as being delivered at an early stage of substance use (an ‘indicated prevention’). An ‘indicated preventive strategy’ targets individuals at high-risk who have been identified as having minimal, but detectable signs foreshadowing alcohol and cannabis abuse (O'Connell, 2009). Early, computerized brief interventions appear to be an important tool to prevent the development of severe alcohol and cannabis use among young people at risk.

This review included all types of early, computerized brief interventions regardless of the type of electronic device, provider or theoretical framework.

This review only included ‘brief’ interventions defined as any preventive or therapeutic activity (such as is delivered by a health worker, psychologist, or volunteer worker) given within a maximum of four structured therapy sessions, each of short duration (Miller, 1992), that typically lasts between five and ten minutes with a maximum total time in treatment of one hour (Babor, 1994). In cases where duration of intervention was unclear, we included studies that had given participants feedback based on an assessment of their alcohol/ cannabis habits regardless of duration. Eligible comparator conditions were an alternative early, brief intervention, no intervention or waiting list control.

3.1.4 Types of outcome measures

3.1.4.1 Primary outcomes

- Alcohol use, measured by validated scales (e.g. the Daily Drinking Questionnaire [Collins, 1985], the Alcohol Timeline Followback [TLFB; Sobell, 1996]) or by self-report. The Daily Drinking Questionnaire measures the quantity and frequency of alcohol use by asking students to estimate the typical number of drinks consumed on each day of the week, averaged over the previous 3 months. The TLFB uses a calendar, with which people provide retrospective estimates of their daily drinking over a specified time period, which can vary up to 12 months from the interview date.

- Cannabis use, measured using a validated scale (e.g. Cannabis Abuse Screening Test [CAST]; Legleye, 2013), by self-report, or by an objective measure such as urine analysis or blood sample analysis.

We compared changes in use (e.g. frequency, quantity or peak consumption, occasions, drinking days) between intervention and comparators at baseline and at all follow-ups. Alcohol use and cannabis use were analyzed separately.

3.1.4.2 Secondary outcomes

- Any reported adverse outcomes.

3.1.5 Duration of follow-up

We examined outcomes at the following time points:

- short-term follow-up (up to and including six months after the intervention ends);
- long-term follow-up (more than 6 months post-intervention).

The exact duration of follow-up was recorded for each study.

3.2 SEARCH METHODS FOR IDENTIFICATION OF STUDIES

3.2.1 Electronic searches

We performed electronic searches of bibliographic databases, as well as on open websites and in the grey literature. By 'grey literature' we mean research that is not published in peer-reviewed journals such as dissertations, books, book chapters and technical reports. We had no publication, geographic, or language restrictions. See Appendix 1 for details about the search strategies. The following sources were searched (latest searches were in April 2016):

Bibliographic databases
MEDLINE (1946 to 2016)
PsycINFO (1806 to April week 2 2016)
EMBASE (1974 to 2016 week 16)
Cinahl (1937 to 2016)
The Cochrane Library (including the Cochrane Central Register of Controlled Trials (CENTRAL)) (1993 to Issue 3 of 12, March 2016)
ISI Web of Science (1975 to 2016)
SveMed+(1977 to 2016)
ERIC (1966 to 2016)
Social Services Abstracts (1980 to 2016)
Sociological Abstracts (1952 to 2016)

Grey literature
OpenGrey (1997 to 2013)
Proquest Dissertations & Theses (1637 to 2013)
International Clinical Trials Registry Platform (ICTRP) (2007 to 2013)
ClinicalTrials.gov

Searching other resources
We searched for ongoing studies in ClinicalTrials.gov and contacted experts in the fields to identify unpublished reports, on-going studies and studies that were not retrieved in the bibliographic search. We also examined the reference lists of included studies and relevant systematic reviews in the field.

We also set up an EBSCO host alert notification (EPAlerts@EPNET.COM) that continuously surveys the Cochrane Library (including CENTRAL), Medline and Embase. We received updated searches via email. This search was updated in May 2016. One researcher (GS) screened the new hits and ordered full texts of possibly relevant reports of studies. Another researcher (AS) independently assessed the full texts, and the two researchers discussed them for inclusion/exclusion. Data extraction and risk of bias assessments for the new included studies were done by GS and checked by AS.

3.3 DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We did not hand-search scientific journals or search all conference proceedings from INEBRIA (International Network on Brief Interventions for Alcohol & Other Drugs), because we believe that we have located all relevant studies through our other extensive search strategies. We did not include on-going studies.

For studies that reported more than one type of outcome, we chose only one outcome, using the priority: 1. consumption, 2. frequency, and 3. peak episode. We did this because we see total consumption as most important. Frequency data can mask differences between for example a young person who drinks one beer every day (frequency = 7/week) and another young person who drinks 20 beers on Saturday night and nothing on the other days of the week (frequency = 1/week). The number of drinks consumed on peak days and number of episodes of heavy drinking tell less about total consumption than the direct consumption outcome.

We did not include post-test data because only two studies, reported in one article, had reported post-test results (Murphy, 2010).

For the analysis, we had planned to impute missing values. We planned to clarify the method of imputation with a statistician. However, the statistician warned us against imputation and advised us to follow the Cochrane Handbook (Higgins & Green, 2011, Chapter 16.1.2) in which the first option is analyzing only the available data (i.e. ignoring the missing data). In the review, we analyze only the available data, but we assessed studies with large and unexplained attrition as high risk of bias.

We planned to analyse effects separately for studies including targeted feedback only, and for studies including both targeted and tailored feedback. However, it seems that all studies used tailored feedback, so we could not perform subgroup analysis on this variable.

We also planned to investigate the effect of baseline frequency of use/dose. However, most of the studies involved college students who were “at risk”, and in most studies it was not possible to extract exact doses/frequencies for subgroup analysis.

Other planned subgroup analyses included differences in participant characteristics such as gender, education, age, setting, and readiness to change at baseline. These were not performed, as there was very little between-study variation in age and setting; most participants were students of similar age at a university. The studies had not reported readiness to change data.

Finally, intensity or length/period of the intervention was a planned subgroup analysis. However, these were all brief computerized interventions in which the exact length of the intervention was mostly unknown, so therefore we did not perform a subgroup analysis on this variable.

After the protocol was published, we decided to include GRADE assessments of the quality of evidence.

3.4 DATA COLLECTION AND ANALYSIS

3.4.1 Selection of studies

The screening of studies proceeded in two phases. At level 1, two reviewers scanned the title and abstract of each reference and scored either “promote to next level”, “exclude”, or “can’t tell”. Only when both reviewers scored “exclude”, the reference was excluded at this level. If at least one reviewer scored “can’t tell” or “include”, the reference was promoted to level 2. References promoted to level 2 were ordered in full text and the same screening criteria were then applied. Two reviewers read the full texts and scored “include” or “exclude”. When there was disagreement, a third reviewer decided whether to include the study. We did not calculate the inter-rater reliability of individual coders’ ratings, but instead piloted a small number of references and discussed the screening practices as a group in order to develop high agreement between raters before we screened the rest of the studies.

3.4.2 Data extraction and management

Data from each study were extracted by two review authors using a specifically developed data extraction form (see Appendix 2) to record detailed information about authors, institutions, journal, participants, intervention, control conditions, research design, sample size, outcomes and results. We applied the same rules for dealing with disagreement as in the screening of titles and abstracts.

3.4.3 Main comparisons

For both alcohol and cannabis outcomes at short-term and long-term we used the following comparisons:

- Assessment and feedback versus no intervention
- Assessment and feedback versus assessment only
- Assessment and feedback versus education
- Comprehensive feedback versus brief feedback
- Computer feedback versus counselor feedback
- Comparison between two types of active interventions
- Feedback plus moderation skills versus feedback only
- Gender-specific feedback vs gender-neutral feedback
- Multi-dose assessment and feedback versus single-dose assessment and feedback

3.4.4 Assessment of risk of bias in included studies

Two review authors independently rated each selected study on the risk of bias (RoB) domains developed by the Cochrane Collaboration (Higgins & Green, 2011). Uncertainty or disagreement was resolved by discussion with a third review author. The criteria that we used to assess the risk of

bias are detailed in Appendix 3. We included studies regardless of their risk of bias, but downgraded for high risk of bias in the GRADE assessments.

3.4.5 Measures of treatment effect

We compared the outcomes of treatment and control groups at post-test and at short-term and long-term follow-up. For dichotomous data, we reported relative risks (risk ratios), and for continuous data, we reported standardised mean differences. In some cases, we reported rate ratios because the authors of the included studies have used this metric. We reported 95% confidence intervals along with all mean effect size estimates to represent statistical uncertainty in parameter estimates. We used the optimal information size (OIS; Poque, 1997) to assess whether the sample size was sufficient for concluding that there is a statistically significant overall effect in a meta-analysis. Using a two-sided alpha of 0.05 and power of 0.95, we calculated that a total sample size of 1,302 is necessary for detecting a small standardised mean difference (SMD) of 0.2. For SMDs of 0.5 (medium) and 0.8 (large), the OIS are 212 and 84, respectively.

3.4.6 Unit of analysis issues

In cluster-randomized trials one has to be careful to avoid unit-of analysis errors. The following may serve as an example: if the population of the study consists of a total of 100 risky alcohol users, distributed in four schools with 25 in each school, and two schools are randomized to the intervention and the other two to the control, the correct N to use in the analyses is not 100, but smaller. The effective sample size of a single intervention group in a cluster-randomized trial is its original sample size divided by a quantity called the design effect. A common design effect is usually assumed across intervention groups. The design effect is $1 + (m - 1) r$, where m is the average cluster size and r is the intra-cluster correlation coefficient (ICC).

In this review, we included one cluster-RCT, for which the data were corrected for clustering. If we include any cluster randomized controlled trials in future updates of this review, we will collect and report data corrected for clustering. If clustering is not accounted for in the primary reports, we will attempt to estimate the intra-cluster correlation. The total variance in the outcome can be partitioned into variance between groups (VBG) and variance within groups (VWG). The intra-cluster correlation is calculated as VBG/(VBG+VWG). The number of participants can be used in the analyses if the ICC is used as a correcting factor; however, the ICC is seldom reported in primary studies. For dichotomous data both the number of participants and the number experiencing the event can be divided by the same design effect (Higgins & Green, 2011).

3.4.7 Dependent outcomes from the same study

When a study reported several different measures of alcohol/cannabis consumption, we included only one outcome in the meta-analysis according to the following rule. If the study reported quantity of alcohol/cannabis use, we used this outcome. If quantity was not reported but frequency was reported, we used the frequency outcome. If quantity and frequency were not reported, we used heavy drinking/binge drinking outcomes.

3.4.8 Multi-arm studies

Some studies may include more than one intervention group and/or more than one control group. We mainly encountered two types of control groups: (1) a no intervention control, and (2) an assessment only control. The intervention groups were also mainly of two types: (1) computerized interventions and (2) therapist-led interventions. Finally, the computerized interventions could offer different doses (e.g. number of repetitions, intervention elements, comprehensive or brief feedback). In every case where there was more than one intervention group and/or more than one control group, we have stated in the Characteristics of Included Studies table the comparisons that we have analyzed.

3.4.9 Dealing with missing data

Effect sizes were calculated from means, standard deviations and N. Where effect sizes were not reported in sufficient detail, we contacted the authors of the primary studies. When this was unsuccessful, we attempted to retrieve effect size data from published meta-analyses, or to calculate effect sizes using Review Manager 5.3 or Comprehensive Meta-Analysis 3.0 software from information such as t-values. When these strategies were unsuccessful, we used the method described in Section 16.1.3 of the Cochrane Handbook (Higgins & Green, 2011).

3.4.10 Assessment of heterogeneity

We assessed heterogeneity among primary outcome studies statistics and discussed any observed heterogeneity and its magnitude. When assessing the quality of evidence, we graded down the quality for inconsistency according to the guidelines in the GRADE Handbook (http://www.guidelinedevelopment.org/handbook/), i.e. wide variance of point estimates across the studies, minimal or no overlap of confidence intervals, tests of heterogeneity, and the magnitude of I-square and tau-square (Higgins & Green, 2011).

3.4.11 Assessment of reporting biases

We searched for pre-published trial protocols and compared the published report with its corresponding protocol if that was available. This may help to detect selective outcome reporting. We scored this as part of our risk of bias assessment. In order to detect whether whole studies were missing (e. g. publication bias), we used funnel plots if there were 10 or more studies.

3.4.12 Data synthesis

We used RevMan 5 (Review Manager, 2014) software to perform meta-analysis using the generic inverse variance method when similar treatments were compared to similar comparators and similar outcomes were used at similar follow-up times. In each case, we discussed whether meta-analysis was appropriate until we reached consensus. We reported the results of meta-analyses using random-effects models because we expected that the studies were clinically heterogeneous

regarding participants, settings, interventions and outcomes. In cases where only one study had been included, we reported the results as a forest plot. When we could not calculate an effect size from the data reported in an included study, we used the authors' own description of the results.

All analyses comparing a brief intervention with an alternative brief intervention (two active interventions) were presented separately. We conducted separate analyses by control group type for comparisons between different passive interventions.

3.4.13 Subgroup analysis and investigation of heterogeneity

We investigated the following factors, with the aim of explaining any observed heterogeneity:

1) Characteristics of the control condition (no intervention, assessment only, other active intervention, etc.), and
2) Different time points (short- and long-term follow-up).

We classified the studies according to these variables in an attempt to identify possible sources of heterogeneity.

3.4.14 Sensitivity analysis

If the number of included studies was sufficient (more than 10), we assessed the impact of differing methodological quality by conducting sensitivity analyses. The following sensitivity analyses were planned a priori:

1. Randomized studies versus quasi-randomized studies (low risk of bias on generation of allocation schedule versus unclear or high risk).
2. Omitting trials with high or unclear risk of bias on attrition bias (incomplete outcome data)

4 Results

See the tables on characteristics of included studies (Appendix 4) and characteristics of excluded studies (Appendix 5) for detailed description of the studies.

4.1 DESCRIPTION OF STUDIES

4.1.1 Results of the search

The literature searches resulted in 7,553 hits (Figure 1) of which 7,111 resulted from the search of the electronic databases and 442 from our search for grey literature. After excluding duplicates and screening titles and abstracts for relevant references, we ordered 198 references in full text. After reviewing the full text, 60 studies met criteria for inclusion in this review. We included 53 studies on alcohol, three studies on cannabis, and four studies on both alcohol and cannabis.

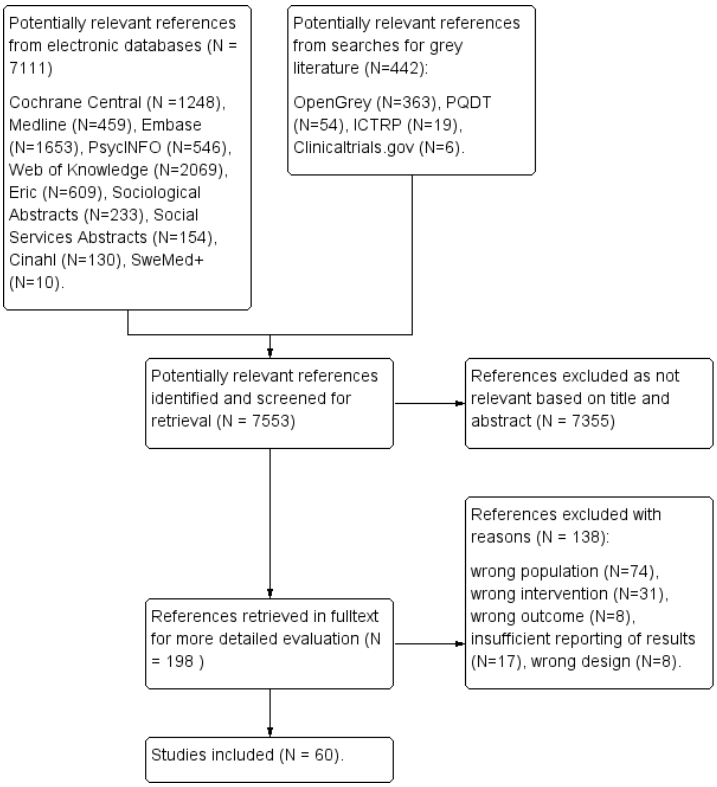


Figure 1: Flow diagram over inclusion of studies

4.1.2 Included studies

The included studies were published between 2004 and 2016. All but one study were RCTs with allocation of individuals. There was one cluster-RCT (Voogt 2013a). Most of the studies were conducted at a university or college (N = 51). The settings for the remaining studies were the general population (N = 5), and emergency departments (N = 4). The majority were from the US (N = 44), with others from New Zealand (N =4), the Netherlands (N =2), Sweden (N = 4), Australia (N = 2), Germany (N = 1), Switzerland (N = 1) and Brazil (N =1), and one study was conducted in several countries (Sweden, Belgium, the Czech Republic, and Germany). Sample sizes ranged from 18 to 3,422 (Mean = 555, SD = 668). Almost all studies focused on alcohol (N =53). Three studies examined effects of the intervention on cannabis, and four studies examined both alcohol and cannabis. The mean age in the studies varied between 16.3 and 25.4[1] years. In some studies, the age was not stated but the percentages of freshmen, sophomore, juniors and seniors were reported. The percentage of females varied between zero and 82. The proportion of Caucasians varied between 13.3 and 99.6 percent, but the percentage of non-Caucasians was not generally reported outside the US. The follow-up time varied between one week and 12 months. Fifty studies had follow-up of 0-6 months, and ten studies had follow-up of more than 6 months. The duration of the intervention was reported to be 0-10 minutes in seven studies, between 11 and 20 minutes in 13 studies, and between 21 and 60 minutes in 11 studies. In 29 studies, the exact duration time was not reported, but the description of the intervention indicated it met inclusion criteria as a brief intervention. The mode of delivery of most interventions was through a webpage (n = 47), while fewer studies used other modes of delivery such as telephone (n = 1), CD-rom (n = 2), e-mail (n = 3), offline tablet computer (n = 1), smartphone app (n = 1), text messages (n = 3), Facebook (n = 1), and chat program (n = 1).

In eight studies, it was reported that the intervention was delivered on the computer screen, with no further information available. In total, 40 studies lacked declaration of interest. In 15 studies, the authors declared that they had no conflict of interest, and in five studies they declared that they had such an interest.

4.1.3 Excluded studies

We excluded 138 studies after reviewing the full text. These excluded studies are listed Appendix 5, Characteristics of Excluded Studies. The reasons for exclusions were that the participants were not high-risk drinkers or cannabis users (n = 74), the intervention did not meet inclusion criteria (n = 31), the study design did not meet inclusion criteria (n = 8), authors did not report included outcomes (n = 8), or that an effect size was not reported and could not be computed (n = 17).

[1] This was, strictly speaking, outside our inclusion criterion for age – the mean age was 0.4 years too high, but we chose to include the study anyway.

4.2 RISK OF BIAS IN INCLUDED STUDIES

Figure 2 presents the risk of bias across all included studies. A significant risk of bias was judged to be present in each of the measured domains, the largest proportion of unclear risk being recorded for ‘Selective reporting' and the smallest for 'Blinding of outcome assessment’. The domains with the lowest risk of bias were 'Blinding of outcome assessment' and 'Random sequence generation'. The domains with largest proportion of high risk were ‘Blinding of participants and personnel’ and ‘Incomplete outcome data’. Only one study (Kypri, 2014) was judged to be at low risk of bias across all the measured domains (Figure 3).

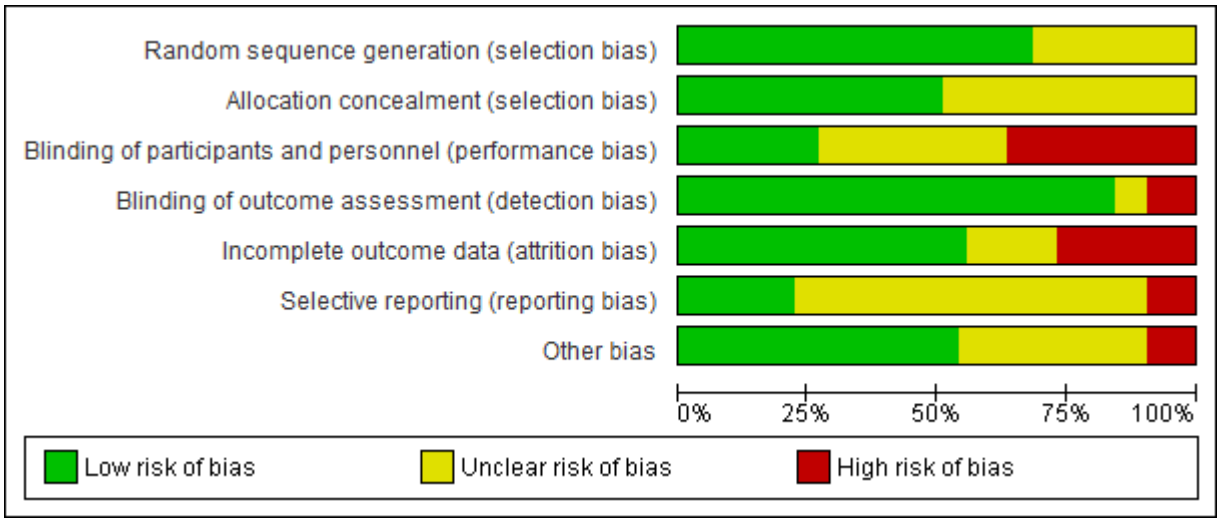


Figure 2: Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies

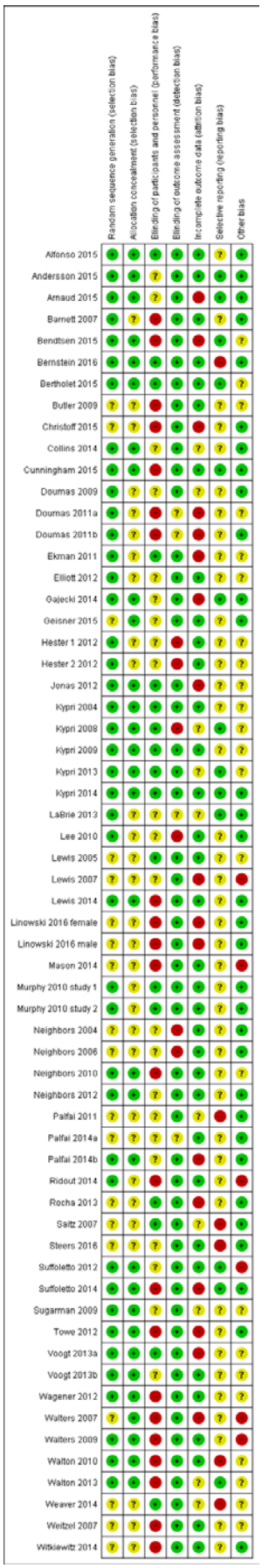


Figure 3: Risk of bias summary: review authors' judgements about each risk of bias item for each included study

4.2.1 Allocation (selection bias)

In approximately two thirds of the studies reported, the method of randomization was judged as adequate, but fewer than half reported that they had successfully concealed the allocation. A total of 29 studies were judged at low risk of bias for both sequence generation and allocation concealment.

4.2.2 Blinding (performance bias and detection bias)

Blinding of personnel was generally not an issue because of the nature of the intervention. The participants might be blinded in some cases, but not always. When participants were informed that they were allocated to a non-intervention control group or to a waiting list, they obviously were not blinded. But when the researchers told the participants that they would be randomized to one of two types of computerized intervention, it might have been hard for the participants to tell whether they were in the intervention or control group. Blinding of outcome assessment should not be a source of bias in studies in which the participants input data directly into a computer. We judged that lack of blinding (participants, providers or assessors) was a possible bias in 28 studies. Fifteen studies had a low risk of bias both for participants and outcome assessors, and none of the studies had a high risk for both blinding domains.

4.2.3 Incomplete outcome data (attrition bias)

In 17 studies, we noted a high risk of bias due to high attrition. In 11 studies the risk of bias was unclear, and in the remaining 34 it was judged to be at low risk.

4.2.4 Selective reporting (reporting bias)

For most of the studies (n = 43), the authors did not report a published protocol, and we could not locate it in trial registries. We judged that six studies had a high risk of reporting bias because of selective reporting. In these studies, we found no published protocol, and there was insufficient reporting of all outcomes mentioned in the study. In 14 studies we found that all the outcomes from the published protocol were fully reported in the article. Thus, in about 77 percent of the studies it was unclear whether there was selective reporting.

4.2.5 Other potential sources of bias

Other sources of bias were: author conflict of interest, social desirability bias, many repeated measurements, contamination bias, baseline differences, delay between assessment and feedback, differing incentives between groups, and different contact time between groups. Few studies (n = 6) had a high risk of other sources of bias, but for 23 studies the risk was unclear. In the remaining 32, the risk was low.

4.3 SYNTHESIS OF RESULTS

Overall, there were 53 studies targeting alcohol, three studies targeting cannabis, and four studies targeting both alcohol and cannabis that reported sufficient effect size data to be included in the meta-analyses. In 18 of the studies (Andersson, 2015; Bernstein, 2016; Butler, 2009; Cunningham, 2015; Gajecki, 2014; Kypri, 2008; LaBrie, 2013; Lewis, 2007; Murphy, 2010 study 2; Rocha, 2013; Steers, 2016; Suffoletto, 2012; Suffoletto, 2014; Wagener, 2012; Weaver, 2014; Witkiewitz, 2014; Christoff, 2015; Walton, 2013), there was more than one intervention group. We included the comparisons that were pre-planned, and we specified the comparison condition for each included study in the Characteristics of Included Studies table (Appendix 4).

We report results of the syntheses for short-term and long-term follow-up time points by primary outcome of interest (i.e., alcohol and cannabis). We also report subgroup analyses by type of comparison:

- Assessment and feedback versus no intervention
- Assessment and feedback versus assessment only
- Assessment and feedback versus education
- Comprehensive feedback versus brief feedback
- Computer feedback versus counsellor feedback
- Comparisons between two types of active interventions
- Feedback plus moderation skills versus feedback only
- Gender-specific feedback versus gender-neutral feedback
- Multi-dose assessment and feedback versus single-dose assessment and feedback

4.3.1 Studies targeting alcohol consumption

The results of effects of interventions are presented by comparisons grouped as passive control groups (no intervention or assessment only), other interventions as comparisons (education, brief feedback or counsellor feedback), two active comparisons, or other comparisons (e.g. gender specific feedback versus gender-neutral feedback).

4.3.1.1Assessment and feedback versus no intervention

Alcohol consumption short term

A meta-analysis of 15 studies found that assessment and feedback significantly reduced short-term alcohol consumption compared to no intervention (see Figure 4). The effect size is small (SMD: -0.17, 95% CI: -0.27 to -0.08, I-squared: 52 %). The quality of the evidence was low (Figure 3, Table 1). Publication bias is presented by using a funnel plot (see Figure 5). The funnel plot is not symmetrical, but we have not graded down for publication bias.[2]

[2] This was based on an overall assessment – if we had graded down for publication bias, the evidence would have been of very low quality, and we would have been forced to conclude that we know nothing about the effects of assessment and feedback versus no intervention despite there being 14 studies with 4,321 participants. This is not reasonable.

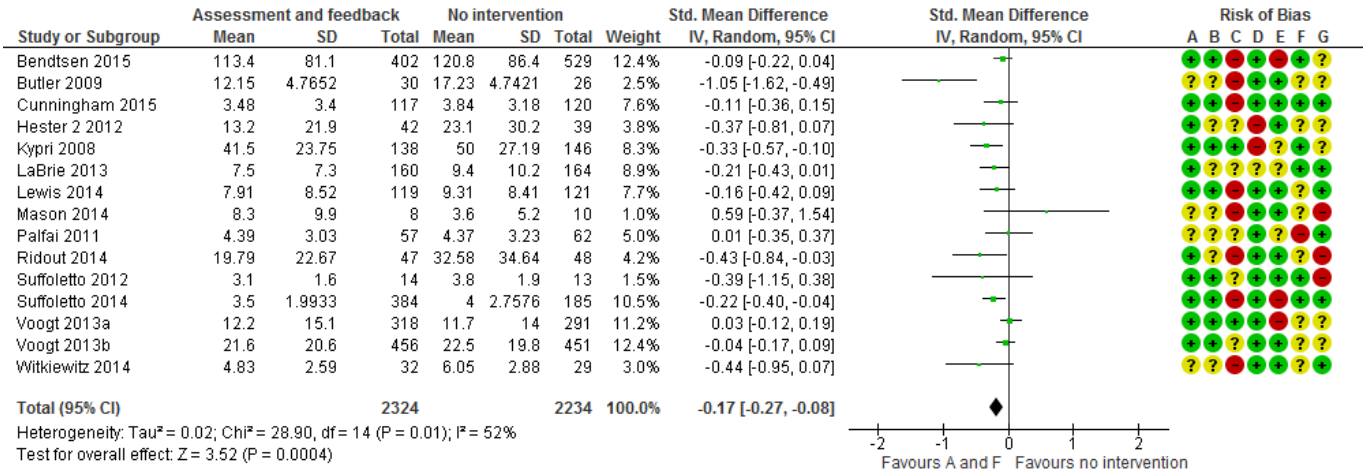


Figure 4: Assessment and feedback versus no intervention – alcohol consumption short term

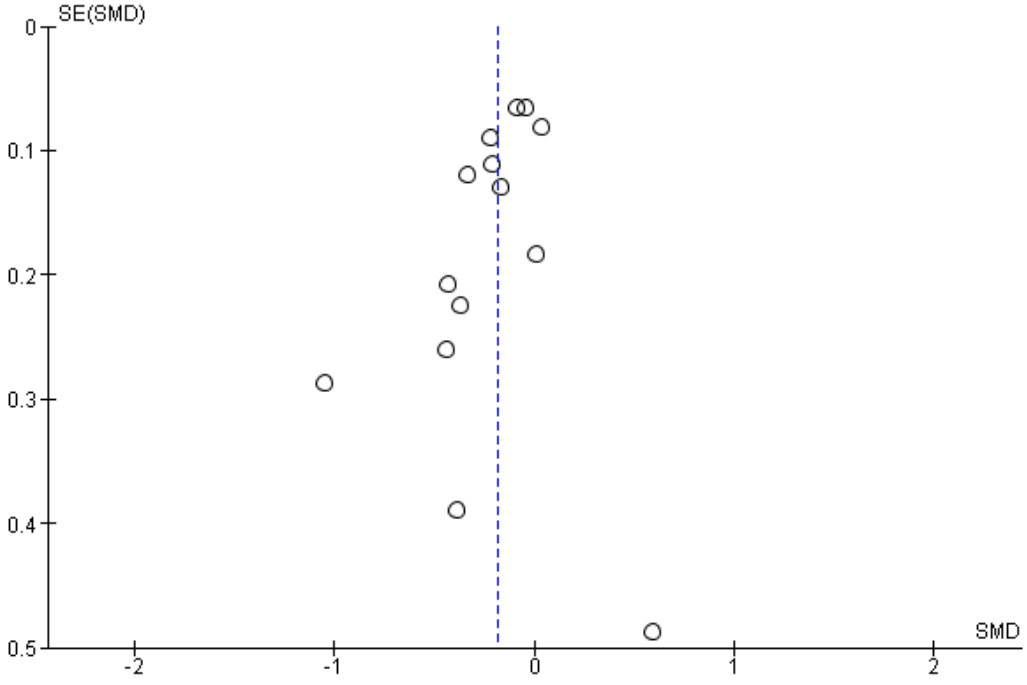


Figure 5: Assessment and feedback versus no intervention – Funnel plot

Alcohol consumption long term

For long-term alcohol consumption, there were only three studies. The effect size was of a similar magnitude (SMD: -0.17, 95% CI: -0.30 to -0.04) (Figure 6). The quality of the evidence was low (Table 1).

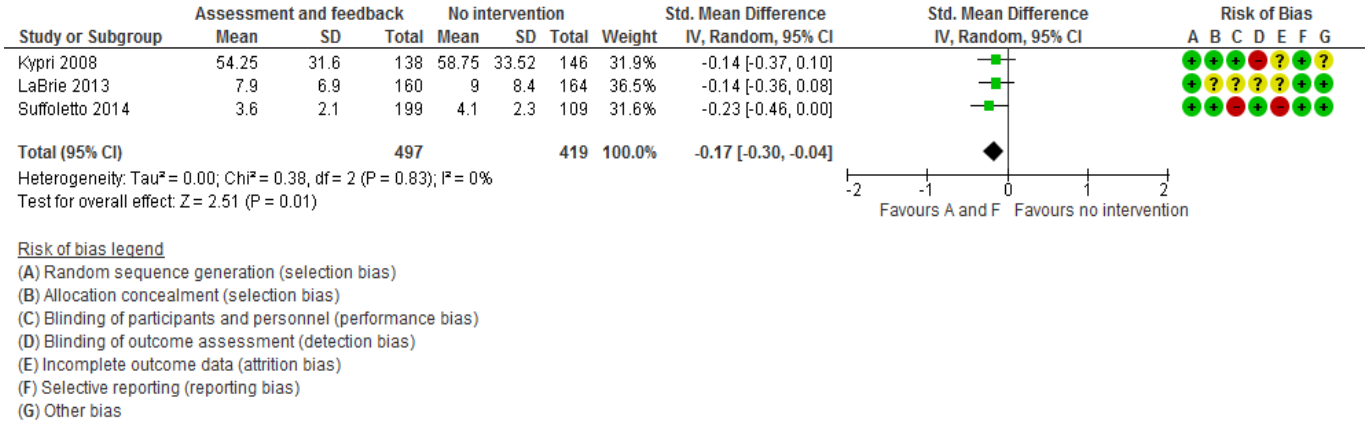


Figure 6: Assessment and feedback versus assessment only – alcohol consumption long term

Table 1: Assessment and feedback compared to no intervention for risky alcohol consumption short and long term

Outcomes	№ of participants (studies) Follow-up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with no intervention	Risk difference with assessment and feedback
Alcohol consumption short-term	4879 (14 RCTs)	⊕⊕◯◯ LOW [a,b]	-	-	SMD **0.18 SD lower** (0.29 lower to 0.08 lower)
Alcohol consumption long-term	916 (3 RCTs)	⊕⊕◯◯ LOW [c,d]	-	-	SMD **0.17 SD lower** (0.3 lower to 0.04 lower)

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; **SMD:** Standardised mean difference

GRADE Working Group grades of evidence

High quality: We are very confident that the true effect lies close to that of the estimate of the effect

Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different

Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect

Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

a. Unclear regarding randomization, blinding and selective reporting.

b. I-square is 59%. Non-overlapping confidence intervals.

c. High risk for blinding of outcome assessor. Unclear on incomplete outcome data.

d. From a moderate positive effect to no effect.

4.3.1.2 Assessment and feedback versus assessment only

Alcohol consumption short term

A meta-analysis of 24 studies[3] with 25 independent samples showed a similar effect size as in the comparison of computerized assessment and feedback versus assessment only (SMD: -0.15, 95% CI: -0.25 to -0.06) (Figure 7). The quality of the evidence was low (Table 2). I-square was 64 percent. The funnel plot was mainly symmetric with three outliers (Figure 8).

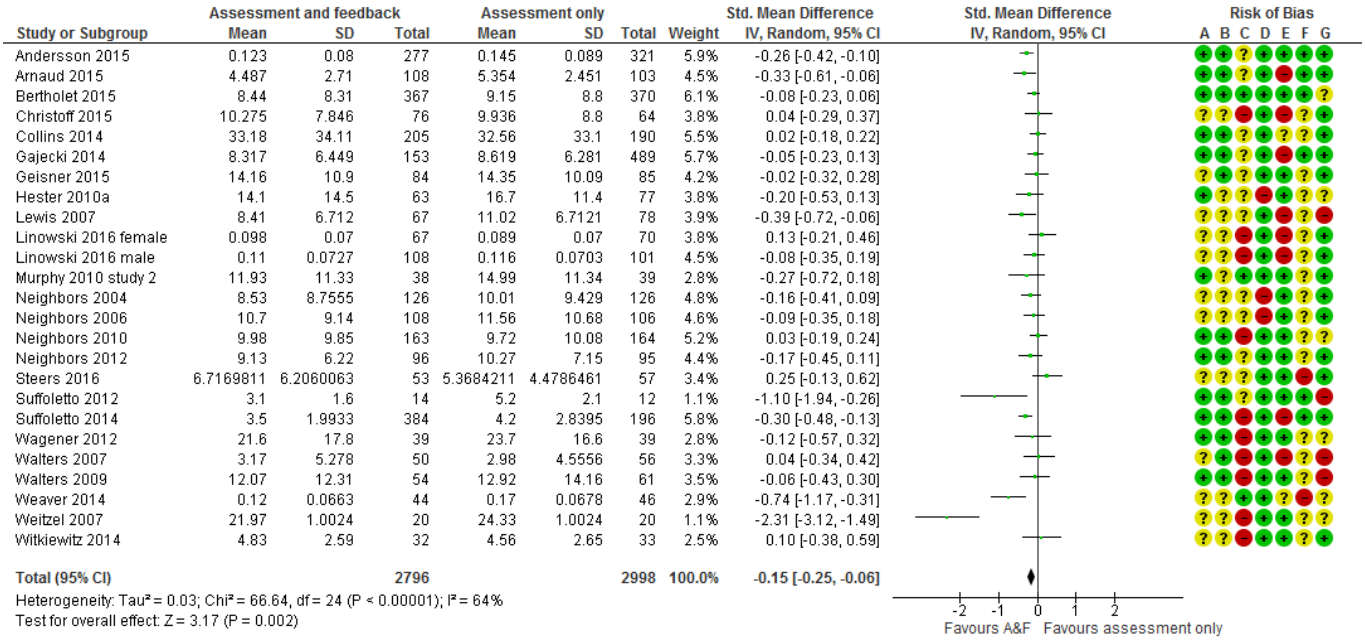


Figure 7: Assessment and feedback versus assessment only – alcohol consumption short term

[3] Actually 22 studies. We split the Linowski 2016 study on gender.

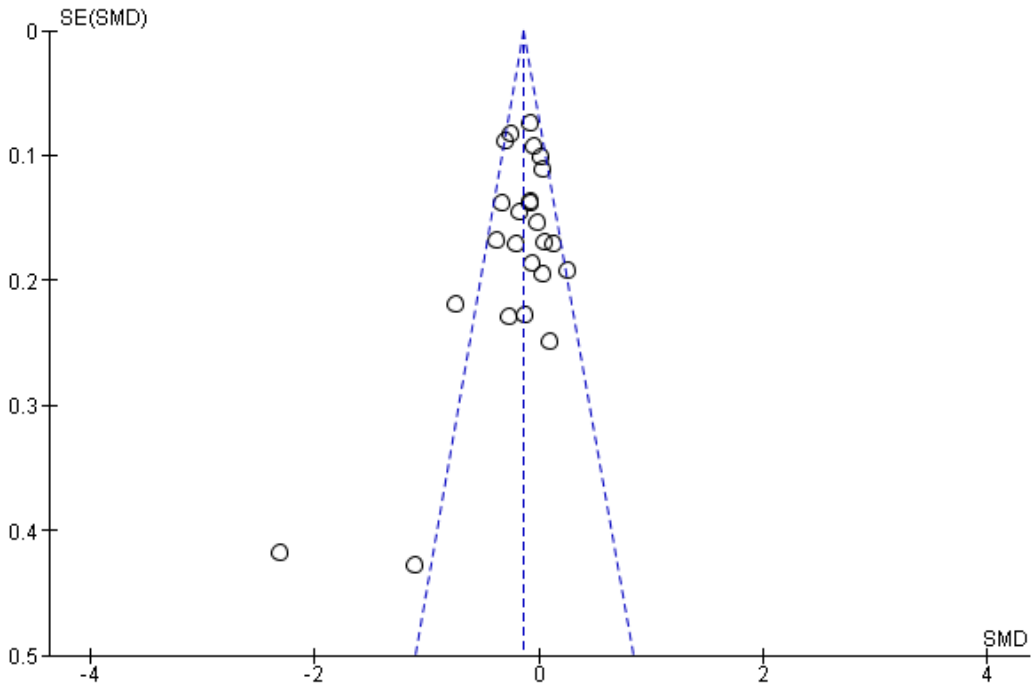


Figure 8: Assessment and feedback versus assessment only – alcohol consumption short term – funnel plot

Alcohol consumption long term

For the long-term follow-up there were only three studies, and there was no significant effect (SMD: -0.03, 95% CI: -0.19 to 0.12) (Figure 9). The evidence was of low quality (Table 2).

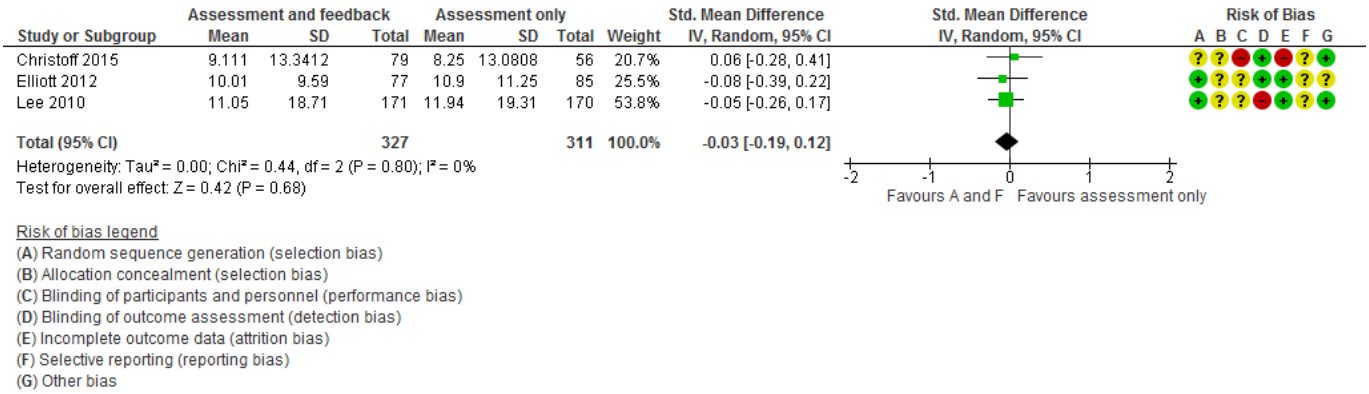


Figure 9: Assessment and feedback versus assessment only – alcohol consumption long term

Table 2: Assessment and feedback compared to assessment only for risky alcohol consumption, short and long term

Outcomes	№ of participants (studies) Follow-up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with assessment only	Risk difference with assessment and feedback
Alcohol consumption short-term	5432 (23 RCTs)	⊕⊕◯◯ LOW [a,b]	-	-	SMD **0.14 SD lower** (0.2 lower to 0.09 lower)
Alcohol consumption long-term	638 (3 RCTs)	⊕◯◯◯ VERY LOW [c,d,e]	-	-	SMD **0.03 SD lower** (0.19 lower to 0.12 higher)

a. Most studies have one or more items with high or unclear risk of bias.

b. I-square is 69%

c. Many items have unclear risk of bias

d. I-square is 85%

e. CI from large positive effect to large negative effect

4.3.1.3 Assessment and feedback versus education

Alcohol consumption short term

A meta-analysis of seven studies showed no significant short-term effect of assessment and feedback compared to education (SMD: -0.02, 95% CI: -0.21 to 0.17) (Figure 10). The evidence was of very low quality (Figure 3, Table 3).

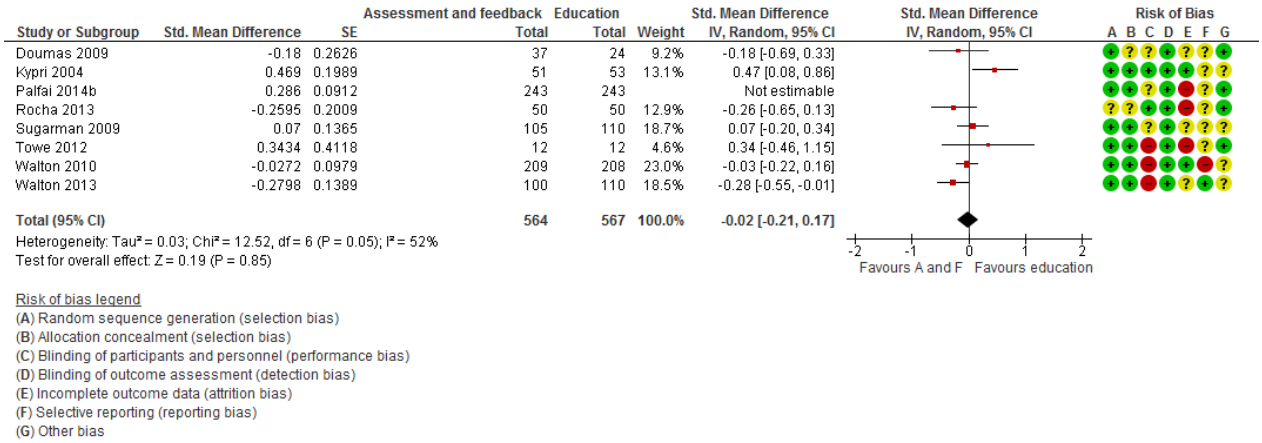


Figure 10: Assessment and feedback versus education – alcohol consumption short term

Alcohol consumption long term

One study (Walton 2013) did not find a significant long-term effect, but the effect size (SMD: -0.23, 95% CI: -0.51 to 0.04) was in favor of assessment and feedback over education. The evidence was of very low quality (Figure 3, Table 3).

Table 3: Assessment and feedback compared to education for risky alcohol or cannabis consumption, short and long term

Outcomes	№ of participants (studies) Follow-up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with education	Risk difference with assessment and feedback
Alcohol consumption short-term	1131 (7 RCTs)	⊕◯◯◯ VERY LOW [a,b,c]	-	-	SMD **0.02 SD lower** (0.21 lower to 0.17 higher)
Alcohol consumption long-term	210 (1 RCT)	⊕⊕◯◯ LOW [d,e]	-	-	SMD **0.23 lower** (0.51 lower to 0.04 higher)

a. High risk on blinding and attrition. Unclear risk on allocation concealment and selective reporting

b. I-square is 57%. Estimates are both positive and negative.

c. CI goes from a small effect to zero effect. Number of participants is only 586.

d. High risk on blinding and unclear risk on attrition.

e. The CI goes from a medium effect to zero effect.

4.3.1.4 Comprehensive feedback versus brief feedback

Alcohol consumption short term

Four studies directly compared a brief computerized intervention using comprehensive feedback to a computerized brief intervention using brief feedback. Hence, the comprehensive interventions were also brief, but the feedback was a little less brief than in the comparison group. A meta-analysis of four studies did not find an added short-term effect of comprehensive feedback compared to brief feedback (SMD: -0.01, 95% CI: -0.18 to 0.19) (Figure 11). The evidence was of low quality (Figure 3, Table 4).

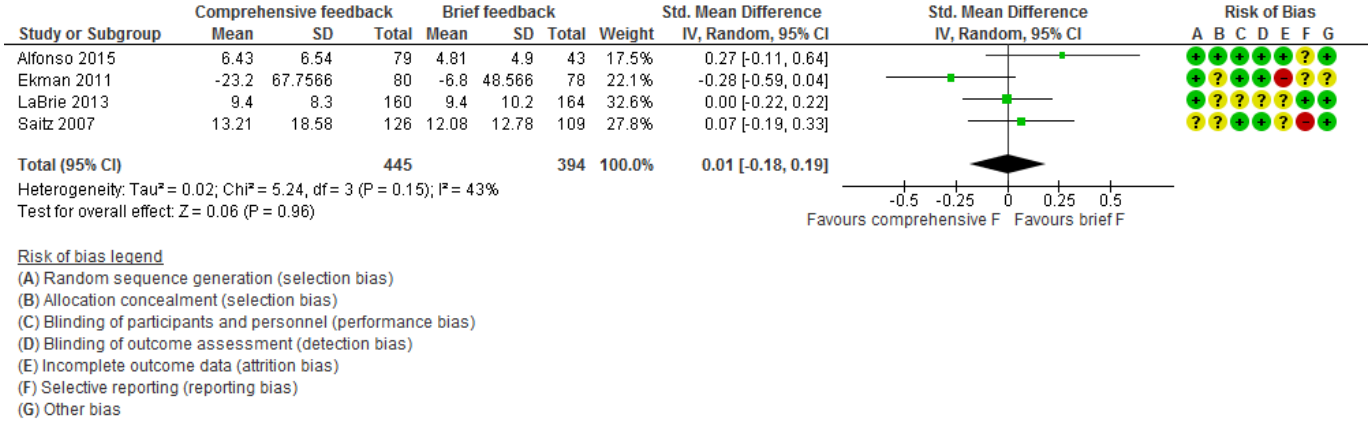


Figure 11: Comprehensive feedback versus brief feedback - Alcohol consumption short-term

Alcohol consumption long-term

One study (LaBrie 2013) also failed to show a long-term effect (SMD: -0.06, 95% CI: -0.28 to 0.16) (Figure 12); low quality evidence (Figure 3, Table 4).

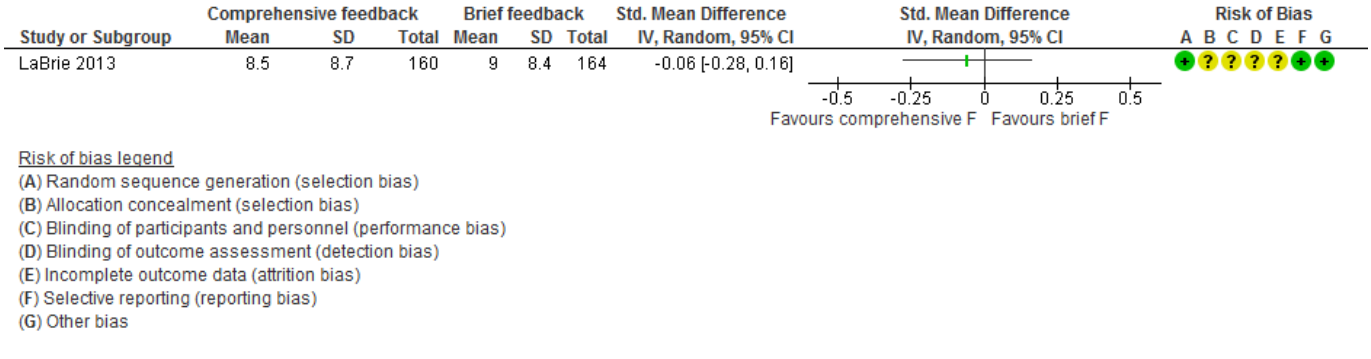


Figure 12: Comprehensive feedback versus brief feedback - Alcohol consumption long-term

Table 4: Comprehensive feedback compared to brief feedback for risky alcohol or cannabis consumption

Outcomes	№ of participants (studies) Follow-up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with brief feedback	Risk difference with comprehensive feedback
Alcohol consumption short-term	839 (4 RCTs)	⊕⊕◯◯ LOW [a,b]	-	-	SMD **0.01 SD lower** (0.18 lower to 0.19 higher)
Alcohol consumption long-term	324 (1 RCT)	⊕⊕◯◯ LOW [c,d]	-	-	SMD **0.06 lower** (0.28 lower to 0.16 higher)

a. High risk of bias on attrition and selective reporting. Unclear risk of bias for allocation concealment and blinding

b. CI goes from a small negative effect to almost a small positive effect.

c. Unclear risk of bias on allocation and attrition. High risk on selective reporting.

d. CI goes from a small negative effect to a small positive effect.

4.3.1.5 Computer assessment and feedback versus counsellor assessment and feedback

Alcohol consumption short term

A meta-analysis of six studies did not find that the short-term effect of computerized brief interventions is different from a brief intervention delivered by a counsellor (SMD: -0.10, 95% CI: -0.30 to 0.11) (Figure 13); very low quality evidence (Figure 3, Table 5). In addition, one study (Cunningham, 2015) reported incidence ratios (IR), which could not be entered in the meta-analysis. The IR for computer intervention versus control was 0.88 (95 % CI: 0.78 to 0.99) and for therapist feedback versus control it was 0.86 (95 % CI: 0.77 to 0.98). This is, thus, an indirect comparison between computer intervention and therapist intervention.

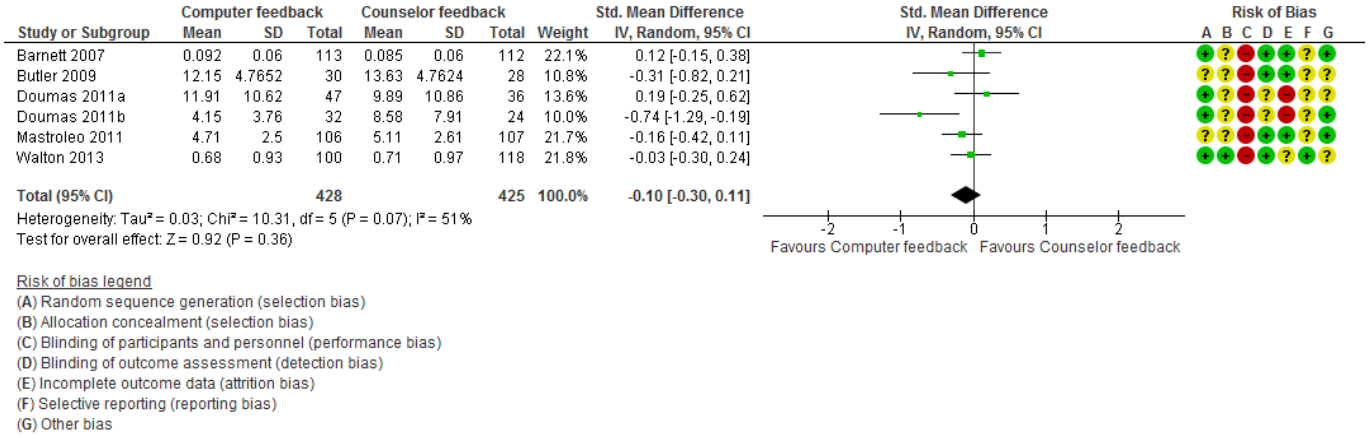


Figure 13: Computer feedback versus counsellor feedback - Alcohol consumption short-term

Alcohol consumption long term

The two studies with long-term effects also showed no difference (SMD: -0.11, 95% CI: -0.53 to 0.32 [Figure 14]; very low quality evidence [Figure 3, Table 5].)

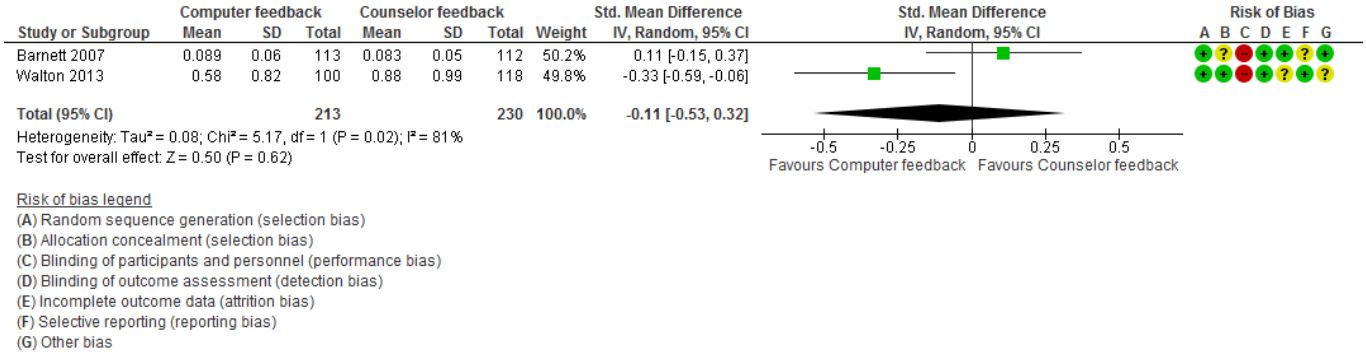


Figure 14: Computer feedback versus counsellor feedback - Alcohol consumption long term

Table 5: Computer feedback compared to counsellor feedback for risky alcohol or cannabis consumption, short and long term

Outcomes	№ of participants (studies) Follow-up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with counsellor feedback	Risk difference with computer feedback
Alcohol consumption short-term	853 (6 RCTs)	⊕◯◯◯ VERY LOW [a,b,c]	-	-	SMD **0.1 lower** (0.3 lower to 0.11 higher)
Alcohol consumption long-term	443 (2 RCTs)	⊕◯◯◯ VERY LOW [a,d,e]	-	-	SMD **0.11 lower** (0.53 lower to 0.32 higher)

a. High risk of bias on blinding. Unclear risk on allocation and selective reporting.

b. I-square is 51%. There is a mix of positive and negative effects.

c. The CI goes from a medium negative to a small positive effect.

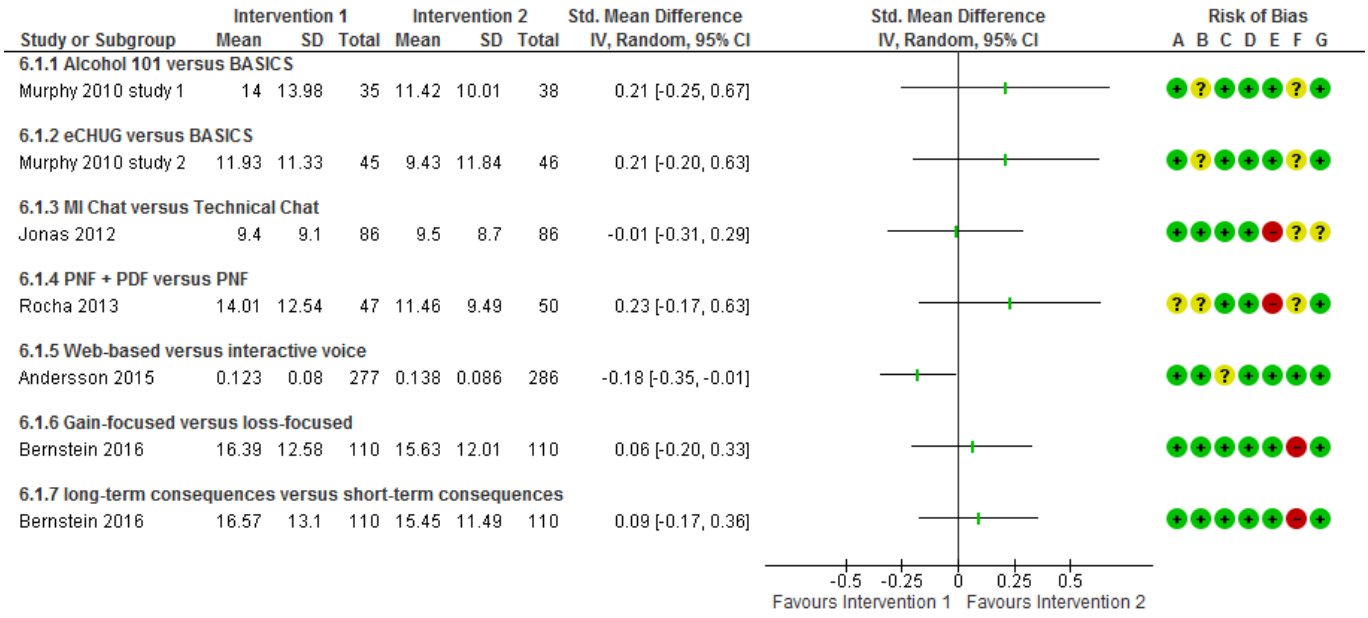
d. I-square is 81%. The two studies show effects in different directions.

e. CI goes from medium negative effect to almost a medium positive effect.

4.3.1.6 Comparisons between two types of computerized brief interventions

Alcohol consumption short term

We found six studies that compared two types of computerized brief interventions. BASICS (Brief Alcohol Screening and Intervention for College Students) did not have a different short-term effect than either Alcohol 101 (SMD: 0.21, 95% CI: -0.25 to 0.67) or eCHUG (SMD: 0.21, 95% CI: -0.20 to 0.63). A web chat based on motivational interviewing principles (MI Chat) had no different effect from a technical chat (SMD: -0.01, 95% CI: -0.31 to 0.29). Adding a personalized drinking feedback (PDF) to a personalized normative feedback (PNF) had no short-term effect on drinking (SMD: 0.23, 95% CI: -0.17 to 0.63). A web-based intervention had a small, significant short-term effect compared to an interactive voice-based intervention (SMD: -0.18, 95% CI: -0.35 to -0.01). There was no difference between a gain-focused and a loss-focused message (SMD: 0.06, 95% CI: -0.20 to 0.33), or between a message focusing on long-term consequences and a message focusing on short-term consequences (SMD: 0.09, 95% CI: -0.17 to 0.36). All the comparisons are presented in Figure 15, but they are not meta-analyzed because the comparisons are all different. All the evidence about short-term outcomes between two active interventions was of low quality (Figure 3, Table 6), and we did not find any studies with long-term effects for this comparison.



Risk of bias legend
(A) Random sequence generation (selection bias)
(B) Allocation concealment (selection bias)
(C) Blinding of participants and personnel (performance bias)
(D) Blinding of outcome assessment (detection bias)
(E) Incomplete outcome data (attrition bias)
(F) Selective reporting (reporting bias)
(G) Other bias

Figure 15: Comparisons between two types of computerized brief interventions – Alcohol consumption short term

Table 6: One active intervention compared to another active intervention for risky alcohol consumption

Outcomes	№ of participants (studies) Follow-up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with another active intervention	Risk difference with one active intervention
Alcohol consumption short-term	1216 (6 RCTs)	⊕⊕◯◯ LOW [a,b]	-	not pooled	not pooled

a. High risk of bias on attrition. Unclear risk of bias for allocation concealment and selective reporting.

b. Six studies that could not be pooled.

4.3.1.7 Feedback plus moderation skills versus feedback only

Alcohol consumption short term

We included two studies that explored the short-term effect of adding moderation skills training to feedback, and they found a small to moderate effect size (SMD: -0.26, 95% CI: -0.49 to 0.03 [Figure 16]; low quality evidence [Figure 3, Table 7]).

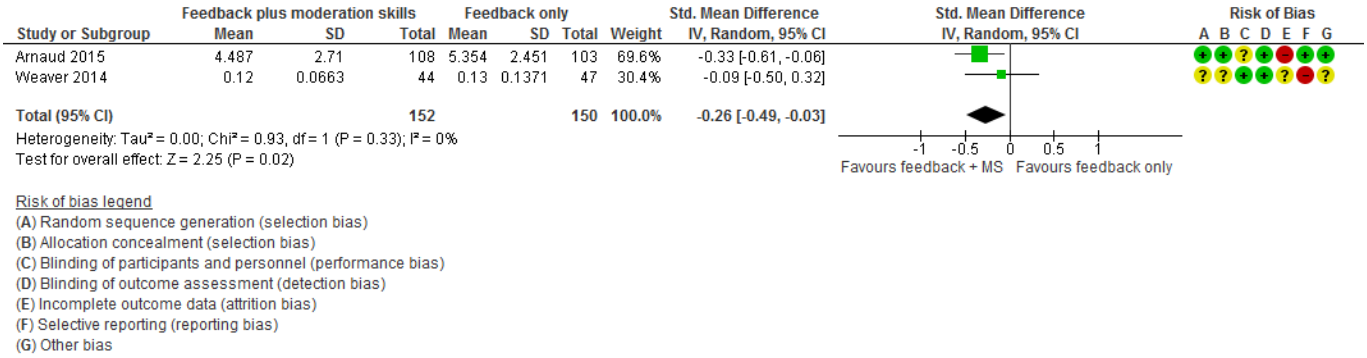


Figure 16: Feedback plus moderation skills versus feedback only - Alcohol consumption short-term

Table 7: Feedback plus moderation skills compared to feedback only for risky alcohol consumption

Outcomes	№ of participants (studies) Follow-up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with feedback only	Risk difference with feedback plus moderation skills
Alcohol consumption short-term assessed with: Estimated blood-alcohol content	302 (2 RCTs)	⊕⊕◯◯ LOW [a,b]	-	-	SMD **0.26 SD lower** (0.49 lower to 0.03 lower)

a. High risk of bias for selective reporting. Unclear risk for allocation and attrition

b. N=87. CI from medium negative effect to small positive effect.

4.3.1.8 Gender-specific feedback versus gender-neutral feedback

Alcohol consumption short term

We found three studies comparing gender-specific feedback with gender-neutral feedback. A meta-analysis of three studies indicate a small, but not statistically significant effect (SMD: -0.14, 95% CI: -0.30 to 0.03) (Figure 17), and the evidence was of low quality (Figure 3, Table 8).

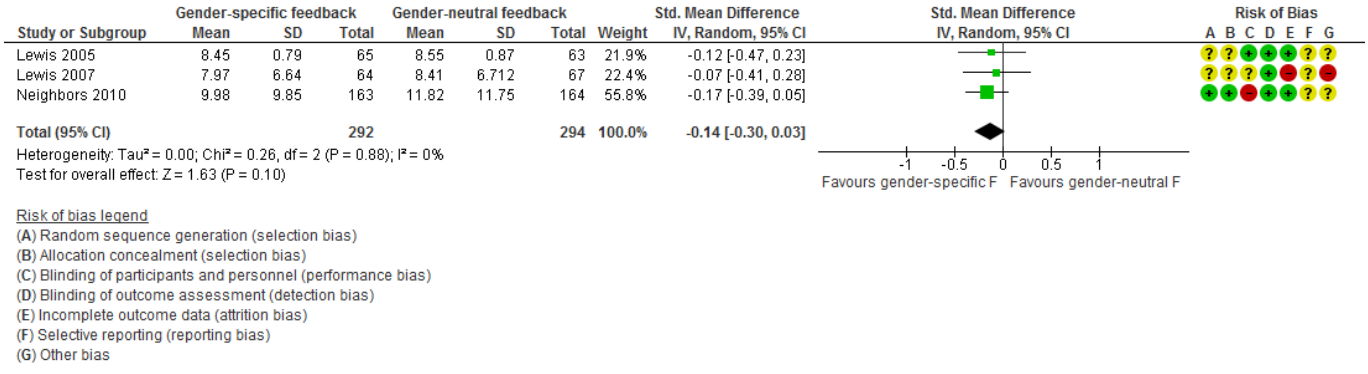


Figure 17: Gender-specific feedback versus gender-neutral feedback - Alcohol consumption short-term

Alcohol consumption long term

Neighbors (2010) found a similar result for a long-term follow-up (SMD: -0.19, 95% CI: -0.41 to 0.02), low quality evidence [Figure 3, Table 8]).

Table 8: Gender-specific feedback compared to gender-neutral feedback for risky alcohol or cannabis consumption, short and long term

Outcomes	№ of participants (studies) Follow-up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with gender-neutral feedback	Risk difference with gender-specific feedback
Alcohol consumption short-term	586 (3 RCTs)	⊕⊕◯◯ LOW [a,b]	-	-	SMD **0.14 lower** (0.3 lower to 0.03 higher)
Alcohol consumption long-term	327 (1 RCT)	⊕⊕◯◯ LOW [c,d]	-	-	SMD **0.19 lower** (0.41 lower to 0.02 higher)

a. High risk of bias for attrition and blinding. Unclear risk for allocation and selective reporting.

b. CI from -0.3 to zero.

c. High risk of bias for blinding and unclear risk for selective reporting.

d. N= 327.

4.3.1.9 Multi-dose assessment and feedback versus single-dose assessment and feedback

Alcohol consumption short term

A meta-analysis of four studies by the same first author found a 16 percent significant short-term reduction in drinking after a repeated assessment and feedback compared to a single assessment and feedback (Rate ratio: 0.84, 95% CI:
0.78 to 0.91) (Figure 18). The quality of evidence was moderate (Figure 3, Table 9). In addition, a study by Anderson (2015) found an SMD of 0.10 (in favour of single dose, 95 % CI: -0.07 to 0.27).

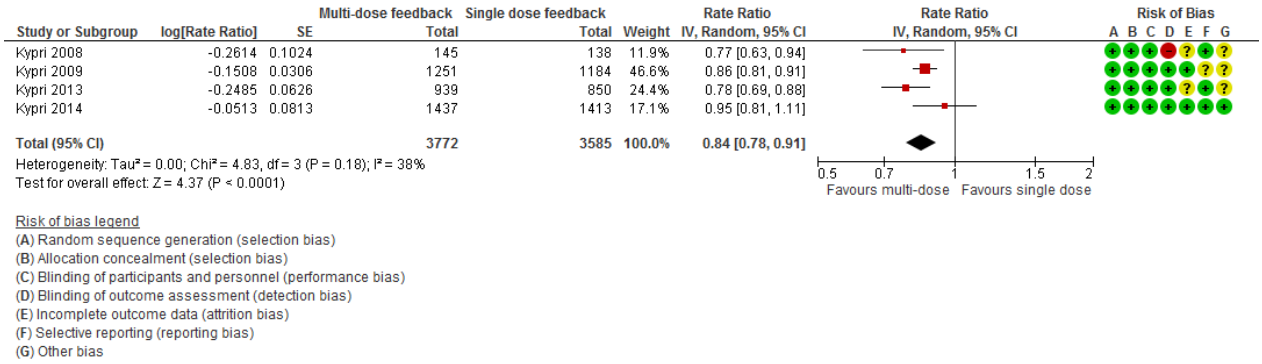


Figure 18: Multi-dose assessment and feedback versus single-dose assessment and feedback Alcohol consumption short-term (rate ratio)

Alcohol consumption long term (rate ratio)

A study by Kypri (2008) found a long-term, significant reduction in drinking after multi-dose feedback compared to single-dose feedback (Rate ratio: 0.77, 95% CI: 0.63 to 0.94).

Table 9: Multi-dose assessment and feedback compared to single dose assessment and feedback for risky alcohol or cannabis consumption

Outcomes	№ of participants (studies) Follow-up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with single dose assessment and feedback	Risk difference with multi-dose assessment and feedback
Alcohol consumption short-term	7357 (4 RCTs)	⊕⊕⊕◯ MODERATE [a]	**Rate ratio 0.84** (0.78 to 0.91)	**Low**	
				0 per 1 000	**0 fewer per 1 000** (0 fewer to 0 fewer)
Alcohol consumption long-term	283 (1 RCT)	⊕⊕◯◯ LOW [b,c]	**Rate ratio 0.77** (0.63 to 0.94)	0 per 1 000	**0 fewer per 1 000** (0 fewer to 0 fewer)

a. High risk for blinding of outcome assessment. Unclear risk for selective reporting and attrition.

b. High risk of bias for blinding of outcome assessment and unclear risk for incomplete outcome data.

c. N=283

4.3.2 Studies Targeting Cannabis Consumption

4.3.2.1 Assessment and feedback versus no intervention

Cannabis consumption short term

Palfai et al. (2014) did not find that the program eCHECKUP TO GO outperformed the control group (SMD: -0.25, 95% CI: -0.64 to 0.14; low quality evidence [Figure 3, Table 10]).

Table 10: Assessment and feedback compared to no intervention for risky cannabis consumption

Outcomes	№ of participants (studies) Follow-up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with no intervention	Risk difference with assessment and feedback
Cannabis consumption short-term	103 (1 RCT)	⊕⊕◯◯ LOW [a,b]	-	-	SMD **0.25 lower** (0.64 lower to 0.14 higher)

a. Unclear randomization, blinding and selective reporting

b. Confidence interval goes from a large beneficial effect to almost a moderate harmful effect.

4.3.2.2 Assessment and feedback versus assessment only

Cannabis consumption short term

A meta-analysis with three studies (Figure 19) did not find any short-term effect of adding feedback to assessment only (SMD: -0.03, 95% CI: -0.19 to 0.12; low quality evidence [Table 11]).

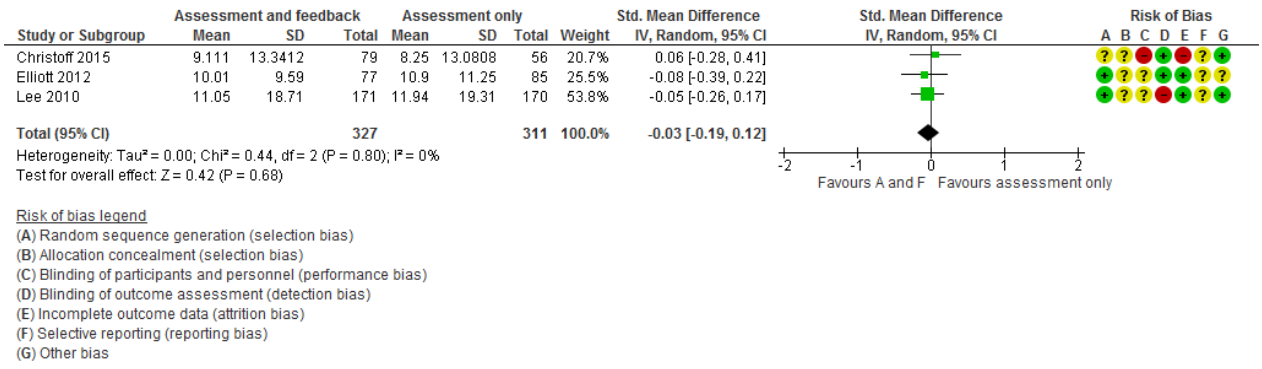


Figure 19: Assessment and feedback versus assessment only - Cannabis consumption short-term

Table 11: Assessment and feedback compared to assessment only for risky cannabis consumption

Outcomes	№ of participants (studies) Follow-up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with assessment only	Risk difference with assessment and feedback
Cannabis consumption short-term	638 (3 RCTs)	⊕⊕◯◯ LOW [a,b]	-	-	SMD **0.03 SD lower** (0.19 lower to 0.12 higher)

a. Unclear to high risk for blinding and attrition.

b. Confidence interval goes from medium beneficial effect to an effect in favour of the control group.

4.3.2.3 Assessment and feedback versus education

Cannabis consumption short term

Two studies compared assessment and feedback to education and found an SMD of -0.08, (95% CI: -0.33 to 0.18) (Figure 20). The quality of evidence was low (Table 12).

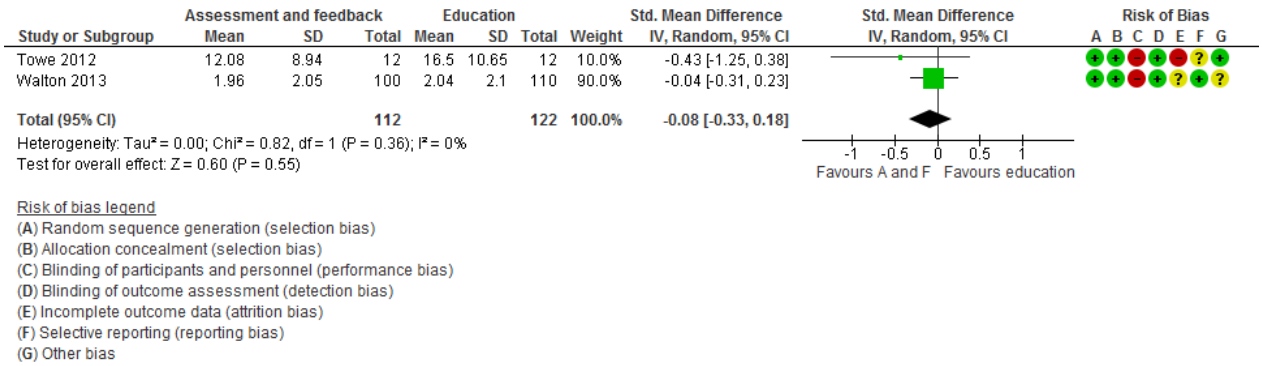


Figure 20: Assessment and feedback versus education - Cannabis consumption short-term

Cannabis consumption long term

One study by Walton (2013) found no difference in cannabis consumption with long-term follow-up (SMD: -0.05, 95% CI: -0.32 to 0.23; low quality evidence [Figure 3, Table 12]).

Table 12: Assessment and feedback compared to education for risky cannabis consumption – short and long term

Outcomes	№ of participants (studies) Follow-up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with education	Risk difference with Assessment and feedback
Cannabis consumption short-term	234 (2 RCTs)	⊕⊕◯◯ LOW [a,b]	-	-	SMD **0.08 SD lower** (0.33 lower to 0.18 higher)
Cannabis consumption long-term	210 (1 RCT)	⊕⊕◯◯ LOW [a,b]	-	-	SMD **0.05 lower** (0.32 lower to 0.23 higher)

a. High risk on blinding and unclear on attrition.

b. Confidence interval goes from small beneficial effect to small harmful effect.

4.3.2.4 Comprehensive feedback versus brief feedback

No studies targeted cannabis for this comparison.

4.3.2.5 Computer assessment and feedback versus counsellor assessment and feedback

Cannabis consumption short-term

Walton et al. (2013) did not find a short-term difference between computer feedback and counsellor feedback (SMD: -0.21, 95% CI: -0.48 to 0.06).

Cannabis consumption long-term

Walton (2013) found a significant small long-term effect favouring computer feedback (SMD: -0.27, 95% CI: -0.53 to 0.00; low quality evidence [Figure 3, Table 13]).

Table 13: Computer feedback compared to counsellor feedback for risky cannabis consumption

Outcomes	№ of participants (studies) Follow-up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with counselor feedback	Risk difference with computer feedback
Cannabis consumption short-term	218 (1 RCT)	⊕⊕◯◯ LOW [a,b]	-	-	SMD **0.21 lower** (0.48 lower to 0.06 higher)
Cannabis consumption long-term	218 (1 RCT)	⊕⊕◯◯ LOW [a,c]	-	-	SMD **0.27 lower** (0.53 lower to 0)

a. High risk for blinding of participants. Unclear risk for incomplete outcome data and other bias.

b. CI goes from medium effect favouring computer to small effect favouring counselor.

c. CI goes from medium effect favouring computer to a zero effect.

4.3.2.6 Comparisons between two types of active interventions

Cannabis consumption short-term

Jonas et al. (2012) did not find a difference between a chat based on motivational interviewing and a chat with technical information on short-term cannabis consumption (SMD: -0.08, 95% CI: -0.75 to 0.58; low quality evidence [Figure 3, Table 14]).

Table 14: One active intervention compared to another active intervention for risky cannabis consumption

Outcomes	№ of participants (studies) Follow-up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with another active intervention	Risk difference with one active intervention
Cannabis consumption short-term	35 (1 RCT)	⊕⊕◯◯ LOW [a,b]	-	-	SMD **0.08 lower** (0.75 lower to 0.58 higher)

a. High risk on attrition. Unclear risk on allocation concealment and selective reporting.

b. Small sample and wide confidence interval.

4.3.2.7 Feedback plus moderation skills versus feedback only

No studies targeted cannabis for this comparison.

4.3.2.8 Gender-specific feedback versus gender-neutral feedback

No studies targeted cannabis for this comparison.

4.3.2.9 Multi-dose assessment and feedback versus single-dose assessment and feedback

No studies targeted cannabis for this comparison.

4.3.3 Adverse outcomes

We did not find any evidence of adverse effects of computerized brief interventions in this review.

4.3.4 Subgroup analyses

We analyzed the different types of control groups separately and reported in sections 4.3.1 and 4.3.2.

4.3.5 Sensitivity analyses

Results of sensitivity analyses are reported in Table 15. Limiting the analyses to only studies with low risk of bias increased the effect size in some cases and reduced it in other cases, but it did not change conclusions in any case. The I-squared also increased in some cases and decreased in others.

Table 15: Sensitivity analyses of bias type and intervention

Type of bias	Control group		SMD	95% CI	I-squared
Selection bias	No intervention control	All studies:	-0.18	-0.29 to -0.08	55%
		Only low risk of bias	-0.12	-0.21 to -0.02	39%
	Assessment only control	All studies	-0.14	-0.19 to -0.08	65%
		Only low risk of bias	-0.14	-0.21 to -0.08	47%
Attrition bias	No intervention control	All studies	-0.18	-0.29 to -0.08	55%
		Only low risk of bias	-0.30	-0.53 to -0.07	64%
	Assessment only control	All studies	-0.14	-0.19 to -0.08	65%
		Only low risk of bias	-0.13	-0.20 to -0.06	70%

5 Discussion

5.1 SUMMARY OF MAIN RESULTS

Alcohol: Overall, the mean effects on alcohol consumption for participants who received computerized interventions compared to participants who received either no intervention or an active non-computerized intervention were small to moderate (Cohen, 1988). It seems that providing assessment and feedback via digital applications might be more effective compared to both no intervention and to assessment only in the short term. We also found a difference between gender-specific computerized feedback and gender-neutral computerized feedback, and that multi-dose assessment and feedback works better than a single-dose. However, caution must be used when applying these results, as the evidence is mostly of low to very low quality, and therefore the true effects might be different from the observed ones. Most of the evidence comes from studies on alcohol. The few studies on cannabis did not show significant effects of any intervention.

Cannabis: The evidence for effects of computerized brief interventions on cannabis consumption is much scarcer than for alcohol. The few included studies indicate that there may be a slight effect compared with no intervention control, and there may be little of no effect compared to assessment only. There may be little or no difference between two active interventions on cannabis consumption.

5.2 OVERALL COMPLETENESS AND APPLICABILITY OF EVIDENCE

The participants in the included studies were mostly American university or college students; therefore, the results cannot necessarily be applied to populations outside the US or to young people who are not university or college students. Moreover, most of the studies seem to have used up-to-date digital technology, such as application software (i.e., an ”app”) for smart phones and tablet computers. Only a small minority of the studies used CD-ROMs, which now must be considered an outdated technology. Using an app on smart phones and tablet computers compared to stationary computers makes the intervention more mobile and accessible. The results cannot be generalized to digital platforms other than those examined.

5.3 QUALITY OF THE EVIDENCE

Forty-one (68 %) of the studies were judged to have some risk of bias, either because the participants were not adequately blinded, the assessors were not blinded, the attrition was high, unbalanced or unexplained, or we suspected selective reporting. Most of the evidence comes from relatively small studies. Because of this, we downgraded most of the evidence due to imprecision. Exceptions are three large studies by Kypri et al. (Kypri, 2009; Kypri, 2013; Kypri, 2014) which

included more than 7,000 participants. Some of the meta-analyses had high heterogeneity, and we therefore downgraded these because of inconsistency (Appendix 4).

5.4 POTENTIAL BIASES IN THE REVIEW PROCESS

One of the strengths of this review is that we employed a systematic literature search, and we are confident that we found most of the randomized controlled trials relevant for our review question published up to April 2016. However, it was difficult to employ the criteria for defining a brief intervention to computerized interventions. We had difficulty assessing the duration/ frequency of use in such interventions. In most cases, the studies did not report the number of times a person had logged into an application, or how much time a person had spent on the application. Assessing the exposure to the intervention is easier in non-computerized interventions when one can count how many group sessions/lectures/etc. people have attended. Our solution was to include a study if it assessed the participants' drinking habits and provided (normative) feedback on these habits regardless of the duration.

A second strength is that we used double data screening and data extraction. A limitation of the present review (and of most systematic reviews) is that the risk of bias assessments are based on the reporting of the studies and not on their actual conduct. It is also difficult to know if the participants knew whether they were allocated to the potentially most effective group. There was generally no information about what the participants were told before the intervention. It is difficult to know whether the technology is old or new from the descriptions. A web page in 2016 is very different from a web page in 1995, and the information is much more accessible in 2016 than in 1995. For instance, describing the delivery of the intervention as ”a computer at the research facility” does not tell us about the technology used. Perhaps the best indicator of technology used is the year the study was conducted.
Finally, because only a few studies had pre-registered a protocol, we were mostly uncertain whether selective reporting could have been a source of bias.

5.5 AGREEMENTS AND DISAGREEMENTS WITH OTHER STUDIES OR REVIEWS

Our systematic literature searches found nine systematic reviews published between 2008 and 2015 that investigated a review question similar to ours.
Carey's meta-analysis (Carey, 2009) studied computer-delivered interventions (CDIs) and concluded that: ”CDIs reduce the quantity and frequency of drinking among college students”. These results are similar to our findings. Carey et al.'s significant effect sizes are between 0.10 and 0.16, and this is smaller than many of our effect sizes. A more recent meta-analysis of 48 studies by the same first author concluded that computerized interventions were effective compared to a control group, but that face-to-face interventions were more effective than computerized interventions (Carey, 2012).

The meta-analysis conducted by Tait and Christensen on alcohol found an overall effect of internet-based interventions of [Cohen's] d = -0.22 (Tait, 2010). It is difficult to compare Tait and Christensen's review with ours because they did not include a forest plot, and many outcomes, follow-up times, and comparisons were not analyzed separately. Moreover, they did not assess the methodological quality of their included studies. Another review by the same first author found an effect size of 0.16 for cannabis use (Tait, 2013). We did not find any significant effect on cannabis consumption in the present review. The population in Tait's review was younger than 15 years in half of the studies. We do not have any other explanation for the discrepancy between Tait's results and our results. A review by White et al. (2010) did not conduct a meta-analysis. They reported a range of change scores in alcohol units of 0.02 to 0.81, and therefore it is not possible to compare our review to theirs. Rooke et al. (2010) conducted a review that was larger in scope than the present review. They included both young people and adults. They also included tobacco.

We identified six reviews claiming to find effects of computerized brief interventions: Cadigan 2015; Laging 2012; Portnoy 2008; Rooke 2010; Tait 2013; White 2010. Most of these reviews with a similar PICO (Population – Intervention – Comparison – Outcome) claim that these interventions are effective. Several of our analyses did not find significant effects (although the analyses with the highest number of studies did). There are several possible explanations for this. We included a very selective population, namely young people at risk of alcohol and/or cannabis abuse but not having a diagnosed substance use disorder. We also chose to split our outcomes in several ways: we analyzed each type of control group (no intervention, assessment only, brief feedback, education, etc.) in separate analyses. In addition, we conducted analyses by different follow-up periods. This gave us low power compared to other review authors who have included everything in one large meta-analysis. However, when we examined the size of effects in our review, these are not very different from those found by other reviews. Lastly, it is important to note that almost all effect sizes in our review are in favour of computerized brief interventions when compared to control, although the effect is not statistically significant.

6 Authors' conclusions

6.1 IMPLICATIONS FOR PRACTICE AND POLICY

Computerized brief interventions are easy and fast to administer, can reach a wide audience, and have low cost and no known adverse effects. The effects of these interventions are, however, probably small to moderate, at least among young people aged 15-25 at risk of alcohol or cannabis abuse. Given the state of current evidence, practitioners who want to reach many people and have limited resources might consider administering such interventions. However, if it is of greater importance to use a more evidence-based method and if more resources and clinical skills are available, practitioners might want to use interventions that have proven efficacy for risky substance use behaviors.

6.2 IMPLICATIONS FOR RESEARCH

There is a need for more high quality research in this area. Based on the studies included in this review, computerized brief interventions might have a small effect on drinking outcomes, although it is difficult to be certain because of the overall low methodological standard. We also recommend that all future studies should be pre-registered in a clinical research registry such as clinicaltrials.gov or WHO ICTRP (http://www.who.int/ictrp/en/). All randomized trials should be reported using the CONSORT criteria (http://www.consort-statement.org/). The research community should develop a list of standard outcome criteria. This would make it easier to compare results between studies.

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8 Information about this review

8.1 TITLE REGISTRATION AND REVIEW PROTOCOL

The title for this systematic review was approved by the Campbell Collaboration in December 2012. The review protocol was approved on January 2, 2014. Title registration and protocol are available at: http://www.campbellcollaboration.org/library

8.2 REVIEW AUTHORS

Lead review author:

Name:	**Geir Smedslund**
Title:	PhD
Affiliation:	Norwegian Institute of Public Health
Address:	Postboks 4404 Nydalen
City, State, Province or County:	Oslo
Postal Code:	N-0403
Country:	Norway
Phone:	+47 2107 7280
Mobile:	+47 9243 0124
Email:	geir.smedslund@fhi.no

Co-author(s):

Name: Sabine Wollscheid	
Title:	PhD
Affiliation:	The Nordic Institute for Studies in Innovation, Research and Education (NIFU)
Address:	P. O. Box 2815 Tøyen, 0608 Oslo
City, State, Province or County:	Oslo
Postal Code:	N-0302
Country:	Norway
Phone:	+47 22 59 51 00

Mobile:	
Email:	sabine.wollscheid@nifu.no

Name:	**Lin Fang**
Title:	PhD
Affiliation:	Factor-Inwentash Faculty of Social Work, University of Toronto
Address:	246 Bloor Street W, Toronto, Ontario
City, State, Province or County:	Toronto
Postal Code:	M5S 1V4
Country:	Canada
Phone:	(416) 946-5084
Mobile:	
Email:	lin.fang@utoronto.ca

Name:	**Wendy Nilsen**
Title:	PhD
Affiliation:	1. Norwegian Institute of Public Health 2. The Work Research Institute
Address:	PO Box 4404 Nydalen
City, State, Province or County:	Oslo
Postal Code:	N-0403
Country:	Norway
Phone:	+47 2107 8336
Mobile:	+47 4023 2207
Email:	wendy.nilsen@afi.hioa.no

Name:	**Asbjørn Steiro**
Title:	Researcher
Affiliation:	Norwegian Institute of Public Health
Address:	Postboks 4404 Nydalen
City, State, Province or County:	Oslo
Postal Code:	N-0403
Country:	Norway
Phone:	+47 2107 7320

Mobile:	+47 4640 0405
Email:	Asbjorn.Steiro@fhi.no

Name:	**Lillebeth Larun**
Title:	PhD
Affiliation:	Norwegian Institute of Public Health
Address:	Postboks 4404 Nydalen
City, State, Province or County:	Oslo
Postal Code:	N-403
Country:	Norway
Phone:	+47 2107 7275
Mobile:	+47 90635591
Email:	Lillebeth.Larun@fhi.no

8.3 ROLES AND RESPONSIBILITIES

- Content: Fang, Nilsen, Smedslund, Steiro
- Systematic review methods: Nilsen, Larun, Steiro, Smedslund, Wollscheid
- Statistical analysis: Smedslund
- Information retrieval: Elisabet Hafstad

8.4 SOURCES OF SUPPORT

Norwegian Knowledge Centre for the Health Services, now Norwegian Institute for Public Health supported the review.

8.5 DECLARATIONS OF INTEREST

We have no conflicts of interest related to computerized brief intervention or to any of the studies reviewed as part of the synthesis.

8.6 PLANS FOR UPDATING THE REVIEW

The authors do not plan to update the review.

8.7 AUTHOR DECLARATION

Authors' responsibilities

By completing this form, you accept responsibility for maintaining the review in light of new evidence, comments and criticisms, and other developments, and updating the review at least once every five years, or, if requested, transferring responsibility for maintaining the review to others as agreed with the Coordinating Group. If an update is not submitted according to agreed plans, or if we are unable to contact you for an extended period, the relevant Coordinating Group has the right to propose the update to alternative authors.

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Form completed by: Geir Smedslund **Date: 20.12.16**

9 Appendices

APPENDIX 1. SEARCH STRATEGIES

Databases: MEDLINE , PsycINFO , EMBASE , Cinahl, the Cochrane Central Register of Controlled Trials (CENTRAL), ISI Web of Science, SveMed+, ERIC , Social Services Abstracts, Sociological Abstracts
Date: 18.04.2016
Study design: Randomized controlled trials
Result: 5547 (8493 including duplicates)
Performed by: Elisabet Hafstad, research librarian

Cochrane Central Register of Controlled Trials: Issue 3 of 12, March 2016

#1 MeSH descriptor: [Alcohol Drinking] explode all trees
#2 MeSH descriptor: [Alcohol-Related Disorders] explode all trees
#3 MeSH descriptor: [Alcoholics] this term only
#4 MeSH descriptor: [Alcoholic Beverages] explode all trees
#5 (alcohol* or drunk* or inebriation):ab,kw,ti
#6 ((behavio?r or binge or heavy or hazard* or harmful or habit* or pattern* or problem* or risk*) near/3 drink*):ab,kw,ti
#7 ((alco* or beer* or wine* or liquor* or ethanol) near/3 (drink* or consum* or intoxicat* or abuse* or misuse* or addict* or depend* or disorder* or poison*)):ab,kw,ti
#8 MeSH descriptor: [Cannabis] this term only
#9 MeSH descriptor: [Tetrahydrocannabinol] this term only
#10 MeSH descriptor: [Marijuana Smoking] this term only
#11 MeSH descriptor: [Marijuana Abuse] this term only
#12 (cannabi* or mari?uana or hash or hashish or tetrahydrocannabinol or thc):ab,kw,ti
#13 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12
#14 MeSH descriptor: [Computer Systems] explode all trees
#15 MeSH descriptor: [Computer-Assisted Instruction] explode all trees
#16 MeSH descriptor: [Medical Informatics] this term only
#17 MeSH descriptor: [Public Health Informatics] this term only
#18 MeSH descriptor: [Software] explode all trees
#19 MeSH descriptor: [Multimedia] this term only
#20 MeSH descriptor: [Compact Disks] explode all trees
#21 MeSH descriptor: [Internet] explode all trees

#22 MeSH descriptor: [Social Media] this term only
#23 MeSH descriptor: [Telecommunications] explode all trees
#24 (pc or pcs or computer* or laptop* or software*):ab,kw,ti
#25 (multimedia or multi-media or hypermedia or hyper-media):ab,kw,ti
#26 (cd-rom* or cdrom* or (compact next (disc* or disk*))):ab,kw,ti
#27 ((education* or instruct*) near/3 media):ab,kw,ti
#28 ((health or medical) next informatics):ab,kw,ti
#29 ((world next wide next web) or www or (worldwide next web) or web site* or web-site* or Internet*):ab,kw,ti
#30 (online or on-line or web-based or web next based):ab,kw,ti
#31 (e-health or e-therap*):ab,kw,ti
#32 ("interactive voice response"):ab,kw,ti
#33 ((app or apps or application*) near/10 (mobile* or phone* or telephone* or cell phone* or smartphone* or tablet* or ipad* or android*)):ab,kw,ti
#34 (messaging or sms* or (text next message*) or e-mail* or (electronic next mail*)):ab,kw,ti
#35 (social next media):ab,kw,ti
#36 #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35 32629
#37 #13 and #36 in Trials

OVID

Embase 1974 to 2013 Week 50, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1946 to Present, PsycINFO 1806 to Week 16 2016

Filter for study design: Clinical Queries Therapy (best balance of sensitivity and specificity) used for each database separately. For MEDLINE also “Cochrane Highly Sensitive Search Strategy for identifying randomized trials in MEDLINE: sensitivity- and precision-maximizing version (2008 revision); Ovid format”.

Result: 2077 (MEDLINE 273, Embase 1412, PsycINFO 392)

1 alcohol drinking/ or exp alcoholic beverages/ or exp alcohol-related disorders/ or alcoholics/ use prmz
2 drinking behaviour/ or alcohol consumption/ or exp alcoholic beverage/ or exp alcohol abuse/ use oemez
3 exp alcohol drinking patterns/ or alcohol drinking attitudes/ or exp alcoholic beverages/ use psyh
4 (alcohol* or drunk* or inebriation).tw.
5 ((behavio?r or binge or heavy or hazard* or harmful or habit* or pattern* or problem* or risk*) adj3 drink*).tw.
6 ((alco* or beer* or wine* or liquor* or ethanol) adj2 (drink* or consum* or intoxicat* or abuse* or misuse or addict* or depend* or disorder* or intake or poison*)).tw.
7 cannabis/ or tetrahydrocannabinol/ or marijuana smoking/ or marijuana abuse/ use prmz
8 cannabis smoking/ or exp cannabinoid/ or cannabis addiction/ use oemez
9 exp cannabis/ or tetrahydrocannabinol/ or marijuana usage/ use psyh
10 (cannabi* or mari?uana or hash or hashish or tetrahydrocannabinol or thc).tw.

11 1 or 4 or 5 or 6 or 7 or 10 [Medline]

12 2 or 4 or 5 or 6 or 8 or 10 [Embase]

13 3 or 4 or 5 or 6 or 9 or 10 [PsycINFO]

14 exp computer systems/ or exp software/ or multimedia/ or exp compact disks/ or Internet/ or social media/ or exp telecommunications/ or computer-assisted instruction/ or medical informatics/ or public health informatics/ use prmz

15 exp computer/ or exp computer program/ or multimedia/ or compact disk/ or social media/ or Internet/ or exp telecommunication/ or medical informatics/ use oemez

16 multimedia/ or Internet/ or social media/ or exp computer applications/ or computer assisted instruction/ or computer mediated communication/ or online therapy/ use psyh

17 (pc or pcs or computer* or laptop* or software*).tw.

18 (multimedia* or multi-media* or hypermedia* or hyper-media*).tw.

19 (cd-rom* or cdrom* or (compact adj (disc* or disk*))).tw.

20 ((education* or instruct*) adj3 media).tw.

21 ((health or medical) adj informatics).tw.

22 (surf* adj2 (web or net)).tw.

23 (online or on-line or web-based or web based).tw.

24 (world wide web or www or worldwide web or web site* or web-site* or Internet*).tw.

25 (e-health or e-therap*).tw.

26 "interactive voice response".tw.

27 social media.tw.

28 ((app or apps or application*) adj10 (mobile* or phone* or telephone* or cell phone* or smartphone* or tablet* or ipad* or android*)).tw.

29 (messaging or sms* or text message* or e-mail* or electronic mail*).tw.

30 (or/17-29) or 14 [Medline]

31 (or/17-29) or 15 [Embase]

32 (or/17-29) or 16 [PsycINFO]

33 11 and 30 use prmz [Medline]

34 12 and 31 use oemez [Embase]

35 13 and 32 use psyh [PsycINFO]

36 randomized controlled trial.pt.

37 controlled clinical trial.pt.

38 randomized.ab.

39 placebo.ab.

40 clinical trials as topic.sh.

41 randomly.ab.

42 trial.ti.

43 36 or 37 or 38 or 39 or 40 or 41 or 42

44 exp animals/ not humans.sh.

45 43 not 44 use prmz

46 33 and 45 use prmz

47 limit 33 to "therapy (maximizes sensitivity)"

48 limit 33 to "therapy (maximizes specificity)"

49 limit 33 to "therapy (best balance of sensitivity and specificity)"

50 46 or 49 use prmz [Medline]

51 limit 34 to "therapy (maximizes sensitivity)"

52 limit 34 to "therapy (maximizes specificity)"

53 limit 34 to "therapy (best balance of sensitivity and specificity)" [Embase]

54 limit 35 to "therapy (maximizes sensitivity)"

55 limit 35 to "therapy (maximizes specificity)"

56 limit 35 to "therapy (best balance of sensitivity and specificity)" [PsycINFO]

57 50 or 53 or 56

58 remove duplicates from 57

ISI Web of Knowledge

Databases=SCI-EXPANDED, SSCI, A&HCI Timespan = 1975-2016

#7 #6 AND #5

#6 TS=(random* or allocat* or double-blind* or single-blind* or RCT* or "controlled clinical" or placebo* or crossover or cross-over)

#5 #4 AND #3

#4 TS=(pc or pcs or computer* or laptop* or software*) OR TS=(multimedia* or multi-media* or hypermedia* or hyper-media*) OR TS=(cd-rom* or cdrom* or (compact near/1 (disc* or disk*))) OR TS=((education* or instruct*) near/3 media) OR TS=((health or medical) near/1 informatics) OR TS=(surf* near/2 (web or net)) OR TS=("world wide web" or www or "worldwide web" or web site* or web-site* or Internet*) OR TS=(online or on-line or web-based or "web based") OR TS=(e-health or e-therap*) OR TS=("interactive voice response") OR TS=("social media") OR TS=((app or apps or application*) near/10 (mobile* or phone* or telephone* or cell phone* or smartphone* or tablet* or ipad* or android*)) OR TS=(telecommunication*) OR TS=(messaging or sms* or ("text message*") or e-mail* or ("electronic mail*"))

#3 #2 OR #1

#2 TS=(cannabi* or mari?uana or hash or hashish or tetrahydrocannabinol or thc)

#1 TS=((alcohol* or drunk* or inebriation)) OR TS=(((behavior?r or binge or heavy or hazard* or harmful or habit* or pattern* or problem* or risk*) near/3 drink*)) OR TS=(((alco* or beer* or wine* or liquor* or ethanol) near/2 (drink* or consum* or intoxicat* or abuse* or misuse or addict* or depend* or disorder* or intake or poison*)))

ERIC; Sociological Abstracts; Social Services Abstracts (ProQuest)

("drinking behaviour" or "drinking behaviour" or "binge drinking" or "heavy drinking" or "hazardous drinking" or "harmful drinking" or "drinking habit" or "drinking pattern" or "problem drinking" or "drinking problem" or "risky drinking" OR alcohol or alcoholic or alcoholism or ethanol or drunkenness or inebriation OR cannabis or marijuana or marihuana or hash or hashish or

tetrahydrocannabinol or thc) AND (pc or pcs or computer* or laptop* or software* or multimedia* or multi-media* or hypermedia* or hyper-media* or cd-rom* or cdrom* or "compact disc*" or "compact disk*" or "educational media" or "instructional media" or "health informatics" or "medical informatics" or "world wide web" or www or "worldwide web" or web site* or web-site* or Internet or online or on-line or web-based or "web based" or e-health or e-therap* or "interactive voice response" or "social media" or app or apps or application* or mobile* or phone* or telephone* or cell phone* or smartphone* or tablet* or ipad* or android* or messaging or sms or "text message*" or e-mail or "electronic mail" or telecommunication*) AND ("experimental group*" or "control group*" or random* or "controlled clinical trial*" or rct* or allocat* or single-blind* or double-blind*)

CINAHL

Filter / Limits: Clinical Queries: Therapy - Best Balance; Exclude MEDLINE records
S27 S8 AND S25 Limiters - Clinical Queries: Therapy - Best Balance; Exclude MEDLINE records
S26 S8 AND S25
S25 S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24
S24 TI ((messaging* or sms* or (text W0 message*) or e-mail* or (electronic W0 mail*))) OR AB ((messaging* or sms* or (text W0 message*) or e-mail* or (electronic W0 mail*)))
S23 TI (((app or apps or application*) N10 (mobile* or phone* or telephone* or cell phone* or smartphone* or tablet* or ipad* or android*))) OR AB (((app or apps or application*) N10 (mobile* or phone* or telephone* or cell phone* or smartphone* or tablet* or ipad* or android*)))
S22 TI "social media" OR AB "social media"
S21 TI "interactive voice response" OR TI "interactive voice response"
S20 TI ((e-health or e-therap*)) OR AB ((e-health or e-therap*))
S19 TI ((online or on-line or web-based)) OR AB ((online or on-line or web-based))
S18 TI ((("world wide web") or www or ("worldwide web") or web site* or web-site* or Internet*)) OR AB ((("world wide web") or www or ("worldwide web") or web site* or web-site* or Internet*))
S17 TI ((surf* N2 (web or net))) OR AB ((surf* N2 (web or net)))
S16 TI (((health or medical) W0 informatics)) OR AB (((health or medical) W0 informatics))
S15 TI (((education* or instruct*) N3 media)) OR AB (((education* or instruct*) N3 media))
S14 TI ((cd-rom* or cdrom* or (compact W0 (disc* or disk*)))) OR AB ((cd-rom* or cdrom* or (compact W0 (disc* or disk*))))
S13 TI ((multimedia* or multi-media* or hypermedia* or hyper-media*)) OR AB ((multimedia* or multi-media* or hypermedia* or hyper-media*))
S12 TI ((pc or pcs or computer* or laptop* or software*)) OR AB ((pc or pcs or computer* or laptop* or software*))
S11 MH Computer Assisted Instruction OR MH Health Informatics+ OR MH Telecommunications+
S10 MH Multimedia OR MH Hypermedia OR MH CD ROM
S9 MH Computer Systems+ OR MH Software
S8 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7
S7 TI ((cannabi* or mari?uana or hash or hashish or tetrahydrocannabinol or thc)) OR AB ((cannabi* or mari?uana or hash or hashish or tetrahydrocannabinol or thc))

S6 MH Cannabis
S5 TI (((alco* or beer* or wine* or liquor* or ethanol) N2 (drink* or consum* or intoxicat* or abuse* or misuse or addict* or depend* or disorder* or intake or poison*))) OR AB (((alco* or beer* or wine* or liquor* or ethanol) N2 (drink* or consum* or intoxicat* or abuse* or misuse or addict* or depend* or disorder* or intake or poison*)))
S4 TI (((behavio?r or binge or heavy or hazard* or harmful or habit* or pattern* or problem* or risk*) N3 drink*)) OR AB (((behavio?r or binge or heavy or hazard* or harmful or habit* or pattern* or problem* or risk*) N3 drink*))
S3 TI ((alcohol* or drunk* or inebriation)) OR AB ((alcohol* or drunk* or inebriation))
S2 MH Alcohol drinking OR MH Alcoholic Beverages+
S1 MH Alcohol Abuse OR MH Alcoholism OR MH Alcoholic intoxication

SveMed+
1 noexp:"alcohol drinking"
2 exp:"Alcohol-Related Disorders"
3 noexp:"alcoholics"
4 exp:"alcoholic beverages"
5 noexp:"cannabis"
6 noexp:"marijuana smoking"
7 exp:"marijuana abuse"
8 noexp:"tetrahydrocannabinol"
9 #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8
10 exp:"computer systems"
11 exp:"software"
12 noexp:"multimedia"
13 exp:"compact disks"
14 noexp:"Internet/"
15 noexp:"social media"
16 noexp:"computer-assisted instruction"
17 noexp:"medical informatics"
18 noexp:"public health informatics"
19 #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18
20 #9 AND #19

APPENDIX 2. DATA EXTRACTION FORM

Intervention review 728

Effect of early, computerized brief interventions on risky alcohol use and risky cannabis use among young people: protocol for a systematic review

General Information

Date form completed (d/m/y)	
Name/ID of person extracting data (Initials)	
Report title *(title of paper/ abstract/ report)*	
Study Id and EndNote ID	
Reference details	
Report author contact details	
Publication type *(e.g. full report, abstract, letter)*	
Study funding source *(including role of funders)*	
Report IDs of other reports of this study *(e.g. duplicate publications, follow-up studies)*	
Possible conflicts of interest *(for study authors)*	
Notes:	

Eligibility

Study Characteristics	**Review Inclusion Criteria** *(Insert inclusion criteria for each characteristic as defined in the Protocol)*	Yes	Unclear	No	**Location in text** *(pg & ¶/fig/table)*
Type of study	Randomised Controlled Trial				

	Cluster RCT (where groups of individuals are randomly allocated to intervention and control group(s)				
	Controlled Clinical Trial *(quasi-randomised trial)*				
Participants	Young people defined as high and/or risky consumers of alcohol or cannabis. (majority between 15 and 25 years of age)				

Types of intervention	Computerized brief intervention for risky alcohol and cannabis use. (all types of early, computerized brief interventions regardless of medium, provider or theoretical framework. These may be 'automatic only' or delivered with the involvement of trained real-time 'counselors' and further defined as any preventive or therapeutic activity given within a max of four structured therapy sessions, each of a short duration, typically lasting between five and ten minutes with a max total time in treatment of one hour.).				
Types of comparisons					
Types of outcome measures (primary)	Alcohol use (measured by validated scales or self-report) Cannabis use (measured by validated scales, by self-report, or by an objective measure such urine analysis or blood sample analysis).				
	INCLUDE EXCLUDE				
Reason for exclusion					
Notes:					

DO NOT PROCEED IF STUDY EXCLUDED FROM REVIEW

Population and setting

	Description *Include comparative information for each group (i.e. intervention and controls) if available*	**Location in text** *(pg & ¶/fig/table)*
Population description *(from which study participants are drawn)*		
Setting *(including location and social context)*		
Inclusion criteria		
Exclusion criteria		
Method/s of recruitment of participants		
Informed consent obtained		
Notes:		

Methods

	Descriptions as stated in report/paper	**Location in text** *(pg & ¶/fig/table)*
Aim of study		
Design*(e.g. parallel, crossover, non-RCT)*		
Unit of allocation *(by individuals, cluster/ groups or body parts)*		

Start and end date data collection			
Duration of participation *(from recruitment to last follow-up)*			
Ethical approval needed/ obtained for study			
Notes:			

Risk of Bias Assessment

See Chapter 8 of the Cochrane Handbook. Additional domains may be required for non-randomised studies.

Domain	Risk of bias Low/high/unclear	**Support for judgement**	**Location in text** *(pg & ¶/fig/table)*
Random sequence generation *(selection bias)*			
Allocation concealment *(selection bias)*			
Blinding of participants and personnel *(performance bias)*			
Blinding of outcome assessor *(detection bias)*			
Incomplete outcome data *(attrition bias)*			
Selective outcome reporting? *(reporting bias)*			
Other bias			

Participants

Provide overall data and, if available, comparative data for each intervention or comparison group.

	Description as stated in report/paper	Location in text (pg & ¶/fig/table)
Total no. randomised *(or total pop. at start of study for NRCTs)*		
Clusters *(if applicable, no., type, no. people per cluster)*		
Baseline imbalances		
Withdrawals and exclusions *(if not provided below by outcome)*		
Age		
Gender		
Race/Ethnicity		
Education/Employment		
Other relevant demographics:		
Subgroups measured		
Subgroups reported		
Notes:		

Intervention groups

Copy and paste table for each intervention and comparison group

Intervention Group 1

	Description as stated in report/paper	Location in text *(pg & ¶/fig/table)*
Group name		

No. randomised to group *(specify whether no. people or clusters)*		
Theoretical basis *(include key references)*		
Description *(include sufficient detail for replication, e.g. content, dose, components)*		
Duration of treatment period		
Timing *(e.g. frequency, duration of each episode)*		
Delivery *(e.g. mechanism, medium, intensity, fidelity)*		
Providers *(e.g. no., profession, training, ethnicity etc. if relevant)*		
Notes:		

Intervention Group 2 (Control)

	Description as stated in report/paper	**Location in text** *(pg & /fig/table)*
Group name		
No. randomised to group *(specify whether no. people or clusters)*		
Theoretical basis *(include key references)*		

Description *(include sufficient detail for replication, e.g. content, dose, components)*		
Duration of treatment period		
Timing *(e.g. frequency, duration of each episode)*		
Delivery *(e.g. mechanism, medium, intensity, fidelity)*		
Providers *(e.g. no., profession, training, ethnicity etc. if relevant)*		
Notes:		

Outcomes and Results

Copy and paste table for each outcome.

Primary outcomes and results

Outcome 1 –	**Description as stated in report/paper**	**Location in text** *(pg & ¶/fig/table)*
Comparison		
Outcome name		
Time points measured *(specify whether from start or end of intervention)*		
Time points reported		
Outcome definition *(with diagnostic criteria if relevant)*		

Person measuring/ reporting							
Unit of measurement *(if relevant)*							
Scales: upper and lower limits *(indicate whether high or low score is good)*							
Is outcome/tool validated?		Yes No Unclear					
Results	**Intervention - E-SBI**			**Control - Screening only**			
	Mean	SD	n	Mean	SD	n	
Follow up							
Follow up							
No. missing participants and reasons							
No. participants moved from other group and reasons							
Any other results reported							
Unit of analysis *(individuals, cluster/ groups or body parts)*							
Statistical methods used and appropriateness of these methods *(e.g. adjustment for correlation)*							
Reanalysis required? *(specify whether yes, no or unclear))*							

Reanalysis possible? *specify whether yes, no or unclear))*		
Reanalysed results		
Notes:		

Secondary outcomes and results

Outcome 2–	**Description as stated in report/paper**	**Location in text** *(pg & ¶/fig/table)*
Comparison		
Outcome name		
Time points measured *(specify whether from start or end of intervention)*		
Time points reported		
Outcome definition *(with diagnostic criteria if relevant)*		
Person measuring/ reporting		

Unit of measurement *(if relevant)*							
Scales: upper and lower limits *(indicate whether high or low score is good)*							
Is outcome/tool validated? *(state, whether yes, no or unclear)*							
Results	**Intervention - E-SBI**			**Control - Screening only**			
	Mean	SD	n	Mean	SD	n	
Follow up							
Follow up							
No. missing participants and reasons							
No. participants moved from other group and reasons							
Any other results reported							
Unit of analysis *(individuals, cluster/ groups or body parts)*							
Statistical methods used and appropriateness of these methods *(e.g. adjustment for correlation)*							
Reanalysis required? *(specify whether yes, no or unclear))*							
Reanalysis possible? *specify whether yes, no or unclear))*							

Reanalysed results	Effect sizes	
Notes:		

Other information

	Description as stated in report/paper	**Location in text** *(pg & ¶/fig/table)*
Key conclusions of study authors		
References to other relevant studies		
Correspondence required for further study information *(from whom, what and when)*		
Notes:		

APPENDIX 3. CRITERIA FOR THE RISK OF BIAS ASSESSMENTS

Random sequence generation

o Low RoB: Resulting sequences are unpredictable (explicitly stated use of either computer-generated random numbers, table of random numbers, drawing lots or envelopes, coin tossing, shuffling, cards or throwing dice).

o Unclear: Vague statement that the study was randomized but not describing the generation of the allocation sequence or statement(s) indicating that random allocation was used in some but not all cases.

o High RoB: Explicit statement that the study was not randomised OR explicit description of inadequate generation of sequence (e.g., using case record numbers, alternation, date of admission, date of birth)

Concealment of allocation sequence:

o Low RoB: Participants and investigators cannot foresee assignment, e.g. central randomization performed at a site remote from trial location; or use of sequentially numbered sealed, opaque envelopes).

o Unclear: Vague statement that the study was randomised but not describing the concealment of the allocation sequence.

o High RoB: Explicit statement that allocation was not concealed OR statement indicating that participants or investigators can foresee upcoming assignment (e.g. open allocation schedule, unsealed or non-opaque envelopes).

Control of initial difference in prognostic factors between groups

In a properly randomised study, all initial differences between groups would arise by chance. This applies to all prognostic variables, both known and unknown. In non-randomised designs, however, there may be important initial differences between groups. These differences can be systematic, and can appear in unmeasured variables as well as in the measured ones. It is generally possible to control for measured variables but not for unmeasured ones. Regression methods can be used after the intervention to control for initial differences, but such methods may introduce bias in the results (Deeks 2003).

Studies, in which both generation and concealment of allocation sequence have a low RoB were coded as low RoB below:

- Low RoB: Control for one or more prognostic factors. Also score low RoB when there is no control for prognostic factors because there was no imbalance in measured variables.
- Unclear: Sufficient information could not be obtained.
- High RoB: Imbalance in prognostic factors and failure to control for this imbalance.

Blinding of participants

- Low RoB: Participants unaware of the assigned treatment.

- Unclear: Blinding of participants not reported and cannot be verified by contacting investigators.

- High RoB: Participants aware of the assigned treatment.

Blinding of participants may only be possible in studies where those in the control condition receive an alternative intervention. In studies where blinding was not possible, we coded this as high risk of bias.

Blinding of personnel

- Low RoB: Personnel unaware of the treatment given.

- Unclear: Blinding of personnel not reported and cannot be verified by contacting investigators.

- High RoB: Personnel aware of the treatment given.

Blinding of personnel would be impossible for those who deliver treatment. In studies where there are no personnel involved and the intervention is totally automatic, the risk of bias in this domain was coded as low.

Blinding of Assessor

- Low RoB: Assessor unaware of the assigned treatment when collecting outcome measures. Also score as met if outcome is questionnaire data or register data.

- Unclear: Blinding of assessor not reported and cannot be verified by contacting investigators.

- High RoB: Assessor aware of the assigned treatment when collecting outcome measure.

We coded the risk of bias as low for studies of computerized interventions where data are recorded automatically.

Incomplete outcome reporting

- Low RoB: Losses to follow up less than or equal to 20 % and equally distributed between comparison groups, and reasons for losses to follow up given, intention to treat analysis performed.

- Unclear: Losses to follow up not reported.

- High RoB: Losses to follow up greater than 20 % or not equally distributed between comparison groups, and reasons for losses to follow up not reported.

Selective outcome reporting

- Low RoB: The study protocol is available and all of the study's pre-specified (primary and secondary) outcomes that are of interest in the review have been reported in the pre-specified way; the study protocol is not available but it is clear that the published reports

include all expected outcomes, including those that were pre-specified (convincing text of this nature may be uncommon).

- Unclear: Insufficient information to permit judgement of 'Yes' or 'No'.

- High RoB: Not all of the study's pre-specified primary outcomes have been reported; one or more primary outcomes are reported using measurements, analysis methods or subsets of the data (e.g. sub scales) that were not pre-specified; one or more reported primary outcomes were not pre-specified (unless clear justification for their reporting is provided, such as an unexpected adverse effect); one or more outcomes of interest in the review are reported incompletely so that they cannot be entered in a meta-analysis; the study report fails to include results for a key outcome that would be expected to have been reported for such a study.

Other sources of bias

- Low RoB: The study appears to be free of other sources of bias

- Unclear: There may be a RoB, but there is either: insufficient information to assess whether an important RoB exists; or insufficient rationale or evidence that an identified problem would introduce bias

- High RoB: There is at least one important RoB. For example, the study: had a potential source of bias related to the specific study design used; or stopped early due to some data-dependent process (including a formal-stopping rule); or had extreme baseline imbalance; or has been claimed to have been fraudulent; or had some other problem.

APPENDIX 4. CHARACTERISTICS OF INCLUDED STUDIES

Studies on alcohol

Alfonso 2015

Methods	**Design:** Randomized controlled trial from a private college in USA
Participants	**Total number randomised**: N= 122 **Mean age:** 18.08 (SD: 0.304) **Gender**: 82% female **Education**: undergraduate freshmen **Ethnicity**: 81% White **Inclusion criteria:** alcohol consumption and at least 18 years of age **Exclusion criteria:** None reported
Interventions	**Intervention :** (Number randomised): n= 79 **Description:** Personalized normative feedback (PNF). The eCHECKUP TO GO is a brief, self-administered online assessment that provides information such as typical and peak blood alcohol content (BAC), level of tolerance to alcohol, negative consequences experienced due to alcohol use, and the component being studied: a comparison of one's own drinking to gender-specific referent norm groups (both university/college and general population). **Duration:** 15-20 minutes **Delivery (e.g., via app, computer):** web **Comparison:** (Number randomised): n= 43 **Description:** Personalized feedback only (PFO) **Duration:** 15-20 minutes **Delivery:** web

Relevant outcomes	**Primary outcomes:** Typical and peak alcohol content (BAC), typical number of drinks per week and month, and alcohol-related risk to assess the efficacy of each intervention on drinking-related outcomes **Secondary outcomes:** Did not list outcomes as primary and secondary **Time points for assessment:** 3 months
Notes	**Date of study:** not reported **Funding source:** Emmanuel College **Declaration of interest among the primary researchers:** not reported

Andersson 2015

Methods	Design: Randomized controlled trial in university students from Sweden
Participants	Total number randomised: N = 1,678 Mean age: 23.2 (SD: 2.9) Gender: Males: n = 842 (59%) Females: n = 580 (41%) Education: Not reported Ethnicity: Not reported Inclusion criteria: hazardous drinking (≥6 for women and ≥8 for men on the Alcohol Use Disorders Identification Test AUDIT) and providing a cell phone number and access to a valid email account Exclusion criteria: Not reported
Interventions	Intervention 1 (Number randomised): n = 323 Description: single computerized intervention. Written material including personalized normative feedback and protective behavioral strategies aimed at reducing intoxication Duration: brief: less than 500 words Delivery (e.g., via app, computer): web Intervention 2 (number randomised) n = 329 Description: Single interactive voice response with same content as Intervention 1 Duration: brief, not specified Delivery: telephone

	Intervention 3 (Number randomised) n = 318 Description: repeated computerized intervention: same as Intervention 1 but twice Duration: brief Delivery: web Intervention 4 (Number randomised) n = 334 Description: repeated interactive voice intervention with same content as Intervention 1-3 Duration: brief Delivery: telephone Comparison (Number randomised): n = 374 Description: control group screening only Duration: brief Delivery: web We compared the single web intervention with the screening only control We also compared the single web intervention with the single voice intervention
Outcomes	Primary outcome: AUDIT Secondary outcome: Daily Drinking Questionnaire (DDQ) Time points for assessment: 6 weeks
Notes	Date of study: Fall 2011 Funding source: Swedish Institute of Public Health, and the Anna and Edwin Berger Foundation Declaration of interest among the primary researchers: "The author declares no competing interests."

Arnaud 2015

Methods	**Design:** Randomized controlled trial in Sweden, Belgium, the Czech Republic, and Germany
Participants	**Total number randomised**: N= 1449 **Mean age:** 16.9 in completer sample. SD not reported **Gender**: 52.7 % female in completer sample

	Education: school children **Ethnicity**: not reported **Inclusion criteria:** Age 16-18 years, online access, and positive screening for at-risk substance use **Exclusion criteria:** not reported
Interventions	**Intervention:** (Number randomised): n= 715 **Description:** WISEteens (Web-based brief Intervention for SubstancE using teens) is a single-session brief motivational in **Duration:** mean 15.5 minutes **Delivery (e.g., via app, computer):** web **Comparison:** (Number randomised): n= 734 **Description:** assessment only **Duration:** short (shorter than 15 minutes) **Delivery:** web
Relevant outcomes	**Primary outcomes:** sum score based on the AUDIT-C subscale (drinking frequency, quantity, and frequency of binge drinking in the p **Secondary outcomes:** no outcomes reported as secondary **Time points for assessment:** 3 months
Notes	**Date of study:** not reported **Funding source**: "The study was funded by the Drug Prevention and Information Programme of the European Union (Gra JUST/2010/DPIP/AG/0914-30-CE-0379823/00-48." **Declaration of interest among the primary researchers**: "There are no conflicts of interest relating to this article."

Barnett 2007

Methods	Design: Randomized controlled trial, individuals from a private university in New England, USA.
Participants	Total number randomised: N = 225 Mean age: 18.8 years (SD: 0.87) Gender: Males: n = 110 (48.9%) Females: n = 115 (51.1%) Education: Freshman: 150 (66.7%); sophomores: 45 (20 %); juniors: 30 (13.3 %)

	Ethnicity: White: 170 (75.6%); Asian: 34 (15.1%); Hispanic: 29 (12.9%); black: 8. (3.6%); native American: 5 (2.2%); other: 6 (2.7%) Inclusion criteria: students required to attend a session of health education following medical evaluation for intoxication or a disciplinary hearing for an alcohol-related violation Exclusion criteria: Seniors were excluded because they would graduate during the 12-month follow-up period
Interventions	Intervention (Number randomised): n = 113 Description: Brief Motivational Intervention condition (BMI) consisting of four major parts: introduction and review of the alcohol event, assessing motivation, enhancing motivation, and establishing goals. Duration: one session, on average 50.19 minutes. Delivery (e.g., via app, computer): By counsellors who were either masters or Ph.Ds. practitioners. Fidelity checks indicating that BMI was administrated as designed and in a way consistent with MI principles Comparison (Number randomised): (n = 112) Description: Computer delivered intervention (CDI) which consisted of an individual session with Alcohol 101 (Century Council, 1998). This program features a "virtual party" that has a number of different "rooms", starting with a virtual bar in which participants can observe the effects of gender, weight, drink type, and speed of consumption on BAC. Duration: 1 individual session lasting 45 minutes Delivery: CD-ROM. By counsellors who were either masters or Ph.Ds. practitioners. Fidelity checks indicating that BMI was administrated as designed and in a way consistent with motivational interviewing (MI) principles
Outcomes	Primary outcome: Alcohol use (Timeline Follow-Back). Alcohol problems assessed with the Young Adult Alcohol Problems Screening Test (YAAPST) Secondary outcome: Motivation to change alcohol use, behavioral strategies, Time points for assessment: Baseline, 3 and 6 months follow-up
Notes	Date of study: September 2000 to May 2005 (follow up) Funding source: Partly supported by Grants AA12158 and AA07459 from the National Institute on Alcohol Abuse and Alcoholism, and by a Senior Research Career Scientist Award to Dr. Monti from the Medical Research Service Office of Research and Development, Department of Veteran Affairs Declaration of interest among the primary researchers: not reported

Methods	**Design:** Randomized controlled trial in 9 colleges in Sweden. The AMADEUS-2 Randomized Controlled Trial of Routine Practice in Swedish Universities
Participants	**Total number randomised**: N= 1,605 **Mean age:** 15.3% were under 18. 68.4% were between 18 and 20. 12.3% were between 21 and 25. 4.0% were between 26 and 30 **Gender**: 49.1% were female **Education**: only reported that they were university students in their 2nd, 4th, or 6th term **Ethnicity**: not reported **Inclusion criteria:** hazardous and harmful drinking **Exclusion criteria:** none reported
Interventions	**Intervention:** (Number randomised): n= 825 **Description:** single-session online alcohol assessment and feedback **Duration:** not reported **Delivery (e.g., via app, computer):** web **Comparison:** (Number randomised): n= 780 **Description:** delayed access **Duration:** not applicable **Delivery:** not applicable
Relevant outcomes	**Primary outcomes:** Weekly alcohol consumption (g/week) **Secondary outcomes:** Proportion drinking above national guidelines, frequency of drinking (days/week), number of drinks per drinking day, frequency of HED (heavy episodic drinking), occasions, motivation to change **Time points for assessment**: 2 months
Notes	**Date of study**: not reported

	Funding source: "The study was funded by the Swedish Council for Working Life and Social Research (FAS, in Swedish; Grant number 2010-0024) and by a Wellcome Trust Research Career Development Fellowship in Basic Biomedical Science (WT086516MA) to JM. IW was supported by the Medical Research Council (Unit Program number: U105260558). **Declaration of interest among the primary researchers**: "PB and MB own the company that developed the online intervention used in this study and that also develops and distributes computerized lifestyle interventions. None of the other authors have any conflicts to declare."

Bernstein 2016

Methods	**Design:** 2x2 RCT factorial design in a US college
Participants	**Total number randomised**: N= 220 **Mean age:** 19.85 (SD: 1.38) **Gender**: 49.1% females **Education**: only stated that they were undergraduates **Ethnicity**: 90.1% White/Caucasian, 2.8% Black or African American, 2.8% Multi-racial, 2.8% Other, 1.4% Asian **Inclusion criteria:** 18-24 old undergraduates with hazardous drinking (= AUDIT scores of 8+/6+ for men/women) **Exclusion criteria:** alcohol or drug treatment in the past 2 years
Interventions	The study included four emailed interventions differing by message framing and temporal context on alcohol involvement: **Intervention 1:** (Number randomised): n= 55 **Description:** gain frame/long term consequences (GFLT) **Duration:** not reported **Delivery (e.g., via app, computer):** email

	Intervention 2: (Number randomised): n= 55 **Description:** gain frame/short term consequences (GFST) **Duration:** not reported **Delivery (e.g., via app, computer):** email **Intervention 3:** (Number randomised): n= 55 **Description:** loss frame/long term consequences (LFLT) **Duration:** not reported **Delivery (e.g., via app, computer):** email **Intervention 4:** (Number randomised): n= 55 **Description:** loss frame/short term consequences (LFST) **Duration:** not reported **Delivery (e.g., via app, computer):** email **Comparison:** There was no no-treatment control group We compared the combined gain-focused groups with the combined loss-focused groups and the combined long-term consequences groups with the combined short-term consequences groups
Relevant outcomes	**Primary outcomes:** heavy episodic drinking (HED) and alcohol-related problems **Secondary outcomes:** The was no secondary outcomes reported **Time points for assessment**: 1 month
Notes	**Date of study**: not reported **Funding source**: a University of Rhode Island Professional Development grant **Declaration of interest among the primary researchers**: None declared

Bertholet 2015

Methods	Design: RCT, young men from the general population, Switzerland
Participants	Total number randomised: N = 737 Mean age: 20.8 years (SD: 1.13). Gender: Males: n = 737 (100%) Females: n = 0 (0%) Education: Not reported Ethnicity: Not reported Inclusion criteria: >14 drinks per week during the past 12 months or at least one episode of binge drinking (six or more drinks/ occasion) per month during the past 12 months, or AUDIT scores ≥8 Exclusion criteria: None
Interventions	Intervention (Number randomised): n = 367 Description: web page with assessment and normative feedback adapted from www.alcooquizz.ch. Duration: Not reported Delivery (e.g., via app, computer): web page Comparison (Number randomised): (n = 370) Description: Same web page and same assessment as intervention group but without the feedback. Duration: Not reported Delivery: web page
Outcomes	Primary outcome: Alcohol use (number of drinks per week) Secondary outcome: binge drinking prevalence, AUDIT score and number of alcohol-related consequences Time points for assessment: Baseline, 1 and 6 months follow-up
Notes	Date of study: Between August 2010 and July 2011, participants to the cohort study "C-SURF" was recruited. From June 2012 to February 2013, participants in C-SURF were invited to take part in the brief intervention trial. Funding source: The study was funded by the Swiss National Science Foundation [grant 325130_135538/1] Declaration of interest among the primary researchers: A long declaration of interest paragraph is found on page 1742

Butler 2009

Methods	RCT with three arms from a college in Alabama, USA.
Participants	Total number randomised: N=84

	Mean age (Mean, SE): Face-to- face 19.70 (SE 0.85). Computerized: 20.60 (1.48); Control: 20.38 (1.49) Gender (%, SE): Male: Face-to-face: female: 68 %; male: 32 %. Computerized: female: 63 %; male: 37 %; Control: 65 %; male: 35 % Education (years of education, SE) : Face-to-face: 13.39 (1.13), Computerized: 14.18 (1.55); Control: 14.25 (1.08) Ethnicity (white in %): Face-to-face: 13.39 (1.13). Computerized: 14.18 (1.55); control: 14.25 (1.08) Inclusion criteria: "endorsing at least two binge episodes (5 or more drinks in one setting for males, 4 or more for females; and two alcohol related problems in the past 28 days." *Exclusion criteria: not explicitly stated*
Interventions	Intervention 1: Face to Face (number randomised) n = 28 Description: participants were provided with personalized feedback regarding their use of alcohol. The feedback forms were created with information collected as part of the pre-intervention assessment battery and were similar to feedback forms used in other recent intervention studies. An overview of the content covered in the feedback : 1. Corrective feedback regarding normative drinking on campus 2. Gender-specific percentile rank comparing participant's alcohol consumption to campus norms. 3. Review of the participant's binge drinking frequency and related consequences. 4. Didactic information on blood alcohol concentration (BAC), including the behavioural effects and potential legal consequences associated with specific BAC levels. 5. Personalized BAC curve for typical and heavy drinking occasions. 6. Review of the participant's reported alcohol-related problems with a gender-specific percentile rank comparing severity of alcohol-related problems to campus norms. 7. Review of participants time allocation across alcohol-related and alcohol-free activities 8. Weekly and estimated yearly consumption of calories consumed from alcohol 9. Weekly, monthly, and yearly money spent on alcohol 10. Review of harm-reduction strategies. 11. Review of on- and off-campus mental health and alcohol treatment resources. Duration: not reported in the report Delivery: quote: "Participants in the face-to-face feedback condition met with a graduate clinician to review a printed feedback form. The clinician was trained to incorporate aspects of Motivational Interviewing into each feedback session."

	Intervention 2. Computerized intervention (number randomised) n = 30 Description: the feedback forms were created with information collected as part of the pre intervention assessment battery, similarly to the Face to Face group Duration: M=11.11 minutes (SD=3.56) Delivery: feedback given via computer in the form of a self-paced slide presentation. A research assistant seated the participants in a private room and instructed them to review their feedback via computer in the form of a self-paced slide presentation. Comparison (Number randomised): n = 26 Description: participants in the control group completed the pre-intervention assessment battery and met the inclusion criterion but did not receive personalized feedback before completing the follow-up measures. At the conclusion of the study, participants in the control group were giving the option of receiving a personalized feedback form. Duration: not reported Delivery: by computer at the research facility We compared the computer intervention to the no intervention group. We also compared the computer intervention to the face-to-face intervention
Outcomes	Primary outcomes: frequency and quantity of alcohol consumption and the frequency of binge drinking , measured by Daily Drinking Questionnaire Secondary outcomes: alcohol related problems measured by 23-item measure includes items such as 'want to work or school drunk' and missed a day of school or work; 5-point scale with values from 0 (never) to 5 (more than 10 times) Time points for assessment: baseline; 4 weeks follow up
Notes	Date of study: not reported Funding source: not reported Declaration of interest among the primary researchers: not reported Participants were awarded extra credit for completing the initial pre-baseline assessment session, and those who qualified received additional extra credit for completing the feedback and follow-up sessions. Participants who completed all phases of the study were also entered into a raffle for one of two $50 prizes

Collins 2014

Methods	Design: RCT in university students in USA
Participants	Total number randomised: N = 724 Mean age: 20.8 (SD: 1.42) Gender: Males: n = ca. 319 (44 %) Females: n = 405 (56 %) Education: 7.2% freshmen, 14.2% sophomores, 23.7% juniors, 51.7% seniors. Ethnicity: 67.1% White/European American, 17.8% Asian, 9.6% multiracial, 1% Black/African American, 0.7% Native Hawaiian/Pacific Islander, and 0.6% American Indian/ Alaska Native. Inclusion criteria: at least 18 years and at least one heavy drinking episode (i.e. four or more drinks for women and five or more drinks for men in the past 30 days). Exclusion criteria: None reported
Interventions	Intervention (Number randomised): n = 242 Description: Personalize normative feedback based on the normative feedback component of BASICS (Brief Alcohol Screening and Intervention for College Students). Duration: baseline questionnaire took appr. 30 minutes. Delivery (e.g., via app, computer): web page Comparison (Number randomised): n = 231 Description: No-treatment control Duration: baseline questionnaire took appr. 30 minutes. Delivery: web page
Outcomes	Primary outcome: Drinking frequency, alcohol quantity, alcohol problems Secondary outcome: the authors did not distinguish between primary and secondary outcomes Time points for assessment: 1, 6, and 12 months
Notes	Date of study: recruitment from April 2011 through February 2012 Funding source: National Institute on Alcohol Abuse and Alcoholism Career Transition Award K22AA018384 Declaration of interest among the primary researchers: not reported

Methods	**Design:** RCT at emergency department in USA
Participants	**Total number randomised**: N= 836 **Mean age:** 18.6 (SD: 1.4) **Gender**: 48.4% female **Education**: 65.8% were currently in college **Ethnicity**: Most participants were white (79.4%), with 9.5% African-American and 11.1% other races; 5.5% were of Hispanic ethnicity **Inclusion criteria:** age 14-20, presenting to an emergency department, screening positive on the Alcohol Use Disorders Identification Test– Consumption (AUDIT-C; age 14–17 years, score ≥3; age 18–20 years, score ≥4) **Exclusion criteria:** could not provide informed consent, aged <18 without a parent/ guardian, acute suicidal ideation, experienced sexual assault, could not self-administer the assessment (e.g. non-English speaking), could not participate in follow-ups (e.g. homeless)
Interventions	**Intervention 1:** (Number randomised): n= 277 **Description:** computerized brief intervention incorporating principles of motivational interviewing **Duration:** Not reported **Delivery (e.g., via app, computer):** offline, Facebook-styled program delivered by using touchscreen tablets with audio (via headphones) **Intervention 2:** (Number randomised): n= 278 **Description:** therapist brief intervention. Similar to the computerized brief intervention (CBI) **Duration:** Not reported **Delivery (e.g., via app, computer):** in person **Comparison** (Number randomised): n= 281

	Description: considered enhanced usual care, the control condition comprised staff reviewing a brochure listing resources (e.g., mental health and substance use services, leisure activities) **Duration:** not reported **Delivery:** in person
Relevant outcomes	**Primary outcomes:** alcohol consumption index ("How often did you have a drink containing alcohol?" (0-4). "How many drinks containing alcohol did you have on a typical day when you were drinking?" (1-5). Scores ranged from 0 to 20 for the whole index with higher scores indicating higher alcohol consumption. **Secondary outcomes:** The National Institute on Drug Abuse *Alcohol, Smoking, and Substance Involvement Screening Test* (ASSIST) assessed use and consequences of 6 illicit drugs. One of them was marijuana. **Time points for assessment**: 3, 6, and 12 months
Notes	**Date of study**: Recruitment occurred during September 2010 and March 2013. **Funding source**: National Institute on Alcohol Abuse and Alcoholism (grant 018122). National Institutes of Health (NIH). **Declaration of interest among the primary researchers**: "The authors have indicated they have no potential conflicts of interest to disclose."

Doumas 2009

Methods	RCT in a university in USA.
Participants	Total number randomised: N = 76 Mean age: 19.24 (SD not reported) Gender: Male: 72.4 % male; Female: 27.6 % Education: Freshman: 48.7 %; Sophomores: 38.2 %; Juniors: 9.2%; seniors: 3.9 % Ethnicity: Caucasian: 85.5 % Inclusion criteria: Students referred to University Counselling Services for violating the university policy for alcohol and other drugs from Spring 2006 to 2007. Exclusion criteria: Not explicitly stated

Interventions	Intervention (Number randomised): Web-based personalized normative feedback (WPNF); n = 46 Description: Participants in the WPNF condition completed a 15-minute Web-based program designed to reduce high-risk drinking by providing personalized feedback and normative data regarding drinking and the risk associated with drinking. Program is free and available at http://notes.camh.net/efeed.nsf/newform An updated version of this program is now available at www.checkyourdrinking.net The online assessment collects basic demographic information and information on alcohol consumption, drinking behaviour, and alcohol related consequences. Individualized graphed feedback is provided immediately in the following domains: a pie chart depicting individual levels of drinking in relation to U.S. peer norms, a summary of the number of days the participant consumed alcohol and number of drinks consumed in the past year, approx. financial cost of drinking in the past year, calories associated with drinking, how quickly the body processes alcohol, risk status for negative consequences associated with drinking, and risk status for problematic drinking based on the participant's AUDIT score. Duration: Average appointment length ranged from 30 to 50 minutes (M=37.30, SD=6.42). Delivery: Individualized graphed feedback is provided immediately after baseline assessment in the following domains: a pie chart depicting individual levels of drinking in relation to U.S. peer norms, a summary of the number of days the participant consumed alcohol and number of drinks consumed in the past year, approx. financial cost of drinking in the past year, calories associated with drinking, how quickly the body processes alcohol, risk status for negative consequences associated with drinking, and risk status for problematic drinking based on the participant's AUDIT score. Comparison (Number randomised): Web-based education; n = 31 Description: Participants in the WE group completed the Judicial Educator located at www.reslife.net. A commercially available program developed to provide an easily administered educational program for students receiving disciplinary sanctions. Use of the Alcohol Module, an automated computerized program that presents general information about alcohol, including rates of alcohol use on college campuses physical effects of alcohol, short term and long-term negative alcohol related consequences, sensible alcohol consumption, and strategies to help friends struggling with problematic alcohol use. Following the computerized presentation, participants are directed to take a 10-item quiz over the material to test their learning. Duration: Approx. 45 minutes Delivery: Computerized presentation
Outcomes	Primary outcomes: Alcohol consumption was measured by 1) Typical quantity of weekly drinking assessed by modified version of the Daily Drinking Questionnaire (Collins, Pars, & Marlatt, 1985), 2) Peak alcohol consumption assessed by an item asking participants to

	indicate the number of drinks consumed on the occasion on which they drank the most the previous month, 3) Frequency of drinking to intoxication assessed by the question: "During the past 30 days …, how many times have you gotten drunk, or very high from alcohol?" This item was rated on a scale with the anchors 0, 1 to 2, 3 to 4, 5 to 6, 7 to 8, or > 9 times. Secondary outcomes: Alcohol related consequences was measured by 1) The Rutgers Alcohol Problem Index (RAPI, White & Labouvie, 1989) is a 23-item self-administered screening tool used to measure adolescent problem drinking. Participants were asked the number of times in the past 30 days they experienced each of 23 negative consequences as a result of drinking. Time points for assessment: baseline, 1-month follow-up
Notes	Date of study: not reported Funding source: not reported Declaration of interest among the primary researchers: not reported.

Doumas 2011a

Methods	RCT in a university in the USA.
Participants	Total number randomised: N = 135 Mean age: 19.7 (SD not reported) Gender: Male: 70 %; Female: 30 % Education: Freshmen: 59 % Ethnicity: Caucasian: 84 % Inclusion criteria: mandated students Exclusion criteria: not reported
Interventions	Intervention (Number randomised) :) (n = 81) Description: Computerized assessment with self-guided Web-based personalized normative feedback (SWF) Duration: approx. 30 minutes Delivery (e.g., via app, computer): computer Comparison (Number randomised): Computerized assessment with counsellor-guided Web-based personalized normative feedback (CWF) (n = 54)

	Duration: 30-60 minutes Delivery*:* in person
Outcomes	Primary outcomes. Measures: Alcohol consumption: Alcohol consumption was operationalized by 1) Typical quantity of weekly drinking; 2) frequency of binge drinking; 3) peak alcohol consumption and measured by the Daily Drinking Questionnaire (Collins et al. 1985) (1), an item asking participants how often they drank 5 or more drinks in a row for males and 4 or more drinks in a row for females in the past 2 weeks (Wechsler et al. 1994) (2) and self-reported number of drinks consumed on the occasion on which they drank the most the previous month (3). Secondary outcomes. Measures: Alcohol related consequences; The Rutgers Alcohol Problem Index (RAPI, White & Labouvie, 1989)) is a 23-item self-administered screening tool used to measure adolescent problem drinking. Participants were asked the number of times in the past 30 days they experienced each of 23 negative consequences as a result of drinking. *Time points for assessment: baseline; follow-up (8-month)*
Notes	Date of study: not reported Funding source: not reported Declaration of interest among the primary researchers: *not reported.*

Doumas 2011b

Methods	RCT in a university in the USA.
Participants	Total number randomised: N = 56 Mean age: 19.22 (SD not reported) Gender: Male: 61 % (n = 34); Female: 39 % (n = 22) Education: Freshman: 72 % ; Sophomores: 14 %, Juniors: 10%; seniors: 4 % Ethnicity: European American: 88 % (n = 49) Inclusion criteria: Students referred to University Counselling Services for violating the university policy for alcohol and other drugs. Exclusion criteria: Not explicitly stated
Interventions	Intervention (Number randomised): Web-based personalized normative feedback (WPF). n = 32

	Description: Participants in the WPF condition directed to take e-CHUG (electronic-Check-Up to Go), a National Association of student Personnel Administration (NASPA) an evidence-based online alcohol intervention and personalized feedback tool developed by counsellors and psychologists at San Diego State University. The program is commercially available and managed by the San Diego State University Research Foundation. Further details about the program, procedures and costs for subscribing to the program: http://www.e-chug.com The program is customized for the participating university, including providing normative data for the specific university population, referrals for the local community, and designing the Web site using university colours and logos. First, students complete an online assessment consisting of basic demographic information and information on alcohol consumption, drinking behaviour, and alcohol related consequences. Following the assessment, individualized graphed feedback is provided in terms of summary of quantity and frequency of drinking including graphic feedback Duration: Approx. 30 minutes Delivery: via computer. Immediately following the assessment, individualized graphed feedback is provided in the following domains: summary of quantity and frequency of drinking including graphical feedback such as the number of cheeseburgers that are equivalent to alcohol calories consumed, graphical comparison of one's own drinking to U.S. adult and college drinking norms, estimated risk status for negative consequences associated with drinking and risk status for problematic drinking based on the participants Alcohol Use Disorder Identification Test (AUDIT) score, genetic risk, tolerance, approximate financial cost of drinking in the past year, normative feedback comparing one's perception of peer drinking to actual university drinking normative data, and referral information for local agencies. Comparison (Number randomised): Counsellor delivered personalized normative feedback. (CPF), n = 24 Duration: 35-45 minutes Delivery: By student counsellor based on the principles and techniques used in motivational theory (Miller & Rollnick, 2002)
Outcomes	Primary outcomes: Alcohol consumption was measured by 1) Typical quantity of weekly drinking assessed using a modified version of the Daily Drinking Questionnaire (Collins, Pars, & Marlatt, 1985), 2) Peak alcohol consumption by an item asking participants to indicate the number of drinks consumed on the occasion on which they drank the most the previous month, 3) Frequency of drinking to intoxication by the question: "During the past 30 days …, how many times have you gotten drunk, or very high from alcohol?" This item was rated on a scale with the anchors *0, 1 to 2, 3 to 4, 5 to 6, 7 to 8, or > 9 times.*

	Secondary outcomes: Alcohol related consequences was measured by 1) The Rutgers Alcohol Problem Index (RAPI, White & Labouvie, 1989)) is a 23-item self-administered screening tool used to measure adolescent problem drinking. Participants were asked about the number of times in the past 30 days they might have experienced any of the 23 negative consequences as result of drinking. Time points: baseline, 3-month follow up
Notes	Date of study: not reported Funding source: not reported Declaration of interest among the primary researchers: not reported.

Ekman 2011

Methods	RCT in a university in Sweden.
Participants	Total number randomised: N = 654 Mean age: 18-20: n = 25 (16%); 21-25: n = 120 (76%); >=26: n = 13 (8%) Gender: n = 66 (42 %) male; 92 (58%) female Education: n = 158 (100 %) university students Ethnicity: not reported Inclusion criteria: "Students considered risky drinkers if, at baseline or follow-up measurements, they fell into either one or both of the following categories: (a) their weekly alcohol consumption exceeded 120 grams of alcohol (women) or 180 grams of alcohol (men) per week in a typical week in the last 3 months and (b) they engaged in heavy episodic drinking (HED) occasions defined as consuming 48 grams of alcohol or more (women) and 60 grams or more (men) on two or more occasions in the preceding month." (p. 2) Exclusion criteria: not explicitly stated, but not risky drinkers excluded
Interventions	Intervention (Number randomised): n = 330. Electronic Screening and Brief Intervention (e-SBI) Description: 'Participants in the IG (e-SBI) received Summary statements received by the CC (control condition), and more comprehensive normative feedback with information describing participants' alcohol use compared with peers at the university, and, if applicable, advice on reducing any unhealthy levels of consumption. The personalized advice received by the IG consisted of 12 possible statements or suggestions about the student's alcohol habits.' (p.2)

	Duration: not reported; ['the personalized advice by the IC consisted of 12 possible statements or suggestions about the student's alcohol habits']. Delivery (e.g., via app, computer): Web Comparison (Number randomised): n = 324 Description: 'Brief feedback, consisting of three statements summarizing their weekly consumption' (p. 2) Duration: not reported; 'brief feedback consisting of three statements summarizing their weekly consumption.' Delivery*: Web*
Outcomes	Primary outcome: Alcohol consumption Alcohol consumption was operationalized by 1) changes in weekly consumption over time, measured by response scale on weekly alcohol consumption (in gram) each day a week, 2) changes in heavy episodic drinking (HED) over time defined as consuming 48 grams of alcohol (women) and 60 or more grams of alcohol (men) on two or more occasions on the preceding week, measured by self-report, 3) changes in peak blood alcohol concentration (BAC) (self-report). Time points for assessment*: baseline; 3-month follow-up, 6-month follow-up*
Notes	Date of study: September 2007 – April 2008 Funding source: study performed within the economical frames of the author's employment at Linköping University. Declaration of interest among the primary researchers*: One of the authors (Preben Bendtsen) is partner of a company that develops similar applications as the one used in this study. (p 6.)*

Gajecki 2014

Methods	RCT with 3 arms in university in Stockholm, Sweden.
Participants	Total number randomised: N = 1932. Mean age: 24.72 (SD=4.809) Gender: Male: n = 931 (48.3%); Female: n = 998 (51.7 %) Education: University students Ethnicity: Not reported

	Inclusion criteria: Participants with an AUDIT score indicating at least hazardous consumption (≥6 for women and≥8 for men) [35] and having a smartphone running either iOS or Android were randomised to one of the two application conditions or to an assessment-only control group. Exclusion criteria: Those, not fulfilling these criteria were excluded from randomization.
Interventions	Intervention 1 (Number randomised): n = 643 Description: Promillekoll app (Check your BAC"). Developed by the Swedish government's Systembolaget and publicly downloadable for iPhone and Android smartphones. This app was released for public use on September 25, 2012. The user can register his/her alcohol consumption in real time, where the app displays the user's current eBAC. ….The application warns the user if the drink entered will result in an eBAC over 0.06 percent and only displays values up to 0.08 percent. It also provides information texts on alcohol and BAC. The study was conducted using a publicly available app, which is constructed as a standalone application that can be used offline. No user data are collected. The research group had no influence on the development or functionality of the app Duration: not reported Delivery (e.g., via app, computer): smartphone App Intervention 2 (Number randomised): (n = 640) Description: Party planner app. In order to further develop and test the idea of modifying drinking intentions with an app, our research group developed a new app, "PartyPlanner," with the functionality of simulating or planning a drinking event beforehand and then comparing the simulation to the real-time event afterwards….in addition to registering alcohol consumption with instant visual eBAC similar to Promillekoll, this app gives the user the opportunity to simulate an event where alcohol will be consumed ahead of time. The app displays the eBAC level at distinct time points throughout the drinking occasion, both for pre-party simulations and real-time registrations. Color codes indicate whether the eBAC is at a risky level. The real-time registration with feedback can be used as a standalone function; i.e., without having made a prior plan. However, if there is a plan, the user can visually compare the plan with the logged real-time event after the actual drinking occasion. In contrast to Promillekoll, the PartyPlanner app was launched as a so-called web app that requires Internet connection using a web browser in order to facilitate additional development following this study and prior to possible future, wider, public accessibility Duration: Not reported Delivery: Web-app

	Comparison (Number randomised): (n = 649) Description: No intervention Individuals allocated to this group did not receive any further information in the time between study registration and follow-up' Duration: Not relevant Delivery: Not relevant. We compared Intervention 2 (Party Planner) to the comparison group.
Outcomes	Primary outcome: Quantity of alcohol measured with the Daily Drinking Questionnaire Secondary outcome: Drinking occasions week, Binge occasions (no per week), eBAC per week Time points for assessment: Baseline, 7 weeks
Notes	Date of study: March and April 2013 Funding source: Alcohol Research Council of the Systembolaget, the Swedish Research Council, and Center for Psychiatric Research at Karolinska Institutet Declaration of interest among the primary researchers: The authors declare that they have no competing interests

Geisner 2015

Methods	Design: RCT. University in the USA
Participants	Total number randomised: N = 339. Mean age: 20.14 (SD: 1.34). Range:18-24 Gender: Males: n = 117 (37.6%) Females: n = 194 (62.4%) Education: All were undergraduates at a university Ethnicity: 59.7% white/Caucasian, 19.4% Asian/Pacific Islander, 1.2% black/African American, 8.4% multiracial, less than 1% Native American Inclusion criteria: Consuming 4+/5+ drinks (women/men) on at least one occasion in the past month, a problem drinking score of 8 or greater on the AUDIT Exclusion criteria: No specific exclusion criteria stated
Interventions	Intervention (Number randomised): n = 84

	Description: alcohol-related feedback. Personalized feedback component that suggested protective behaviors (i.e. tips/strategies for reducing problematic alcohol use), as well as brief psycho-education regarding the potential relationship between alcohol and depressed mood, without directly targeting mood symptoms. Personalized feedback of own reported drinking frequency and quantity compared to other students. Duration: not reported Delivery (e.g., via app, computer): webpage Comparison (Number randomised): n = 85 Description: assessment only control Duration: not reported Delivery: webpage Two other intervention arms were not considered relevant for our review: Mood intervention (to target depressed mood) and integrated intervention (designed to target both alcohol and depressed mood).
Outcomes	Primary outcome: typical weekly drinks Secondary outcome: Time points for assessment: 1 month
Notes	Date of study: Four quarters between fall of 2011 and winter of 2013 Funding source: NIAAA Grant R21AA019993 Declaration of interest among the primary researchers: All authors declare that they have no conflict of interest

Hester 1 2010

Methods	RCT. Psychology course in university in the USA.
Participants	Total number randomised: N = 144 Mean age: CDCU: Mean = 20.51 (SD=1.80); Control: 20.29 (1.63) No sign. Difference between treatment and control group Gender: CDCU: Males: n = 41 (63%); Females: n = 24 (37%); Control: Males: n = 49 (62%); Females: n = 30 (38%) Education (years in school) 1: n = 18 (28%) 2: n = 17 (26%)

	3: n = 17 (26%) 4: n = 10 (15%) 5: n = 3 (5%) Control: 1: n = 23 (29%) 2: n = 17 (22%) 3: n = 21 (27%) 4: n = 13 (16%) 5: n = 5 (6%) Ethnicity: CDCU: Non-Hispanic white: 40 (62%); Hispanic Latino: 15 (23 %); others: 10 (15%); Control: Non-Hispanic white: 40 (51%); Hispanic Latino: 26 (33%); Others: 13 (16%) Inclusion criteria: "a) Self-identified college student drinkers meeting the NIAAA's (National Institute on Alcohol Abuse and Alcoholism) criteria for heavy episodic drinking (i.e. 4+ drinks per occasion for women, 5+ for men, at least once in the last 2 weeks and an estimated peak BAC of 80 mg % or more) and b) Age range of 18-24. " Exclusion criteria: Being mandated to an intervention because of an alcohol policy infraction, not having a significant other to corroborate their self-report of drinking, and anticipating not being available for follow-ups.
Interventions	Intervention (Number randomised): The College Drinker's Check-up (CDCU)n = 65 Description: Brief motivational interviewing (Miller & Sanchez, 1994) Quote: "We developed the CDCU as both a Windows and web-based brief motivational intervention (BMI). We consider it a BMI because it is designed to be administered in one, relatively brief (approximately) 35 minutes session. It employs the *FRAMES* elements of effective BMIs (Miller & Sanchez, 1994). FRAMES is an acronym for: *F*eedback is personalized; *A*dvice is given carefully; a *M*enu of options for changing is offered; an *E*mpathic, non-judgmental tone is used; and there is an emphasis on *S*elf-efficacy" (p. 3) Duration: approx. 20 minutes Delivery (e.g., via app, computer): Adaption of the Drinker's Check-up (DCU), that the authors originally had developed for older heavy drinkers (p. 18-19) 'The CDCU begins with a screening for heavy drinking using the AUDIT and two questions about the individual's heaviest drinking in the last two weeks. Students are then given personalized feedback, and those who screen positive for heavy drinking are invited to use

	the rest of the program. (Part of the rationale of the screening process in the experiments was to ensure that participants would screen positive and so be appropriate candidates for the intervention). Once the screening portion of the program is complete, students enter the Look at Your Drinking module, which includes a decisional balance exercise, a comprehensive assessment of drinking and drug use, alcohol-related problems, and risk factors for future alcohol-related problems. The Get Feedback module uses gender- and university-specific norms. Students receive feedback on the quantity and frequency of their drinking compared to their same gender fellow students at their university, BAC feedback, and feedback on how their frequency of alcohol-related problems compares to other, same gender students at their school. The final module, Consider Your Options, extends the initial decisional balance exercise, asking users to rate the level of importance of the "good things" and the "not so good things" about their drinking. It also asks them how ready they are to change their drinking and takes their readiness into account in helping them develop a plan of action to reduce their drinking and risk for alcohol-related problems.' (p. 5-6) Comparison (Number randomised): Assessment-only control, n = 79 Description: not relevant Duration: not relevant Delivery: not relevant.
Outcomes	Primary outcomes: Alcohol consumption, operationalized by 1) Standard drinks per week, measured by the AUDIT (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) a widely used 10-item brief screen for heavy drinking and alcohol problems. "The Brief Drinker's Profile (BDP, Miller & Marlatt, 1987) to gather the quantity and frequency of drinking, drug use, and family history of alcohol problems." 2) Mean number of drinks in two heavier episodes in the previous month, measured by the Brief Drinker's Profile (BDP, Miller & Marlatt, 1987) 3) Peak BAC in a typical week, measured by the AUDIT (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) is a widely used 10-item brief screen for heavy drinking and alcohol problems. " 1) "The Brief Drinker's Profile (BDP, Miller & Marlatt, 1987) to gather the quantity and frequency of drinking, drug use, and family history of alcohol problems." (p. 5) Time points for assessment: baseline, 1-month follow up, 12 month follow up.
Notes	Date of study: not reported

	Funding source: The project was supported by a SBIR grant from National Institute on Alcohol Abuse and Alcoholism's (NIAAA), R44AA014766. Declaration of interest among the primary researchers: not reported.

Hester 2 2010

Methods	RCT. Psychology course in university in the USA.
Participants	Total number randomised: N = 82. Mean age: CDCU: Mean = 20.02 (SD=1.52); Control: 20.28 (2.09) No sign. Difference between treatment and control group Gender: CDCU: Males: n = 23 (55%); Females: n = 19 (45%); Control: Males: n = 23 (58%); Females: n = 17 (42%) Education (years in school) 1: n = 14 (33%) 2: n = 9 (21%) 3: n = 10 (24%) 4: n = 8 (19%) 5: n = 1 (2%) Control: 1: n = 18 (45%) 2: n = 7 (18%) 3: n = 5 (12%) 4: n = 8 (20%) 5: n = 2 (5%) Ethnicity: CDCU: Non-Hispanic white: 21 (50%); Hispanic Latino: 15 (36 %); others: 6 (13%); Control: Non-Hispanic white: 17 (43%); Hispanic Latino: 16 (40%); Others: 6 (16%) Inclusion criteria: "a) Self-identified college student drinkers meeting the NIAAA's criteria for heavy episodic drinking (i.e. 4+ drinks per occasion for women, 5+ for men, at least once in the last 2 weeks and an estimated peak BAC of 80 mg % or more) and b) Age range of 18-24. "

	Exclusion criteria: Being mandated to an intervention because of an alcohol policy infraction, not having a significant other to corroborate their self-report of drinking, and anticipating not being available for follow-ups.
Interventions	Intervention (Number randomised): The College Drinker's Check-up (CDCU)n = 42 Description: Brief motivational interviewing (Miller & Sanchez, 1994) Quote: "We developed the CDCU as both a Windows and web-based brief motivational intervention (BMI). We consider it a BMI because it is designed to be administered in one, relatively brief (approximately) 35 minutes session. It employs the *FRAMES* elements of effective BMIs (Miller & Sanchez, 1994). FRAMES is an acronym for: *F*eedback is personalized; *A*dvice is given carefully; a *M*enu of options for changing is offered; an *E*mpathic, non-judgmental tone is used; and there is an emphasis on *S*elf-efficacy" (p. 3) Duration: approx. 20 minutes Delivery (e.g., via app, computer): Adaption of the Drinker's Check-up (DCU), that the authors originally had developed for older heavy drinkers (p. 18-19) 'The CDCU begins with a screening for heavy drinking using the AUDIT and two questions about the individual's heaviest drinking in the last two weeks. Students are then given personalized feedback, and those who screen positive for heavy drinking are invited to use the rest of the program. (Part of the rationale of the screening process in the experiments was to ensure that participants would screen positive and so be appropriate candidates for the intervention). Once the screening portion of the program is complete, students enter the Look at Your Drinking module, which includes a decisional balance exercise, a comprehensive assessment of drinking and drug use, alcohol-related problems, and risk factors for future alcohol-related problems. The Get Feedback module uses gender- and university-specific norms. Students receive feedback on the quantity and frequency of their drinking compared to their same gender fellow students at their university, BAC feedback, and feedback on how their frequency of alcohol-related problems compares to other, same gender students at their school. The final module, Consider Your Options, extends the initial decisional balance exercise, asking users to rate the level of importance of the "good things" and the "not so good things" about their drinking. It also asks them how ready they are to change their drinking and takes their readiness into account in helping them develop a plan of action to reduce their drinking and risk for alcohol-related problems.' (p. 5-6) Comparison (Number randomised): Assessment-only control, n = 40 Description: not relevant Duration: not relevant

	Delivery: not relevant.
Outcomes	Primary outcomes: Alcohol consumption, operationalized by 1) Standard drinks per week, measured by the AUDIT (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) a widely used 10-item brief screen for heavy drinking and alcohol problems. "The Brief Drinker's Profile (BDP, Miller & Marlatt, 1987) to gather the quantity and frequency of drinking, drug use, and family history of alcohol problems." 2) Mean number of drinks in two heavier episodes in the previous month, measured by the Brief Drinker's Profile (BDP, Miller & Marlatt, 1987) 3) Peak BAC in a typical week, measured by the AUDIT (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) is a widely used 10-item brief screen for heavy drinking and alcohol problems. " 1) "The Brief Drinker's Profile (BDP, Miller & Marlatt, 1987) to gather the quantity and frequency of drinking, drug use, and family history of alcohol problems." (p. 5) Time points for assessment: baseline, 1-month follow up.
Notes	Date of study: not given Funding source: The project was supported by a SBIR grant from National Institute on Alcohol Abuse and Alcoholism's (NIAAA), R44AA014766. Declaration of interest among the primary researchers: not reported.

Kypri 2004

Methods	Double-blind RCT from a university student health service in New Zealand.
Participants	Total number randomised: N = 104. Mean age: 20.4 (1.8) years in control group and 19.9 (1.4) years in intervention group Gender: 50% females Education: not reported Ethnicity: not reported Inclusion criteria: users of student health service. 17-26 years. Participants scoring 8 or more on the Alcohol Use Disorders Identification Test (AUDIT) and consuming more than four/six standard drinks

	(females/males) on one or more occasions in the preceding 4 weeks Exclusion criteria: not reported
Interventions	Intervention (number randomised): n = 51 Description: Assessment included a 14-day retrospective drinking diary, self-reported weight and perceptions of peer drinking norms. Feedback consisted of a summary of recent consumption; their risk status, comparison of their consumption with recommended upper limits, and an estimate of their blood alcohol concentration for their heaviest drinking occasion in the preceding 4 weeks (criterion feedback); comparison of their consumption with that of national and university norms (normative feedback); and correction of norm. misperceptions. Duration: mean = 11.2 minutes Delivery (e.g., via app, computer): web-based Comparison (Number randomised): N = 53 Description: leaflet-only control group. Received a leaflet on the health effects of alcohol. Duration: extremely short Delivery: leaflet.
Outcomes	Primary outcomes (the authors did not distinguish between primary and secondary outcomes): *Frequency of drinking*: number of drinking days in the preceding 2 weeks. *Typical occasion quantity*: number of standard drinks consumed per typical drinking occasion in the preceding 4 weeks *Total volume*: number of standard drinks consumed in the preceding 2 weeks. *Frequency of very heavy episodes*: number of occasions in the preceding 2 weeks where a threshold of 80/120 grams of ethanol was breached, for women/men, respectively. Time points for assessment: baseline and 6 weeks
Notes	Date of study: March to October 2002 Funding source: Alcohol Advisory Council of New Zealand and the Health Research Council of New Zealand. Declaration of interest among the primary researchers: not reported.

Kypri 2008

Methods	RCT, 4 arms, 3 arms presented in this paper in a university in Otago, New Zealand.
Participants	Total number randomised: N = 429 Mean Age: Control (n = 146): 20.1 (2.2); Single dose e-SBI (n = 138): 20.1 1.9); Multi dose e-SBI: (n = 145): 20.1 (1.9) Gender: Control (n = 146): Female: 76 (52.1); Male: 70 (47.9) Single dose e-SBI (n = 138): Female: 71 (51.4); Male 67 (48.6) Multi dose e-SBI: (n = 145): Female: 76 (52.4); Male 69 (47.6) Education: Students Ethnicity: Not reported Inclusion criteria: Students (age range, 17-29) who had attended a university primary health care service defined and who scored positive for hazardous drinking. Exclusion criteria: Not reported
Interventions	Intervention 1 (Number randomised): n = 138 Single-Dose e-SBI computerized intervention Description: Those assigned to single-dose and multidose e-SBI were presented with assessment questions and then personalized feedback, which together comprised the intervention. Assessment included self-reported weight, a 14-day retrospective drinking diary, and perceptions of drinking norms of peers.10 Feedback consisted of their risk status, a summary of recent consumption, a comparison of their consumption with recommended limits, and an estimate of blood alcohol concentration for their heaviest drinking occasion in the preceding 4 weeks (criterion feedback), as well as a comparison of their consumption with that of national and university norms (normative feedback) and correction of misperceptions of norms Duration: Median completion time for intervention: 9.3 minutes Delivery (e.g., via app, computer): Website Intervention 2 (Number randomised): (n = 145) Multi-Dose e-SBI Group ('booster') computerized intervention

	Description: 'Those assigned to single-dose and multidose e-SBI were presented with assessment questions and then personalized feedback, which together comprised the intervention. Assessment included self-reported weight, a 14-day retrospective drinking diary, and perceptions of drinking norms of peers.10 Feedback consisted of their risk status, a summary of recent consumption, a comparison of their consumption with recommended limits, and an estimate of blood alcohol concentration for their heaviest drinking occasion in the preceding 4 weeks (criterion feedback), as well as a comparison of their consumption with that of national and university norms (normative feedback) and correction of misperceptions of norms. ' Multidose e-SBI involved repetition of the assessment and feedback, with the participant's drinking at 6 months compared against that at baseline and at 1month in a series of bar charts Duration: Median completion time for intervention: 9.3 minutes Delivery: Web-site Comparison (Number randomised): (n = 146) Screening alone/Information pamphlet only Description: Participants assigned to the control conditions were directed to a Web page thanking them for their involvement' Duration: Median completion time: 3.3 minutes Delivery: Website We compared single-dose versus multi-dose computerized intervention We also compared single-dose computerized intervention versus control
Outcomes	Outcomes: (1) frequency of drinking ; (2) typical occasion quantity (standard drinks [10 grams of alcohol] consumed per typical drinking occasion in the preceding 4 weeks); (3) total volume (standard drinks consumed in the preceding 2 weeks); (4) frequency of very heavy episodes (number of occasions in the preceding 2 weeks on which a threshold of 80 grams of alcohol for women or 120 grams of alcohol for men was breached); (5) personal, social, sexual, and legal consequences of episodic heavy drinking (items endorsed on the Alcohol Problems Scale [score range, 0-14])16; (6) consequences related to academic performance (score on the Academic Role Expectations and Alcohol Scale [score range, 0-35])16; and (7) the AUDIT score at 12 months Time points for assessment: Baseline, 6 and 12 months
Notes	Date of study: Start 3.32003 end 26.6.2004

	Funding source: This study was supported by the Alcohol Advisory Council of New Zealand and the Health Research Council of New Zealand Declaration of interest among the primary researchers: "The Alcohol Advisory Council of New Zealand and the Health Research Council of New Zealand had no role in the design or conduct of the study; in the collection, management, analysis, or interpretation of the data; or in the preparation, review, or approval of the manuscript

Kypri 2009

Methods	RCT with two arms in university in Australia.
Participants	Total number randomised: N = 2435 Mean age: Web-based brief intervention: Mean: 19.7 (SD: 1.8) Control (only screening: Mean: 19.7 (SD: 1.8) Gender: Web-based brief intervention: Female: 45.1%; Male: 54.9% Control (only screening: Female: 45.5 %; Male: 54.5% Education: Undergraduate students Ethnicity: Not reported Inclusion criteria: Full-time undergraduates aged 17 to 24 years. Respondents who scored 8 or more on the AUDIT and had exceeded the Australian National Health and Medical Research Council's guideline for acute risk (binge drinking: 4 standard drinks for women, 6 for men) in the last 4 weeks were considered to have screened positive for unhealthy alcohol use." Exclusion criteria: Not reported
Interventions	Intervention (Number randomised): n = 1251 Web-based brief intervention (motivational feedback) Description: Respondents visited a Web site called THRIVE (Tertiary Health Research Intervention Via Email), consisting of a branched 7-page online questionnaire with items covering (1) demographics (sex, age, and living arrangement); (2) drinking in the last 12 months (yes/no); (3) AUDIT (10 questions)23; (4) largest number of standard drinks (10 grams of ethanol) consumed on 1 occasion in the last 4 weeks, duration of the drinking episode in hours, and height and weight; (5) second-hand effects (e.g., "being pushed, hit,

	or otherwise assaulted"), with the response options yes, no, or prefer not to answer24; (6) opinions on alcohol beverage labeling25; and (7) smoking history. The survey instrument and feedback can be accessed at http://lamp.health.curtin.edu.au/thrive/baselinetest.php Duration: Apr 10 minutes Delivery: (e.g., via app, computer): Web site Comparison (Number randomised): (n = 1184) Control / screening only Description: Respondents visited a Web site called THRIVE (Tertiary Health Research Intervention Via Email), consisting of a branched 7-page online questionnaire with items covering (1) demographics (sex, age, and living arrangement); (2) drinking in the last 12 months (yes/no); (3) AUDIT (10 questions)23; (4) largest number of standard drinks (10 grams of ethanol) consumed on 1 occasion in the last 4 weeks, duration of the drinking episode in hours, and height and weight; (5) second-hand effects (e.g., "being pushed, hit, or otherwise assaulted"), with the response options yes, no, or prefer not to answer24; (6) opinions on alcohol beverage labeling25; and (7) smoking history Duration: 3-5minutes, once Delivery: Web site
Outcomes	Primary outcome: Frequency of drinking (range, 0-28 days), number of standard drinks per typical occasion, and average weekly volume [(28-day frequency typical quantity)/4] Secondary outcome: Included the Alcohol Problems Scale (APS) score (range, 0-14), the AREASscore (Academic Role Expectations and Alcohol Scale; range, 0-15), prevalence of binge drinking (for women and men, respectively, 4 and 6 standard drinks on 1 occasion in the preceding 4 weeks), and prevalence of heavy drinking (for women and men, respectively, 14 and 28 standard drinks per week in the preceding 4 weeks) Time points for assessment: baseline, 1 and 6 months
Notes	Date of study: Start March 2007 Funding source: This study was funded in part by grant 15166 from the Western Australian Health Promotion Foundation (Healthway) Declaration of interest among the primary researchers: not reported

Kypri 2013

Methods	RCT from seven universities in New Zealand.
Participants	Total number randomised: N=1789 Mean age: Intervention: 20.2 (1.8). Control: 20.1 (1.7) Gender: 'Intervention: Female: 64.3 % (n = 604); Male: 35.7 % (n = 335) Control: Female: 66.8 % (n = 568); Male: 33.2 % (282) Education: Undergraduate students Ethnicity: Maori Inclusion criteria: Maori students aged 17-24 who scored >= 4 on the Alcohol Use Disorders Identification Test (AUDIT) Exclusion criteria: not reported
Interventions	Intervention (Number randomised): n = 939 Web-based alcohol screening and brief intervention (e-SBI) for reducing hazardous drinking Description: The intervention group received personalized feedback consisting of: their AUDIT and LDQ scores with an explanation of the associated health risk and information about how to reduce that risk; an estimated BAC for their heaviest episode in the previous 4 weeks, with information on the Behavioural and physiological sequelae of various BACs, and traffic crash relative risk; estimates of monetary expenditure per month; bar graphs comparing the reported episodic and weekly consumption levels with those of other students and the general population of the same age and gender; and hyperlinks for help with drinking problems. Further web pages were presented as options, offering facts about alcohol, tips for reducing the risk of alcohol-related harm, and where medical help and counselling support could be found. A demonstration version of the instrument can be viewed at http://www.webcitation.org/69vNZW3B' Duration: Approx. 10 minutes Delivery (e.g., via app, computer): Web-based Comparison (Number randomised): (n = 850) Screening only Description: AUDIT Duration: Approx. 1.2 minutes

	Delivery: Web-based
Outcomes	Primary outcome: frequency of drinking (range: 0–28 days), number of standard drinks (10 grams of ethanol) per typical occasion, average weekly volume [(28-day frequency x typical quantity)/4], and AREAS score (range 0–15). Time points for assessment: Baseline, 6 and 12 months follow up Included the prevalence of drinking above New Zealand recommended limits for acute risk (for women and men, respectively, more than four and more than six standard drinks on one occasion in the preceding 4 weeks) and chronic risk (for women and men, respectively, more than 14 and more than 21 standard drinks per week in the preceding 4 weeks)
Notes	Date of study: April 2010 to October 2012 Funding source: The study was funded by New Zealand's Alcohol Advisory Council Declaration of interest among the primary researchers: None

Kypri 2014

Methods	RCT with 2 arms in 7 universities in New Zealand.
Participants	Total number randomised: N = 3422 Mean age: Intervention: 20.2 (SD: 1.8) Control: 20.1 (SD: 1.7) Gender: Intervention: Female: 58 % (n = 989); Male: 42 % (n = 717) Control: Female: 57 % (n = 978); Male: 43 % (n = 738) Education: Students Ethnicity: Maori and Non-Maori Inclusion criteria: not reported Exclusion criteria: not reported
Interventions	Intervention (Number randomised): n = 1706 Web-based alcohol screening and brief intervention (e-SBI) for reducing hazardous drinking

	Description: The intervention group received personalized feedback consisting of their AUDIT and Leeds Dependence Questionnaire (LDQ) scores with explanation of the associated health risk and information about how to reduce that risk; an estimated blood alcohol concentration for their heaviest episode in the previous 4 weeks with information on the Behavioural and physiological sequelae of various blood alcohol concentration levels and the risk of having a motor vehicle traffic crash; estimates of monthly expenditure; bar graphs comparing reported episodic and weekly consumption with that of other students and the general population of the same age and sex; and hyperlinks for help with drinking problems. Additional web pages were presented as options offering facts about alcohol, tips for reducing the risk of harm, and informing of where medical help and counselling could be found. Duration: Approx. 10 minutes Delivery (e.g., via app, computer): Web-based Comparison (Number randomised): (n = 1716) Screening only Description: AUDIT screening Duration: Apr. 1.2 minutes Delivery: Web-based
Outcomes	Primary outcomes: There were 6 planned primary outcome measures: frequency of drinking (range, 0-28 days), number of standard drinks (10 grams of ethanol) per typical occasion, average weekly volume of drinks ([28-day frequency × typical quantity]/4), the AREAS score (range, 0-15), whether the participant was drinking above recommended limits for acute risk (>40 grams [for women] or >60 grams [for men]) of ethanol on 1 occasion in the preceding 4weeks), and whether the participant exceeded guidelines for chronic risk (>140 grams [for women] or >210 grams [for men] of ethanol/week in the preceding 4 weeks). Time points for assessment: Baseline, 5 months
Notes	Date of study: April and May 2010 recruitment, September 2010 follow-up Funding source: The research was funded by the Alcohol Advisory Council (now the Health Promotion Agency), a statutory body of the New Zealand government. Dr Kypri's involvement in the research was partly funded by an Australian National Health & Medical Research Council Senior Research Fellowship (APP1041867 Declaration of interest among the primary researchers: None

LaBrie 2013

Methods	RCT using stratified block randomization; assignment was stratified by Greek organization membership (yes/no), sex (male/female), race (Asian/Caucasian), and total drinks per week (10 or fewer, 11 or more)." Two West Coast universities in the USA.
Participants	Total number randomised: N = 1,663 Mean age: 19.92 (SD=1.3) Gender: Females=56.7 % (n = 943); males 43.3 % (n = 720) Education: students Ethnicity: Caucasian = 75.7% (n = 1, 259) Inclusion criteria: Students reporting a minimum of one past-month heavy episodic drinking event (HED; consuming at least four [for female] or five [for males] drinks during a drinking occasion) and identifying as either Caucasian or Asian. Exclusion criteria: not reported
Interventions	Intervention 1 (computerized intervention): Personal normative feedback (PNF). Eight conditions provided normative feedback based on differing levels of specificity of the reference group: PNF – typical student norms: n = 187, PNF – typical sex norms: n = 184, PNF – typical Greek norms: n = 185, PNF – typical race norms: n = 178, PNF – typical sex, race norms: n = 185, PNF – typical sex, Greek norms: n = 187, PNF – typical race. Greek norms: n = 190, PNF – typical sex, race, Greek norms: n = 187 Description: PNF intervention. Of the 10 conditions examined in the current study, eight provided normative feedback based on differing levels of specificity of the reference group. Quote: "Condition 1 was provided normative information about the typical student at the same university. Conditions 2–4 were provided matched normative information at one level of specificity based on the participant's gender, Greek status, or race. Conditions 5–7 were presented two levels of specificity for students at the same university matched to participant's gender and race (e.g., typical female Asian), gender and Greek status (e.g., typical male Greek affiliated student), or race and Greek status (e.g., typical Caucasian Greek-affiliated student). The eighth condition provided participants with three levels of specificity for students at the same university matched to participant's gender, race, and Greek status (e.g., typical female, Asian, Greek-affiliated student)." The PNF contained four pages of information in text and bar graph format. Separate graphs, each including three bars, were used to present information regarding the number of drinking days per week, average drinks per occasion, and total average drinks per week

for (a) one's own drinking behaviour, (b) their reported perceptions of the reference group's drinking behaviour on their respective campus, at the level of specificity defined by their assigned intervention condition, and (c) actual college student drinking norms for the specified reference group. Actual norms were derived from large representative surveys conducted on each campus in the prior year as a formative step in the trial. Participants were also provided with their percentile rank comparing them with other students on their respective campus for the specified reference group (e.g., "Your percentile rank is 99%; this means that you drink as much or more than 99% of other college students on your campus")
Duration: not reported
Delivery (e.g., via app, computer): PNF program description provided but software development and testing not reported

Intervention 2 (computerized intervention):WEB-BASICS feedback (n = 183)
Description: "The Web-BASICS feedback contained a total of 26 pages of interactive comprehensive motivational information based on assessment results, modelled from the efficacious in-person BASICS intervention (Dimeff et al., 1999; Larimer et al., 2001). It addressed quantity and frequency of alcohol use; past-month peak alcohol consumption; estimated blood alcohol content (BAC); and provided information regarding standard drink size, how alcohol affects men and women differently, oxidation, alcohol effects, reported alcohol-related experiences, estimated calories, and financial costs based on reported weekly use, estimated level of tolerance, risks based on family history, risks for alcohol problems, and tips for reducing risks while drinking as well as alternatives to drinking. The feedback also included PNF using typical student drinking norms. Participants were given the option to click links throughout the feedback to obtain additional information on standard drink size, sex differences and alcohol use, oxidation, biphasic tips, hangovers, alcohol costs, tolerance, and protective factors, as well as provided with a link to a BAC calculator."
Duration: not reported
Delivery: e-mail with URL

Comparison (Number randomised):Generic control feedback (n = 184)
Description: Generic control feedback contained three pages of information in text and bar graph format. Separate graphs, each including two bars, were used to present information regarding the number of hours spent texting, number of hours spent downloading music, and number of hours spent playing video games per week for (a) one's own behaviour and (b) actual college student behaviour. Participants were also provided with their percentile rank comparing them with other students on their respective campus (e.g., "Your percentile rank is 60%; this means that you text as much or more than 60% of other college students on your campus").
Delivery: e-mail with URL

	We have compared the BASICS group with the control group. We also compared the personalized normative feedback (typical student) with the control group.
Outcomes	Primary outcome: Alcohol consumption operationalized as 1) Number of drinks per week, measured by the Daily Drinking Questionnaire (DDQ); 2) Quantity/ Frequency Index, an assessment of alcohol use (Baer, 1993) that measures participant's drinking during the past month. Participants were asked to think about the occasion when they drank the most and to report how many drinks they consumed on that occasion. In addition, participants reported how many days they drank alcohol in the past month. Secondary outcome: Alcohol related consequences assessed by The 25-item Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989) assessed the frequency of alcohol-related negative consequences. Response options ranged from 0 (*never*) to 4 (*10 or more times*). The items included "Passed out or fainted suddenly"; "Caused shame or embarrassment to someone"; and "Felt physically or psychologically dependent on alcohol." Items were summed to create a composite score for the analysis. Time points for assessment: screening/baseline, 1-month follow-up, 3-month follow-up, 6-month follow-up and 12-month follow-up.
Notes	Date of study: not reported Funding source: Data collection and manuscript preparation were supported by National Institute on Alcohol Abuse and Alcoholism Grant R01AA012547-06A2 Declaration of interest among the primary researchers: not reported

Lewis 2005

Methods	RCT in university in the USA. Psychology students with risky alcohol use.
Participants	Total number randomised: N = 185 Mean age: 20.1 (SD: 1.8) Gender: 54.6% females Education: students Ethnicity: 97.3% White, and 2.7% others

	Inclusion criteria: Students who indicated at least one heavy drinking episode (five/four drinks at one sitting for men/women, respectively) were eligible to participate. Exclusion criteria: not reported.
Interventions	Intervention: Gender-specific PNF (number randomised): n = 65 Description: Personalized normative feedback: "All participants who received feedback viewed the feedback on the computer screen for approximately one to two minutes as it was being printed. Participants were given the printout of this information to take with them. There was no interpersonal interaction between participants and the experimenter during the feedback intervention…The format of personalized normative feedback was modelled after the normative feedback component of the BASICS intervention… this feedback included a summary of the students information with reference to 1) their own drinking behaviour, 2) their perceptions of typical student drinking behaviour (perceived norm), and 3) actual typical student drinking behaviour (actual norm). For gender-specific feedback, information was relative to the typical same-sex student… consistent with previous brief interventions, participants' percentile ranking comparing their drinking with other same-sex or typical college students drinking was provided." Duration: 1-2 minutes Delivery (e.g., via app, computer): computer screen Comparison: Gender-neutral PNF (Number randomised): N = 63 For gender-neutral feedback, the intervention was the same as for gender-specific feedback, the only difference being that information was relative to the typical college student without reference to gender. Duration: 1-2 minutes Delivery: computer screen
Outcomes	Primary outcomes: overall alcohol consumption, typical weekly drinking, typical number drinks consumed per drinking occasion and typical drinking frequency Time points for assessment: baseline, one month follow-up
Notes	Date of study: not reported

	Funding source: "Manuscript preparation was funded in part by National Institute on Alcohol Abuse and Alcoholism grants T32AA007455 and R01AA014576." Declaration of interest among the primary researchers: not reported

Lewis 2007

Methods	RCT in controlled laboratory setting on campus in a university in the USA.
Participants	Total number randomised: N = 316. Mean age: 18.53 (SD: 2.04) Gender: 52.24 % female Education: freshmen Ethnicity: 99.6% Caucasian Inclusion criteria: Students reporting at least one heavy-drinking episode (4/5 drinks at one setting for women/men, respectively) in the previous month were recruited to participate. Exclusion criteria: Estimated peak BAC level of .26 or higher in the previous month.
Interventions	Intervention 1: Gender-specific PNF (computerized intervention) Number randomised n = 75 Description: Gender-specific personalized normative feedback includes three pieces of information pertaining to: 1) personal drinking behaviour, 2) personal perceptions of typical student drinking behaviour, and 3) information regarding actual norms for typical student drinking behaviour. Feedback was freshmen-specific and gender specific. Duration: extremely short Delivery (e.g., via app, computer): computer screen Intervention 2: Gender-neutral PNF (computerized intervention) Number randomised: n = 82

	Description: Gender-neutral personalized normative feedback includes three pieces of information pertaining to: 1) personal drinking behaviour, 2) personal perceptions of typical student drinking behaviour, and 3) information regarding actual norms for typical student drinking behaviour. Feedback was freshmen-specific but gender neutral. Duration: extremely short Delivery: computer screen Comparison: (Number randomised): n = 88 Description: assessment only control group Duration: extremely short Delivery: computer screen. We compared the gender-neutral PNF to the assessment only control. We also compared the gender-neutral PNF to the gender-specific PNF
Outcomes	Primary outcomes: drinking frequency, drinks per week (assessed with a modified version of the Daily Drinking Questionnaire (DDQ) Time points for assessment: baseline, 3 months, 5 months
Notes	Date of study: not reported Funding source: "Data collection and manuscript preparation was supported by National Institute on Alcohol Abuse and Alcoholism Grants U18AA015885 and U01AA014742. Manuscript preparation was also supported by National Institute on Alcohol Abuse and Alcoholism Grant T32AA07455." Declaration of interest among the primary researchers: not reported

Lewis 2014

Methods	RCT in large public North-western university in the USA.
Participants	Total number randomised: N = 480 Mean age: 20.08 (SD: 1.48) years Gender: 57.6% female

	Education: undergraduate students. Ethnicity: 70% White, 12.5% Asian, and 16.2% other or not indicated race/ethnicity Inclusion criteria: (a) having at least four drinks (for women) or five drinks (for men) on one occasion in the past month, (b) having oral, vaginal, or anal sex in the past 12 months, and (c) typically having sex with a member of the opposite sex. Exclusion criteria: not reported
Interventions	Intervention: alcohol only (number randomised): n = 119 Description: Drinking behaviours in the past 3 months included (a) number of times spent drinking during the typical week, (b) average number of drinks consumed per typical drinking occasion, and (c) number of drinks consumed per typical week. Each screen presented one graph and related feedback content. The final screen of the feedback provided a percentile rank for comparison between the participants' reported drinking and that of their same-sex peers. Duration: 30 minutes Delivery (e.g., via app, computer): web Comparison: attention control (Number randomised): n=121 Description: Control participants were shown information related to use of technology. Technology use was broken down into three topics: (a) texting, (b) downloading music, and (c) playing video games. Each screen presented one graph and related feedback content. For each screen of the feedback, participants were provided their percentile rank for the specific technology uses. Duration: not reported Delivery: web There were two other intervention conditions in this study which both were about risky sexual behaviour and not exclusively about alcohol.
Outcomes	Primary outcomes: 1. Number of typical drinks per week (assessed with the Daily Drinking Questionnaire) 2. frequency of drinking per month 3. number of typical drinks per drinking occasion Time points for assessment: baseline, 3 months, 6 months

Notes	Date of study: 2009 fall quarter Funding source: "Data collection and manuscript preparation were supported by National Institute on Alcohol Abuse and Alcoholism Grant K01AA016966 awarded to Melissa A. Lewis. Manuscript preparation was also supported by National Institute on Alcohol Abuse and Alcoholism Grants R03AA018735 and K99AA020869." Declaration of interest among the primary researchers: not reported

Linowski 2016

Methods	**Design:** RCT in mandated college students in USA
Participants	**Total number randomised**: N= 346 **Mean age:** 19.0 in both groups. SD: 0.9 in control group and 1.0 in intervention group **Gender**: 39.6% female **Education**: In the control (intervention) group there were 45.0% (46.3%) freshmen, 38.6% (39.4%) sophomore, 14.0% (9.1%) junior, 1. (0.0%) 5th year students. **Ethnicity**: In the control (intervention) group there were 7.0% (8.7%) Asian, 1.2% (1.2%) Black, 1.2% (2.3%) Hispanic, and 90.6% (87.8 **Inclusion criteria:** 18 years or older. First offender of campus alcohol policy **Exclusion criteria:** Not reported
Interventions	**Intervention**: (Number randomised): n= 175 **Description**: electronic booster feedback. The feedback was personalized and normative and followed the BASICS program interviewing approach. **Duration:** not reported **Delivery** (e.g., via app, computer): web **Control** (Number randomised): n= 171 **Description:** assessment only

	Duration: not reported **Delivery**: web
Relevant outcomes	**Primary outcomes:** self-reported drinking measured on the Daily Drinking Questionnaire (typical BAC (blood alcohol con (Brief Young Adult Alcohol Consequences Questionnaire), frequency of binge drinking **Secondary outcomes:** The authors did not distinguish between primary and secondary outcomes **Time points for assessment**: The study was part of another study, starting 3 months earlier. The original study had asses months, 6 months and 12 months, so the present study had follow-up at 3 months and 9 months
Notes	**Date of study**: not reported **Funding source**: The Substance Abuse Mental Health Services Administration, Center for Substance Abuse Treatment, gra the United States Department of Education Model Grant Program grant number Q184N080015. **Declaration of interest among the primary researchers**: "The author(s) declared no potential conflicts of interest wi authorship, and/or publication of this article."

Mason 2014

Methods	RCT in large south-eastern university in the USA.
Participants	Total number randomised: N = 18 Mean age: 19.2 (SD =1.3) Gender: Males: n = 8 (44 %), Females: n = 10 (56. %) Education: Freshmen: n = 6 (33.3%); Sophomores: n = 6 (33.3 %); Juniors=n = 6 (33.3%) Ethnicity: White: n = 12 (66 %); African-American: n = 4 (22%); Hispanic/Latino: n = 2 (11%) Inclusion criteria: Students who scored 8 or more when taking the Alcohol Use Disorders Identification Test (AUDIT; Bohn, Babor & Kranzler, 1995) Exclusion criteria: not reported
Interventions	Intervention: Text messaging (n = 8) Duration: 20 min.

	Delivery (e.g., via app, computer): mobile phone Comparison: no active treatment (Number randomised): (n = 10) Duration: not reported Delivery: not reported.
Outcomes	Primary outcome: 1) AUDIT (total), 2) Drink past week, 3) drink last occasion, 4) max. drinks last month, 5) Avg. drinks/occasion last month Secondary outcome: Readiness to change drinking Time points for assessment: Baseline, one-month follow-up
Notes	Date of study: not reported Funding source: not reported Declaration of interest among the primary researchers: not reported

Murphy 2010 Study 1

Methods	RCT (stratification by gender and ethnicity) in a large metropolitan public university in the Southern United States.
Participants	Total number randomised: N = 74 Mean age: 21.2 (SD = 2) years Gender: Males = 30 (41 %), Females: n = 44 (59 %) Education: first-year students: 12.2%, second-year students: 28.4%; third-year students: 31.1%, fourth-year students: 27.7% Ethnicity: 73% Caucasian, 23% African-American, 2.7% Hispanic/Latino, 2.7 % Asian, and 1.4% American Indian. Inclusion criteria: Students who were at least 18 years old and reported one or more heavy drinking episodes (>= 5/4 drinks on one occasion for a man/woman) in the past month. Because the study authors were interested in recruiting an ethnically diverse sample, and research has shown that minority students drink less than Caucasian students (Chen et al., 2004/2005), but may also begin to experience problems at lower levels of drinking (Welte & Barnes, 1987), they used a lower eligibility threshold for minority students (1 or more past month heavy drinking episode) than for Caucasian students (2 or more past-month heavy episodes) and stratified our randomization by ethnic minority status. (p. 630).

	Exclusion criteria: not reported
Interventions	Intervention: Brief Alcohol Screening and Intervention program for College Students (BASICS) (Number randomised): n = 39 Description: Interventions conducted in private lab space in the Psychology Department. The BASICS session consisted of five major parts: (a) an introductory discussion that emphasized confidentiality, harm reduction, and the student's autonomy/ responsibility to make decisions about the information provided in the session; (b) a discussion of the student's college and career goals, and how they might relate to decisions about substance use; (c) a decisional balance exercise; (d) personalized feedback; and (e) summary, goal setting, and, if the student was interested, reviewing protective Behavioral strategies. Personalized feedback elements included: (a) a comparison of the student's perception of how much college students drink and actual student norms; (b) a comparison of the student's alcohol use vs. gender-based national norms; (c) an estimated blood alcohol content (BAC) chart depicting the student's past month peak BAC and the BAC associated with a more moderate drinking episode (i.e., a DDQ entry in which the participant drank under the binge threshold and/or spaced their drinking such that their estimated BAC was less than .081); (d) alcohol-related consequences and risk behaviour, including drinking and driving and alcohol-related risky sexual behaviour; (e) a comparison of the time spent drinking with time on other activities (e.g. studying, exercising); (f) money spent on alcohol; and (g) calories consumed from alcoholic drinks. Clinicians used MI principles and methods to encourage the student to engage in discussion about the feedback. Students who were interested in changing their drinking were encouraged to set specific goals." Duration: one session (50 – 60 minutes) Delivery (e.g., via app, computer): Clinicians, i.e., eight clinical or counselling psychology doctoral students who had completed over 20 hours of training in MI that included directed readings, MI training DVDs, and supervised role-plays. Clinicians received weekly supervision (including review of session tapes) by a psychologist with extensive experience with college drinking and motivational interventions (J.G.M., M.E.M., or M.P.M.)." Comparison: Alcohol 101 Plus CD-ROM program (Number randomised): (n = 35) Description: This program features a virtual campus that students are required to navigate. They may visit different "buildings" such as the library, the dormitories, or the quad. In each location the student may view information, watch a video depicting potential negative outcomes associated with drinking (e.g. a sexual assault or a drinking and driving arrest), or take a quiz about alcohol and its effects on the body. There is also a virtual bar on the campus in which students may enter their gender, weight, drink type, and speed of consumption and receive feedback on their BAC. Students were instructed to spend at least 50 minutes navigating the virtual campus. At the end of the session, the research assistant used a feature of the program to record the components the participant had seen in

	order to ensure adequate exposure to the intervention. Thus, in addition to the difference in modality (computer vs. counsellor administered), Alcohol 101 does not include the personalized feedback (other than BAC feedback), decisional balance exercise, discussion of the relations between drinking and college/career goals, or goal setting included in the BASICS session; both interventions include similar informational content, harm reduction suggestions, and general material intended to highlight the potential risks associated with drinking (though the material highlighting risk is more personalized in the BASICS session)." Duration: At least 50 minutes, one-time session Delivery: CD-ROM
Outcomes	Primary outcome: 1) Drinks per week, measured using the Daily Drinking Questionnaire (DDQ; Collins, Parks, and Marlatt 1985); 2) frequency of heavy drinking by asking participants how many times in the past month they had engaged in a heavy drinking episode (>=5/4 drinks for a man/woman) in a 2-hour period of time. Drinks per week (African-American only; Caucasian only), Heavy drinking (African-American only; Caucasian only) Secondary outcome: Motivation to change assessed by the Readiness Ladder (Biener & Abrams, 1991) This measure includes an image of a ladder and requires that participants circle the rung that most closely corresponded to their thoughts of changing their drinking. The rungs ranged from 0 (no thought of changing) to 10 (taking action to change). This single item measure has been found to be sensitive to changes in motivation in other brief alcohol intervention studies. [other reported secondary outcomes: normative discrepancy, self-ideal discrepancy] Time points for assessment: baseline, post-test one-month follow-up [1-month follow-up not reported
Notes	Date of study: not given Funding source: Funded by research grants from the Alcohol Research Foundation (ABMRF; JGM) and the National Institutes of Health (AA016304 JGM) Declaration of interest among the primary researchers: not reported

Murphy 2010 Study 2

Methods	RCT, stratified by ethnic minority status in a large metropolitan public university in the Southern United States.
Participants	Total number randomised: N = 133 Mean age: 18.6 (SD = 1.2) years

	Gender: Males: n = 67 (49.6 %); females: n = 66 (50.4%) Education: First-year students= 98%; second-year students= 2% Ethnicity: 65.4% Caucasian, 30.1% African-American, 2.3% Hispanic/Latino, 2.3% Native American, .8% Hawaiian and .8% Asian Inclusion criteria: "Students at least 18 years old who reported one or more heavy drinking episodes (>= 5/4 drinks on one occasion for a man/woman) in the past month. Because study authors were interested in recruiting an ethnically diverse sample, and research has shown that minority students drink less than Caucasian students (Chen et al., 2004/2005), but may also begin to experience problems at lower levels of drinking (Welte & Barnes, 1987), they used a lower eligibility threshold for minority students (1 or more past month heavy drinking episode) than for Caucasian students (2 or more past-month heavy episodes) and stratified our randomization by ethnic minority status." Exclusion criteria: Not reported
Interventions	Intervention 1: Brief Alcohol Screening and Intervention program for College Students (BASICS); (computerized intervention): n = 46 Description: Interventions conducted in private lab space in the Psychology Department. The BASICS session consisted of five major parts: (a) an introductory discussion that emphasized confidentiality, harm reduction, and the student's autonomy/ responsibility to make decisions about the information provided in the session; (b) a discussion of the student's college and career goals, and how they might relate to decisions about substance use; (c) a decisional balance exercise; (d) personalized feedback; and (e) summary, goal setting, and, if the student was interested, reviewing protective Behavioral strategies. Personalized feedback elements included: (a) a comparison of the student's perception of how much college students drink and actual student norms; (b) a comparison of the student's alcohol use vs. gender-based national norms; (c) an estimated blood alcohol content (BAC) chart depicting the student's past month peak BAC and the BAC associated with a more moderate drinking episode (i.e., a DDQ entry in which the participant drank under the binge threshold and/or spaced their drinking such that their estimated BAC was less than .081); (d) alcohol-related consequences and risk behaviour, including drinking and driving and alcohol-related risky sexual behaviour; (e) a comparison of the time spent drinking with time on other activities (e.g. studying, exercising); (f) money spent on alcohol; and (g) calories consumed from alcoholic drinks. Clinicians used MI principles and methods to encourage the student to engage in discussion about the feedback. Students who were interested in changing their drinking were encouraged to set specific goals." Duration: One session (50-60 minutes) Delivery (e.g., via app, computer): Clinicians; eight clinical or counselling psychology doctoral students who completed over 20 hours of training in MI that included directed readings, MI training DVDs, and supervised role-plays. Clinicians received weekly supervision

	(including review of session tapes) by a psychologist with extensive experience with college drinking and motivational interventions (J.G.M., M.E.M., or M.P.M.)." Intervention 2 (computerized intervention): web-based feedback program e-Chug (n = 45) Description: A web-based program that includes (personalized normative feedback) PNF. an interactive web-based program that requires students to complete a brief drinking assessment that is used to instantly generate personalized feedback in the following areas: (a) quantity and frequency of drinking, (b) comparison of drinking with student norms, (c) peak BAC, (d) tolerance level, (e) alcohol related consequences, (f) money spent on alcohol, (g) calories consumed from alcohol, and (h) family risk score. Students were asked to review the feedback for at least 30 minutes and completed a brief comprehension check to ensure adequate exposure to the intervention. BASICS and e-CHUG interventions included nearly identical personalized feedback and harm reduction strategy elements. In addition to differing in treatment modality (computerized vs. counsellor administered), BASICS included three additional elements: discussion of the relations between the student's career goals and drinking, decisional balance, and goal setting." Duration: One time session consisting of a drinking assessment (6-7 minutes) + 30 minutes feedback review and brief comprehension check. Delivery: Web-based program Comparison (Number randomised): Assessment only control (n = 42) Description: Not applicable Duration: Not applicable Delivery: Not applicable We compared the BASICS group with the e-CHUG group. We also compared e-CHUG with the assessment only control group
Outcomes	Primary outcome: 1) Drinks per week, measured using the Daily Drinking Questionnaire (DDQ; Collins, Parks, and Marlatt 1985); 2) frequency of heavy drinking by asking participants how many times in the past month they had engaged in a heavy drinking episode (>=5/4 drinks for a man/woman) in a 2-hour period of time. Drinks per week (African-American only; Caucasian only), Heavy drinking (African-American only; Caucasian only)

	Secondary outcome: Motivation to change assessed by the Readiness Ladder (Biener & Abrams, 1991) This measure includes an image of a ladder and requires that participants circle the rung that most closely corresponded to their thoughts of changing their drinking. The rungs ranged from 0 (no thought of changing) to 10 (taking action to change). This single item measure has been found to be sensitive to changes in motivation in other brief alcohol intervention studies. [other reported secondary outcomes: normative discrepancy, self-ideal discrepancy] Time points for assessment: Baseline, post-test one-month follow-up [1-month follow-up not reported
Notes	Date of study: Not reported Funding source: Funded by research grants from the Alcohol Research Foundation (ABMRF; JGM) and the National Institutes of Health (AA016304 JGM) Declaration of interest among the primary researchers: Not reported

Neighbors 2004

Methods	RCT in a large north-western university in the U.S.
Participants	Total number randomised: N = 252 Mean age: 18.5 (SD=1.24) Gender: Males: n = 104 (41.3 %); females: n = 148 (58.7%) Education: Students Ethnicity: 79.5% Caucasian, 13.7 % Asian-American; 6.8% other. Inclusion criteria: Students indicating at least one heavy drinking episode (5–4 drinks at one sitting for men and women, respectively) in the previous month. Exclusion criteria: Not reported
Interventions	Intervention (number randomised): Computer-delivered personalized normative feedback: (n = 126) Description: "Participants received personalized normative feedback immediately following the completion of baseline assessment. Participants viewed the feedback on screen for approximately 1 min as it was being printed. Participants were given the printout of this information to take with them. There was no interpersonal interaction involved in the feedback intervention. The format of personalized normative feedback was modelled after the normative feedback component of the BASICS intervention (Dimeff et al., 1999)."

	Duration: Participants viewed the feedback on screen for approximately 1 min as it was being printed. Delivery (e.g., via app, computer): Computer Comparison (Number randomised): Passive control, (n = 126) Description: Following the baseline assessment, individuals in the control group were thanked for their participation Duration: not reported Delivery: not reported
Outcomes	Primary outcomes: Drinking behaviour measured as a latent variable consisting of measures of overall consumption, peak quantity, typical weekly drinking and alcohol-related problems. Secondary outcome: Alcohol-related problems Time points for assessment: 3 months and 6 months
Notes	Date of study: not reported Funding source: This study was supported in part by National Institute for Alcohol Abuse and Alcoholism Grant T32AA07455 and by the Alcohol and Drug Abuse Institute at the University of Washington Declaration of interest among the primary researchers: not reported

Neighbors 2006

Methods	RCT in a medium-sized Midwestern university in the U.S.
Participants	Total number randomised: N = 214 Mean age: 19.67 (SD=2.02) Gender: Males: n = 95 (44.4 %); females: n = 119 (55.6%) Education: 59.8 % freshmen, 25 % sophomores, 9.31 % juniors, 5.88 % seniors Ethnicity: 98.4 % Caucasian, 1.96 % other. Inclusion criteria: reporting at least one heavy drinking episode (four and five drinks at one sitting for women and men, respectively) in the previous month. Exclusion criteria: Not reported

Interventions	Intervention (number randomised): Personalized normative feedback (n = 108) Description: "Participants in the intervention condition received personalized normative feedback immediately after completing baseline assessment. They viewed the feedback on the computer screen for approximately 1 to 2 min while it was being printed. Participants were given the printout to take with them. Actual campus drinking norms were based on the screening questionnaire. Personalized normative feedback was modelled on the normative feedback component of the Brief Alcohol Screening and Intervention for College Students (BASICS); (Dimeff, Baer, Kivlahan, & Marlatt, 1999) and was identical in format to that used in Neighbors, Larimer, and Lewis (2004). Normative feedback included a summary of the student's perceived drinking norms for quantity and frequency of alcohol consumption com-pared with actual quantity and frequency norms and a summary of the student's reported consumption compared with actual norms. Each participant's percentile ranking, which was based on typical number of drinks per week and that compared his or her drinking with other college students' drinking, was also included." Duration: approx. 1-2 minutes, one feedback only Delivery (e.g., via app, computer): Computer Comparison (Number randomised):Passive control, (n = 106) Description: not applicable Duration: not applicable Delivery: not applicable
Outcomes	Primary outcomes: Alcohol consumption defined as the average number of standard drinks consumed, and the time-period of consumption for each day of the week over the previous 3 months. Final scores represent the average number of drinks consumed each week over the previous 3 months." Secondary outcome: Alcohol related problems assessed by "a modified version of the Rutgers Alcohol Problems Index (RAPI; White & Labouvie, 1989) Time points for assessment: baseline, two-month follow-up
Notes	Date of study: not reported Funding source: This research was supported in part by National Institute on Alcohol Abuse and Alcoholism Grant R01AA014576, National Center for Research Resources Grant P20RR16471, and North Dakota State University Grant in Aid NDSU 1111-3390 Declaration of interest among the primary researchers: not reported

Methods	RCT in a large public north-western university in the U.S.
Participants	Total number randomised: N = 818 Mean age: not reported for those randomised into groups Gender: Males: n = 347 (42.42 %); females: n = 471 (57.58%) Education: all freshman Ethnicity: 65.28% Caucasian, 24.21% Asian/Pacific Islander, 4.16% Hispanic/Latino, 1.47% African American, 0.49%Native American/American Indian, and 4.40% other. Inclusion criteria: "at least five/four drinks for men/women, respectively, on one or more occasions during the past month". Exclusion criteria: Not reported
Interventions	Intervention The participants were randomised to 5 groups: 1. Gender-specific feedback baseline only (n = 163) 2. Gender-specific feedback each assessment (n = 164) 3. Gender-non-specific feedback baseline only (n = 164) 4. Gender-non-specific feedback each assessment (n = 163) 5. Control (n = 164) Description: PNF: "Following the conceptualization of PNF as personalized information designed to correct overestimated normative perceptions, this intervention was extremely brief and contained only three required elements, which included information regarding (a) one's own drinking behaviour, (b) one's perceptions of other students' drinking behaviour on the participating campus, and (c) other students' self-reported drinking behaviour in text and bar graph formats. Together, these three pieces of information explicitly illustrated that participants overestimated the prevalence of drinking among their peers and, for participants who reported heavy drinking, that most students drank less than the participant did. Bar graphs were provided for weekly frequency and number of drinks consumed per week. Each graph included three bars representing the campus norm, the participants' reported perception of the campus norm, and the participants' reported behaviour. Normative feedback about episodic heavy drinking was not provided. Participants randomised to the feedback conditions were given feedback regardless of whether they overestimated the campus norm. The structures of the bar graphs were individually tailored to the participants' data so that, for each graph, the scale on the y-axis was dependent on the

	maximum of these three values for each participant. Participants were also provided with their percentile rank comparing them with other students (e.g., "Your percentile rank is 96%, which suggests that you drink more than 96% of other college students"). Participants were notified at each time-point that the information contained in the feedback came from a random sample of 2,548 freshmen students at their university." "Gender-specific feedback. Gender-specific feedback presented feedback regarding the students' own drinking behaviour, the students' reported perception of typical drinking by the average same-sex student at his/her university, and actual typical drinking by same-sex students at his/her university. Thus, gender-specific feedback followed the same format described above with the exceptions that perceived and actual norms were based on the "average same-sex" student. Duration: extremely brief Delivery (e.g., via app, computer): web-based We compared the gender-specific (baseline only) group with the gender-nonspecific (baseline only) group.
Outcomes	Primary outcomes: weekly drinks, alcohol-related problems (i.e., RAPI), and heavy episodic drinking. Secondary outcome: none Time points for assessment: baseline, two-month follow-up
Notes	Date of study: not given Funding source: Preparation of this article was supported in part by National Institute on Alcohol Abuse and Alcoholism Grants R01AA014576, K01AA016966, and T32AA007455 Declaration of interest among the primary researchers: not reported

Neighbors 2012

Methods	Design: RCT in university students from USA
Participants	Total number randomised: n = 642. Mean age: Not reported, but all participants were turning 21 during the study Gender: Males: n = appr. 276 (46.1%) Females: n = approx. 323 (53.9%) Education: Not reported, but all were students Ethnicity: 68.1% White, 15.9% Asian, 7.7% multiethnic, 8.3% "other"

	Inclusion criteria: (a) intending to consume four (for women) or five (for men) drinks during their 21st birthday; (b) listing the e-mail address of at least one friend, 18 years or older, with whom they planned to celebrate their birthday; and (c) having not previously participated in the study as a friend Exclusion criteria: Not reported
Interventions	Intervention (Number randomised): n = 110 Description: WEBBASICS – a web-based version of BASICS Duration: Unclear – the participants were able to view the feedback as often as they chose and could print the feedback if desired Delivery (e.g., via app, computer): web page Comparison (Number randomised): n = 106 Description: only assessment Duration: short – not specified Delivery: web page
Outcomes	Primary outcomes: 21st birthday drinking intentions, intended BAC, likelihood of alcohol-related 21st birthday consequences, 21st birthday drinking, 21st birthday alcohol-related consequences, satisfaction Secondary outcome: the authors did not state primary and secondary outcomes Time points for assessment: 1 week
Notes	Date of study: screening and recruitment commenced between December 2008 and December 2009 Funding source: National Institute on Alcohol Abuse and Alcoholism Grant R01AA016099 Declaration of interest among the primary researchers: not reported

Palfai 2011

Methods	Parallel RCT. 2x2 factorial design in a college in the USA.
Participants	Total number randomised: N = 119 Mean age: 18.6 years with SD 1.45 Gender: 30% males Education: students Ethnicity: 20.5% ethnic minorities 5% Hispanic, 14% Asian/pacific, 1.5% black

	Inclusion criteria: (1) Consumed alcohol in the past month and scored 8 or above on the AUDIT or (2) reported two or more heavy drinking episodes in the past month. Exclusion criteria: not reported
Interventions	**Intervention** (number randomised): not reported number randomised to each group **Description**: three intervention groups: 1) Feedback only, 2) feedback and motivational assessment, 3) motivational assessment only, **Duration:** short, but not specified **Delivery** (e.g., via app, computer): computer and pencil-and paper **Comparison** (Number randomised): not reported **Description**: information on health guidelines for sleep and consumption of fruit and vegetables **Duration**: short **Delivery**: computer
Outcomes	Primary outcomes: weekly drinking measured with a modified version of the Daily Drinking Questionnaire Secondary outcome: heavy episodic drinking (5 or more drinks in the past month for males and 4 for females) Time points for assessment: Baseline and 1 month follow-up
Notes	Date of study: not reported Funding source: NIAAA Grant P60 AA013759 Declaration of interest among the primary researchers: not reported.

Palfai 2014b

Methods	**Design:** RCT in college students in USA
Participants	**Total number randomised**: N= 1336 were initially randomised. 1137 agreed to subsequent email, and 705 completed second survey.

	Mean age: 18.23 years in the control group (SD: 0.43) and 18.18 years in the intervention group (SD: 0.45) **Gender**: 72.7% females in the control group and 70.0% in the intervention group **Education**: All were first-year students **Ethnicity**: In the control group (intervention group) there were 74.7% White (75.0%), 19.7% Asian/ Asian American (16.2%), 2.8% African American (4.4%), and were 9.2% Hispanic (8.8%) **Inclusion criteria:** First-year students 18 years or older (we included only the subgroup who were high-risk drinkers) **Exclusion criteria:** none stated
Interventions	**Intervention**: Feedback-based alcohol intervention (Number randomised): n= 890 but 456 completed follow-up **Description**: answered an online survey and received personalized feedback about their drinking behavior that would support student choices to abstain from drinking, and offer harm reduction tips regarding alcohol use. **Duration:** 15 minutes **Delivery** (e.g., via app, computer): web **Control:** (Number randomised): n= 446 but 249 completed follow-up **Description:** received standard feedback about their sleep and dietary behavior based on their responses to screening questions **Duration**: 15 minutes **Delivery**: web
Relevant outcomes	**Primary outcomes:** frequency of heavy episodic drinking **Secondary outcomes:** typical quantity per occasion in the past month, typical quantity per week in the past month **Time points for assessment**: baseline and 5 months
Notes	**Date of study**: not reported **Funding source**: National Institute on Alcohol Abuse and Alcoholism Grant P60 AA013759 **Declaration of interest among the primary researchers**: not reported

Ridout 2014

Methods	**Design:** RCT in university students from Australia
Participants	**Total number randomised**: N= 98 **Mean age:** 19.05 (SD: 1.78) **Gender**: 78.7 % female in intervention group and 81.3 % female in control group **Education**: Not reported **Ethnicity**: In the intervention/ control group there were 72.3/77.1 percent Caucasians, 21.3/16.7 Asian, 4.3/4.2 Middle Eastern and 2.1/2.1 Pacific Islanders **Inclusion criteria:** First-year students scoring 8 or above on the AUDIT **Exclusion criteria:** Not reported
Interventions	**Intervention**: Intervention group (Number randomised): n= 47 analyzed **Description**: received social norms feedback via personalized Facebook private messages over three sessions **Duration:** not reported **Delivery** (e.g., via app, computer): Facebook **Control** (Number randomised): n= 48 analyzed **Description:** No treatment control **Duration:** Not applicable **Delivery:** Not applicable
Relevant outcomes	**Primary outcomes:** Number of standard drinks in past month, Number of drinking days in past month **Secondary outcomes:** The authors did not distinguish between primary and secondary outcomes **Time points for assessment:** 1 month and 3 months

Notes	**Date of study:** not reported **Funding source**: "the DBH Scholarship" **Declaration of interest among the primary researchers:** not reported

Rocha 2013

Methods	RCT- three-group, repeated-measures in population-based study in the USA.
Participants	Total number randomised: N = 276 Mean age: 25.38 years (SD: 4.47) Gender: female (52.2 %) Education: college educated (25.7 %) Ethnicity: 82.6% White Inclusion criteria: Men with AUDIT scores of 8 and higher and women with AUDIT scores 6 and higher. Exclusion criteria: Full-time college students were excluded
Interventions	Intervention 1 (computerized intervention): PNF (n = 89) Description: Personalized normative feedback Duration: not reported Delivery (e.g., via app, computer): web page Intervention 2 PNF+PDF (computerized intervention) n = 98 personalized normative feedback + personalized drinking feedback Duration: not reported Delivery (e.g., via app, computer): web page Comparison (Number randomised): 89 Description: educational information about alcohol use. Participants in the control condition, however, completed the same pre- and follow up assessments as did participants in the two treatment conditions.

	Duration: not reported Delivery: web page We compared the PNF group to the education control group. We also compared the PNF group to the PNF + PDF group
Outcomes	**Primary outcomes:** total drinks per week measured with the Daily Drinking Questionnaire **Secondary outcome:** no relevant secondary outcomes **Time points for assessment**: baseline and 1 month follow-up
Notes	**Date of study**: not reported **Funding source**: not reported **Declaration of interest among the primary researchers**: not reported

Saitz 2007

Methods	RCT in a large urban private university in the Northeast USA.
Participants	Total number randomised: N = 650 Mean age: "freshmen" Gender: 54% females in minimal intervention group and 56% females in more extensive intervention group Education: all freshmen Ethnicity: 81% White in both groups. 12 (10) % Asian in minimal (extensive) intervention. 7(9)% other in minimal (extensive) Inclusion criteria: Unhealthy alcohol use (AUDIT >8). >18 years and had a valid university email address. Exclusion criteria: not reported
Interventions	Intervention (number randomised): n = 324 Description: More extensive intervention. Three additional web screens: (i) highest blood alcohol level

	obtained in the past month and a chart describing the effects of alcohol on cognition and behaviour at different levels, (ii) a graphic profile of consequences of drinking reported in the past year, with normative information about the percent of freshmen of the same gender experiencing these consequences and (iii) the amount of money spent per week and per year on alcohol, the number of alcohol calories consumed per month (also reported as the equivalent number of sticks of butter), and the amount of time required on a treadmill to burn these calories and maintain current weight. Duration: short Delivery (e.g., via app, computer): Web page Comparison (Number randomised): n = 326 Description: Minimal intervention consisted of three web screens. The first two showed gender-specific graphic comparison to local norms for (i) number of drinks per typical week in the past month, and (ii) number of heavy drinking episodes in the past month (defined as>5 drinks on an occasion for men,>4 for women). The third web screen provided information about drinking guidelines, dependence symptoms, pregnancy, legal drinking age, coexisting medical conditions, and medication use. Duration: short Delivery: web page
Outcomes	Primary outcomes: Number of drinks per week, heavy drinking episodes, and maximum number of drinks on a single occasion Secondary outcome: readiness to change Time points for assessment: 1 month
Notes	Date of study: invitation started on October 4, 2004. End date of study not reported

	Funding source: "This study was supported by two grants from the National Institute on Alcohol Abuse and Alcoholism (P60 AA013759 and R01 AA12617). Funding to pay the Open Access publication charges for this article was provided by Boston University School of Public Health." Declaration of interest among the primary researchers: The authors of this manuscript reported no conflicts of interest

Steers 2016

Methods	RCT in university students in USA
Participants	**Total number randomised**: N= 176 **Mean age:** 23.25 years (SD: 4.96) **Gender**: 82% female **Education**: not reported **Ethnicity**: The sample was racially (16% Asian/Pacific Islander, 14% Black, 46% White, 4% multiethnic, 20% other) and ethnically (42% Hispanic) diverse. **Inclusion criteria:** students aged 18 or over who reported at least one heaving drinking episode (4+ drinks for women/5+ drinks for men) in the past month **Exclusion criteria:** not reported
Interventions	**Intervention** 1: Descriptive only (Number randomised): n= 55 **Description**: participants received gender-specific personalize normative feedback (PNF). They also received their percentage of alcoholic intake relative to same-sex students **Duration:** not reported **Delivery** (e.g., via app, computer): web **Intervention** 2: Descriptive plus injunctive (Number randomised): n= 53

	Description: received the same feedback as the descriptive-only condition, with the addition of an emoticon to represent an injunctive message (happy face if at or below average drinking of same-sex peers; sad face if above). **Duration:** not reported **Delivery** (e.g., via app, computer): web **Control:** assessment only (Number randomised): n= 57 **Description:** The control condition received no feedback **Duration**: not relevant **Delivery**: not relevant We compared intervention 2 to the control group.
Relevant outcomes	**Primary outcomes:** self-reported drinking with the Daily Drinking Questionnaire. **Secondary outcomes:** not reported **Time points for assessment**: baseline and 2 weeks
Notes	**Date of study**: not reported **Funding source**: National Institute on Alcohol Abuse and Alcoholism (NIAAA) Grant R01AA014576. **Declaration of interest among the primary researchers**: not reported

Suffoletto 2012

Methods	RCT in emergency departments in Pittsburgh, USA.
Participants	Total number randomised: N = 45 Mean age: 21 (SD: 1.8) years Gender: Males 36%, n = 16 Education: Enrolled in college 82%, n = 37 Ethnicity: Black 24%, n = 11 Inclusion criteria: Between 18 and 24 years of age and speak English. Had to own a personal cell phone with TM features.

	Exclusion criteria: Too ill to participate (Emergency Severity Index 1 to 2) and those seeking treatment for alcohol use or psychiatric conditions.
Interventions	Intervention 1 (number randomised): n = 15 Description: Computerized intervention. Feedback Duration: extremely short – a text message every week for 12 weeks Delivery (e.g., via app, computer): text messages Intervention 2: (Number randomised): n = 15 Description: assessment only Duration: extremely short – a text message every week for 12 weeks Delivery: text messages Control: (Number randomised): n = 15 Description: no treatment control Duration: not applicable Delivery: NA We compared the text message with feedback group to the assessment only group. We also compared the text message with feedback group to the no treatment control
Outcomes	Primary outcome: Heavy drinking days measured with the Timeline Follow-Back Time points for assessment: baseline and 3 months
Notes	Date of study: Recruitment between August and September 2010 (Suffoletto BP, Callaway CW, Kraemer KL, Clark DB. Text-messaging-based intervention to reduce at-risk drinking in young adults. Alcoholism, clinical and experimental research 2011; 35:146a.) Funding source: not reported. Declaration of interest among the primary researchers: not reported

Suffoletto 2014

Methods	Design: Multicenter RCT in emergency departments in USA
Participants	Total number randomised: N = 765 Mean age: 22.0 (SD not reported) Gender: Males: n = 265 (34.6 %) Females: n = 500 (65.4 %) Education: 43.7 % had current college enrollment Ethnicity: 43.0 % African American, 49.2 % White, 7.8 % other Inclusion criteria: Age 18-25 who presented at emergency departments, medically stable, gave permission, spoke English, had AUDIT-C ≥ 3 for women and ≥ 4 for men, cell phone ownership with text messaging Exclusion criteria: seeking treatment for drugs or alcohol, been enrolled in an alcohol-related study in the prior year, past treatment for drug use or psychiatric disorders
Interventions	Intervention 1 (Number randomised): n = 384 Description: assessment with feedback via text messages Duration: short, not specified Delivery (e.g., via app, computer): web page Intervention 2 (Number randomised): n = 196 Description: assessment without feedback Duration: short, not specified Delivery (e.g., via app, computer): web page Comparison (Number randomised): n = 185 Description: control Duration: short, not specified Delivery: web page We compared intervention 1 with the comparison group We also compared intervention 1 with intervention 2
Outcomes	Primary outcome: Timeline Follow-Back Secondary outcome: Injury Behavior Checklist Time points for assessment: baseline, 3-month, 9 month follow-up
Notes	Date of study: November 2012 to November 2013

	Funding source: Emergency Medicine Foundation Grant K02 AA018195 (Chung), R01AA016482 and P50DA05605 and PA-HEAL SPH00010 (Clark), K05AA019681 and P01 AA019072 Declaration of interest among the primary researchers: not reported

Sugarman 2009

Methods	RCT at a college in the USA.
Participants	Total number randomised: N = 393 Mean age: 19.2 years among completers (SD not reported) Gender: 56.3 % female among completers Education: 51.2% were freshmen, 25.1% were sophomores, 14.9% were juniors, 6.5% were seniors and 2.3% were graduate students among completers. Ethnicity: 7.0 Hispanic, 82.8% White, 8.9% Asian/Pacific Islander, 1.9% African-American. 0.9% Native American/Alaskan. 5.6% were other ethnicity. Inclusion criteria: 18 years of older. Reported two or more heavy drinking episodes in the past month Exclusion criteria: not reported
Interventions	Intervention: personalized feedback related to alcohol use n = 186 Description: received information on: (a) the quantity and (b) the frequency of their drinking, (c) the frequency of heavy drinking episodes, (d) their average BAC and (e) their peak BAC, and (f) a list of any alcohol related problems that they reported experiencing in the past month. In addition, this information was presented in the context of (g) national and (h) local (Syracuse University) normative gender-specific data. The feedback also contained (i) educational information on BAC, (j) the effects of alcohol on the body, and (k) tips for safer drinking Duration: short Delivery (e.g., via app, computer): web Comparison: general health information (Number randomised): n = 207

	Description: Participants received general health information on the following topics: nutrition, physical activity, smoking, and making healthy choices. The information was geared toward college students and the sections on nutrition, physical activity, and smoking contained normative information related to college students in the U.S. (based on data from the National College Health Assessment; (American College Health Association, 37 2006), and contained text and numerical information designed to raise awareness and provide guidelines for healthier choices. Each topic appeared on a separate web page. The feedback forms for both conditions were equivalent in length Duration: short Delivery: web
Outcomes	Primary outcomes: Alcohol consumption measured with the Timeline Follow-Back. Average drinks per week Average drinks per drinking day No. of heavy drinking days Average BAC on drinking days Peak BAC Time points for assessment: baseline, 1 month and 2 months.
Notes	Date of study: not reported Funding source: "This work was supported in part by an American Psychological Association Dissertation Award to Dawn Sugarman, M.S., and by NIAAA grant K02- AA15574 to Kate Carey, Ph.D." Declaration of interest among the primary researchers: not reported

Voogt 2013a

Methods	Cluster-RCT in preparatory and secondary vocational education in the Netherlands. ICC's were calculated to control for the clustered data since participants were nested within classes. All regression analyses were adjusted for clustering.
Participants	Total number randomised: N = 73 classes with 609 students Mean age: 17.3 (SD = 1.3) Gender: 59.9% males Education: 16.6% attended VMBO education (voorbereidend middelbaar beroepsonderwijs, literally, "preparatory middle-level vocational education") Ethnicity: not reported

	Inclusion criteria: "Inclusion criteria of the study were that participants needed to 1) be between 15 and 20 years of age, 2) report heavy drinking in the past six months, and 3) be ready to change their alcohol consumption." "Due to the lack of readiness to change of the target population and time and financial constraints, we decided to include all heavy drinking adolescents and young adults aged 15–20 years (i.e., those meeting two out of the three inclusion criteria) in the study and run the analyses on 609 participants." Exclusion criteria: "Participants who showed symptoms of alcohol abuse or dependence (i.e., an AUDIT score of 20 above and/or received treatment for alcohol-related problems were excluded from the study because the WDYD (What Did You Drink) intervention focuses on the prevention of heavy drinking rather than problem drinking."
Interventions	Intervention (number randomised): n = 37 classes with 318 participants Description: "What Do You Drink" program Duration: Single session 20 minutes Delivery (e.g., via app, computer): web Comparison (Number randomised): 36 classes with 291 participants Description: no intervention Duration: not applicable Delivery: not applicable
Outcomes	Primary outcomes: heavy drinking, frequency of binge drinking, weekly alcohol consumption were measured with the Dutch version of the Alcohol Weekly Recall Time points for assessment: 1 and 6 months
Notes	Date of study: not reported Funding source: "The major funding agency ZonMw, The Netherlands Organization for Health Research and Development, provided a grant for this study (project no. 50-50110-96-682)." Declaration of interest among the primary researchers: "The authors declare that they have no competing interests."

Voogt 2013b

Methods	RCT in higher Professional Education (HPO) institutions and universities in the Netherlands.

Participants	Total number randomised: N = 907 Mean age: 20.8 (SD: 1.7) Gender: Males: 60.3% Education: 26.5% attending higher professional education and 73.5% attending university Ethnicity: not reported Inclusion criteria: Students between 18 and 24 years old who reported heavy drinking in the past six months, were ready to change their alcohol consumption, had daily access to the Internet, and signed an informed consent form were included in the study. Exclusion criteria: Students reporting a score of 20 or higher on the Alcohol Use Disorders Identification Test (AUDIT: [23]) and/or receiving treatment for alcohol-related problems were excluded from the study.
Interventions	Intervention (number randomised): n = 456 Description: Single session web-based brief alcohol intervention "What Do You Drink" Duration: One session, appr. 20 minutes Delivery (e.g., via app, computer): web Comparison (Number randomised): 451 Description: no intervention Duration: not applicable Delivery: not applicable
Outcomes	Primary outcomes: weekly alcohol consumption measured with the Dutch version of the Alcohol Weekly Recall, frequency of binge drinking, heavy drinking status Time points for assessment: 25 different weekly follow-ups
Notes	Date of study: not reported Funding source: "This study was funded by ZonMw, The Netherlands Organization for Health Research and Development with grant number 50-50110-96-682 (www.zonmw.nl/)." Declaration of interest among the primary researchers: "The authors have declared that no competing interests exist."

Methods	RCT at a large Midwestern university (Oklahoma?), USA.
Participants	Total number randomised: N = 152 Mean age: 20.9 (SD: 1.9) Gender: 54.6% males Education: Years of education between 14.21 and 14.54 Ethnicity: 84.6% were White. Inclusion criteria: (a) current enrolment as a college student, (b) between 18 and 25 years of age, (c) reported at least one heavy drinking episode (5 or more drinks on one occasion for males, 4 or more for females) in the last month, (d) reported drinking at least 20 drinks per month on average, and (e) reported at least one associated negative consequence of that use in the last month. Exclusion criteria: (a) Currently in treatment for alcohol abuse or dependence, (b) currently receiving treatment for a psychological or emotional disorder.
Interventions	Intervention 1 (number randomised): n = 37 Description: in-person personalized feedback intervention (not relevant for this review) Duration: 60-90 minutes Delivery (e.g., via app, computer): in person Intervention 2 (number randomised): n = 39 Description: DrAFT-CS. Drinking Assessment and Feedback Tool for College Students (computerized intervention) Duration: 45 minutes Delivery (e.g., via app, computer): computer Intervention 3 (number randomised): n = 37 Description: CA. Comprehensive assessment Duration: short Delivery (e.g., via app, computer): computer

	Comparison (Number randomised): 39 Description: minimal assessment Duration: short Delivery: computer We compared the DrAFT-CS to the minimal assessment
Outcomes	Primary outcomes: Alcohol consumption measured with a modified version of the Daily Drinking Questionnaire (typical BAC, peak BAC, weekly alcohol consumption) Time points for assessment: 10 weeks
Notes	Date of study: Not reported Funding source: "Study funding was provided by the Oklahoma Department of Mental Health and Substance Abuse Services Science to Service Grant (T. Wagener, PI). Dr. Wagener is supported by Grant T32-HL-076134-05 (R. Wing, PI) from the National Heart Blood and Lung Institute. Development of the DrAFT-CS intervention was supported by a grant from the Oklahoma Center for the Advancement of Science and Technology Health Research Program (T. Leffingwell, PI)." Declaration of interest among the primary researchers: Not reported

Walters 2007

Methods	RCT at a large Southern public university in the USA.
Participants	**Total number randomised :** N = 106 **Mean age:** not reported. freshmen **Gender:** 48.1% female **Education:** freshmen. **Ethnicity:** 72.7% Caucasians **Inclusion criteria:** freshmen who reported a heavy episodic drinking. **Exclusion criteria:** not reported

Interventions	**Intervention**: (Number randomised): n = 50 **Description:** personalized feedback on a secure web site. The feedback group received a personalized report, which was displayed immediately on the screen. **Duration:** extremely short **Delivery (e.g., via app, computer):** secure web site **Comparison:** (Number randomised): n = 56 **Description:** assessment only, but received feedback after the 16-week assessment. **Duration:** Not applicable **Delivery:** Not applicable
Outcomes	**Primary outcomes:** Alcohol consumption measured with Daily Drinking Questionnaire **Secondary outcomes:** peak BAC (not clear what is primary and secondary outcomes) **Time points for assessment:** baseline, 8 weeks, 16 weeks
Notes	Date of study: not reported Funding source: "This project was supported by a PRIME grant from the University of Texas School of Public Health." Declaration of interest among the primary researchers: not reported

Walters 2009

Methods	RCT in a medium-sized private university in the southern United States.
Participants	**Total number randomised:** N = 279 **Mean age:** 19.8 years (SD not reported) **Gender:** 64.2% female **Education:** 41.2% freshmen, 21.1% sophomores, 21.9% juniors and 15.8% seniors **Ethnicity:** 84.6% White

	Inclusion criteria: at least 18 years old and reported at least one heavy-drinking episode (i.e., 5 or more drinks for men, 4 or more drinks for women, in a single episode) in the past 2 weeks. **Exclusion criteria:** not reported
Interventions	RELEVANT FOR THE PRESENT REVIEW Feedback only (Number randomised): n = 67 Description: The feedback was modified from the electronic-Check-Up to Go (e-CHUG; http://www.e-chug.com), a commercially-available feedback program Duration: one session Delivery (e.g., via app, computer): computer Assessment only (Number randomised): n = 69 Description: assessment only Duration: extremely short Delivery: computer NOT RELEVANT FOR THE PRESENT REVIEW Intervention 2: motivational interview only (Number randomised): n = 70 Description: MI is a directive, client-centered counselling style for eliciting behaviour change by helping clients to explore and resolve ambivalence Duration: one session Delivery (e.g., via app, computer): in person Intervention 3: motivational interview with feedback (Number randomised): n = 73 Description: see above Duration: one session Delivery (e.g., via app, computer): in-person and computer
Outcomes	**Primary outcome:** drinks per week measured with a modified Daily Drinking Questionnaire **Secondary outcomes:** peak BAC (not clear what is primary/secondary)

	Time points for assessment: baseline, 3 months, and 6 months
Notes	Date of study: "during the Fall of 2006 and Spring of 2007" Funding source: "This project was supported by R01 AA016005-01 funded by the National Institute of Alcohol Abuse and Alcoholism." Declaration of interest among the primary researchers: not reported

Walton 2010

Methods	RCT in emergency department in the USA.
Participants	**Total number randomised :** N = 726 **Mean age:** 16.8 (SD: 1.3) **Gender:** 43.5% male **Education:** not reported **Ethnicity:** 55.9% African American, 39.1% White, 5.0% other. **Inclusion criteria:** Emergency department patients aged 14 to 18 years who presented for medical illness or injury **Exclusion criteria:** acute sexual assault or suicidal ideation, altered mental status precluding consent, or medical instability (i.e., abnormal vital signs).
Interventions	RELEVANT FOR THIS REVIEW Intervention: computerized brief intervention (Number randomised): n = 237 Description: The SafERteens brief interventions were based on principles of motivational interviewing but also involved normative resetting and alcohol refusal and conflict resolution skills practice. An animated character guided participants through the intervention components via audio feedback for the choices made, focusing on tipping the decisional balance away from risk behaviours. The entire computer program was an interaction, not passively viewed. For example, during the role-play scenarios, participants had to interact with peers and make behavioural choices about drinking and fighting Duration: one session

	Delivery (e.g., via app, computer): computer Comparison: (Number randomised): n = 235 Description: control group received only a brochure Duration: not applicable Delivery: brochure NOT RELEVANT FOR THIS REVIEW Therapist brief intervention (Number randomised): n = 254 Description: The sections included goals, personalized feedback for alcohol, violence, and weapon carriage, decisional balance exercise for the potential benefit of staying away from drinking and fighting, 5 tailored role plays (e.g., anger management, conflict resolution, alcohol refusals, not drinking and driving), and referral Duration: not reported Delivery: in person
Outcomes	**Primary outcomes:** alcohol misuse (AUDIT-C), any binge drinking **Secondary outcomes:** no relevant ones for the present review **Time points for assessment:** baseline, 3 months, 6 months
Notes	Date of study: Between September 2006 and September 2009 Funding source: This project was supported by National Institute on Alcohol Abuse and Alcoholism (NIAAA) grant 014889. Declaration of interest among the primary researchers: "Financial Disclosures: None reported." "Role of the Sponsor: The NIAAA had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; or preparation, review, or approval of the manuscript."

Methods	RCT in undergraduate psychology course at a large Midwestern university, USA.
Participants	**Total number randomised:** N = 176 **Mean age:** not reported **Gender:** 89 men (50.6%) and 87 (49.4%) women **Education:** "freshmen" 41.2 %, sophomores 20.5% **Ethnicity:** 83.1% White in both groups. **Inclusion criteria:** consumed alcohol, currently enrolled in college, between 18 and 25 years of age, at least one heavy episodic drinking episode in the last month, drinking at least 20 drinks per month on average, and at least one negative consequence related to alcohol use within the past month. **Exclusion criteria:** endorsed current treatment for an alcohol use disorder or currently being treated for a psychological disorder.
Interventions	Intervention 1: DrAFT-CS (Number randomised n = 47) Description: The Drinking Assessment and Feedback Tool for College Students (computerized intervention) Duration: short Delivery (e.g., via app, computer): Web page Intervention 2: DrAFT-CS+ (Number randomised n = 44) Description: The Drinking Assessment and Feedback Tool for College Students + moderation skills (computerized intervention) Duration: short Delivery (e.g., via app, computer): Web page Intervention 3: MOI (Number randomised n = 39) Description: Moderation skills only Duration: short Delivery (e.g., via app, computer): Web page

	Control: Assessment only (Number randomised: n = 46) Description: assessment only Duration: short Delivery: web page We compared feedback + moderation skills with feedback only We also compared feedback + moderation skills with assessment only
Outcomes	**Primary outcomes:** Daily alcohol consumption measured with the Daily Drinking Questionnaire (the DDQ) **Secondary outcomes:** Frequency and amount of alcohol consumed over the past month assessed using the Frequency-Quantity Questionnaire (the FQQ). NOTE: not clear what was primary and secondary outcomes. **Time points for assessment:** 1 month
Notes	Date of study: start and end dates of study not reported Funding source: "This study was in part supported by an NIH Ruth L Kirchstein National Research Service Award (T32 AA013526 10) to Kenneth J. Sher, PhD." Declaration of interest among the primary researchers: not reported

Weitzel 2007

Methods	RCT at a private university in the south-eastern United States.
Participants	**Total number randomised:** N = 40 **Age:** 19.2 years (SD not reported) **Gender:** 22 (55%) females **Education:** 9 (22.5%) freshmen, 21 (52.5%) sophomores, 5 (12.5%) juniors, and 4 (10%) seniors. **Ethnicity:** 30 (75%) White, 5 (12.5%) Black, 2 (5%) Asian, 1 (2.5%) Hispanic, and 1 (2.5%) other

	Inclusion criteria: drinking more than once a week, 18 years of age or older, US citizens. **Exclusion criteria:** not reported
Interventions	Intervention: Handheld-plus-messaging (Number randomised): n = 20 Description: used handheld computers to complete daily surveys and to receive individual tailored messages. The tailored messages addressed consequences of alcohol use and were tailored to respondents' reported behaviour, self-efficacy and outcome expectancies regarding alcohol related consequences. Duration: Short. Participants received a daily text message for 14 days Delivery (e.g., via app, computer): text messages via handheld computer Comparison: Handheld only (Number randomised): n = 20 Description: received daily surveys Duration: Short. Participants received a daily text message for 14 days Delivery: text messages via handheld computers
Outcomes	**Primary outcome:** drinks per drinking day (Timeline Follow-Back) **Secondary outcomes:** Alcohol consumed total drinks during study period, drinking days, **Time points for assessment:** baseline and 14 days after baseline (i.e. immediately following end of intervention period)
Notes	Date of study: not reported Funding source: National Institute on Alcohol Abuse and Alcoholism grant 5R21AAD13969-02 Declaration of interest among the primary researchers: not reported

Methods	**Design:** RCT in college students from USA
Participants	**Total number randomised:** N= 94 **Age:** 20.5 years (SD: 1.7) **Gender:** 27.7% were women **Education:** not reported **Ethnicity:** The sample was 71.3% White, 21.3% Asian, 3.2% American Indian/Alaskan Native, 3.2% African American, 1% Native Hawaiian/Pacific Islander, and 2.1% Hispanic or Latino **Inclusion criteria:** non-treatment seeking college students, at least one episode of heavy drinking (5/4 drinks per occasion for men/women) in the past 2 weeks and reported concurrent smoking and drinking at least once a week. **Exclusion criteria:** not reported
Interventions	**Intervention 1**: (Number randomised): n= 32 **Description**: intervention derived from the BASICS program **Duration:** short daily messages for 14 days **Delivery** (e.g., via app, computer): web-enabled phone **Intervention 2**: (Number randomised): n= 33 **Description**: mobile assessment-only **Duration:** short daily messages for 14 days **Delivery** (e.g., via app, computer): web-enabled phone **Comparison** (Number randomised): n= 29 **Description**: minimal assessment control group **Duration**: only baseline screening and follow-up **Delivery**: web-enabled phone

	We compared the BASICS intervention with assessment only. We also compared BASICS with minimal assessment.
Relevant outcomes	**Primary outcomes:** drinks per drinking day, heavy drinking days **Secondary outcomes:** no secondary outcomes reported **Time points for assessment**: baseline, 1 month
Notes	**Date of study**: not reported **Funding source**: "Supported by the National Institute on Alcohol Abuse and Alcoholism (Grant AA018336)." **Declaration of interest among the primary researchers**: not reported

Studies on cannabis

Elliot 2012

Methods	RCT. Stratified by gender. Psychology course at a university in the USA.
Participants	Total number randomised: N = 317 Mean age: 19.34 (SD not reported) Gender: Male: 48%; Female: 52% (splitting by gender) Education: first year of college: 42 %; second year of college: 26% Ethnicity: White: 78% Inclusion criteria: Past-month marijuana users (the participants reported marijuana use for 11 days per month) Exclusion criteria: Non-traditional students (two aged 27, one aged 42).
Interventions	Intervention (Number randomised): eToken – full assessment, n = 161 Description: Baseline full assessment: received all measures but questionnaire rating intervention satisfaction; baseline abbreviated assessment: only demographic information and social desirability measure (p. 19). Marijuana e-Checkup to go (e-Toke) for Universities

	and Colleges (San Diego State University Research Foundation, 2009). E-Toke is a brief web-based intervention designed to help college students think about their personal marijuana use and consider options for decreasing use. 'The program includes several screens of assessment regarding marijuana use, pros and cons, perceived norms of use, other valued activities, involvement with alcohol and cigarettes, and money spent on all substances. Several screens of feedback compare perceived norms with actual norms, provide feedback on annual money spent on substances (with comparisons with other possible uses of these funds), provide suggestions for campus resources that may fit their needs, and provide possible first steps to decreasing use. The program allows completers to move through the program at any pace, and the program can be completed at any computer with Internet access.' (p. 25) Duration: approx. 20 minutes Delivery (e.g., via app, computer): Computer program provided in a link in the e-mail sent to interested participants Quote: "Completion of the intervention was monitored twice weekly by the investigator to ensure participation (token numbers of completed interventions were provided by the intervention company via emailed Excel databases). Email reminders were given for participants who did not complete the intervention promptly (i.e., reminders were sent after approximately one week, ten days, and two weeks, as necessary)." (p. 20) Comparison (Number randomised): Assessment-only control, n = 156; 85 had a full baseline assessment, 71 had an abbreviated baseline assessment Description: Baseline full assessment: received all measures but questionnaire rating intervention satisfaction; Baseline abbreviated assessment: only demographic information and social desirability measure (Duration: not reported Delivery: computer
Outcomes	Primary outcome: Substance use –marijuana, measured by the Revised Drug History Questionnaire (Appendix C; Sobell, Kwan, & Sobell, 1995) (slightly modified). This questionnaire assessed typical method, age of first use, frequency of use, and recency of use. Research has shown lifetime use and past-year use responses to be perfectly reliable over an interval of three weeks, with significant correlations in responses to number of years used ($r = 0.74$, $p < 0.001$) and frequency of past month use ($r = 0.49$, $p < 0.05$) (Sobell, Kwan, & Sobell, 1995) Secondary outcome: Marijuana problems, measured by the Rutgers Marijuana Problems Inventory at both time points (RMPI; White, Labouvie, & Papdaratsakis, 2005), an adaptation of the Rutgers Alcohol Problems Inventory (White & Labouvie, 1989) (see Appendix

	D). Participants rated 18 possible problems resulting from marijuana use in terms of their frequency of occurrence: never, 1-2 times, 3-5 times, 6-10 times, or more than 10 times in the last month. " Time points for assessment: Baseline, 1-month follow up
Notes	Date of study: not given Funding source: The author has received a couple of fellowships and funding during the period she conducted her PhD (see CV, p. 79) Declaration of interest among the primary researchers: not reported

Lee 2010

Methods	RCT – two arms, stratified randomization procedure to produce groups with equivalent use rates at randomization. Large public university in the Northwest USA.
Participants	Total number randomised: N = 341 Mean age: 18.03 years (SD: 0.31) Gender: Females: 54.55% (n = 186); males: 45.45 % (n = 155) Education: not reported Ethnicity: Ethnic representation consisted of 68.33% White, 15.54% Asian, 1.47% African American, 6.16% Hispanic, 0.88% Native American, 0.59% Hawaiian/Pacific Islander, and 7.04% other or not indicated. Total group white: 75.74 (n = 256) Control group white: 72.35% (n = 123) Feedback white: 79. 17% (n = 133) Inclusion criteria: any use of marijuana in the 3 months prior to screening (participants reported using marijuana about 12 times in the last 90 days, which is about once each week.) Exclusion criteria: not reported
Interventions	Intervention (Number randomised): Personalized Feedback Intervention (PFI): n = 171 Description: Quote: "Students in the intervention group received individual personalized feedback based on baseline information. On completion of the baseline survey, PFI participants could immediately view feedback online and could choose to print feedback to their own printer. Participants could return to view feedback on the web for 3 months." "The feedback was primarily text based but

	incorporated pictures to enhance interest and appeal as well as figures/graphs representing normative information and comparisons. Participants were presented with feedback about their marijuana use (e.g., frequency and quantity of use), perceived and actual descriptive norms for marijuana use (e.g., how frequently they believe the typical student uses marijuana), and perceived pros and cons of using marijuana. Self-reported negative consequences were included in the feedback as well as ways in which reducing or eliminating marijuana use might be associated with reduced social and academic harm and participants own cost-benefit scale for use. Finally, skills training tips for avoiding marijuana and making changes in one's use were provided, as well as limited alcohol feedback. Perceived high-risk contexts and alternative activities around campus and in the community were provided." Duration: not reported Delivery (e.g., via app, computer): web-based Comparison (Number randomised): Control (n = 170) Description: Quote: "Students randomised to the control condition did not receive any feedback or information. Students were asked to complete web-based assessments." Duration: not reported Delivery: web-based
Outcomes	Primary outcome: Marijuana use defined as days used marijuana. Self. Report via web by asking participants "On how many days did you use any kind of marijuana or hashish?" in the last 90 days. Items were adapted from the Global Appraisal of Individual Needs–I (Dennis et al., 2002). Secondary outcome: Consequences of marijuana measured by item: "Not able to do your homework or study for a test" and "Missed out on other things because you spent too much money on marijuana." Items were summed to assess number of different problems experienced." Time points for assessment: baseline, 3-month, 6-month
Notes	Date of study: August/September 2005 (start) Funding source: This research was supported by National Institute on Drug Abuse Grant DA019257 Declaration of interest among the primary researchers: not reported

Palfai 2014

Methods	Individual RCT in university in Boston, USA.
Participants	Total number randomised: N = 123 Mean age: 19.33 to 20.33 in the four groups. (SD not reported) Gender: Males: 38% to 46% in the four groups. Education: Undergraduate students Ethnicity: Not reported Inclusion criteria: Undergraduate students with at least monthly marijuana use. Exclusion criteria: ASSIST >=27
Interventions	Intervention: eCHECKUP TO GO (Number randomised): n = 61 Description: Commercially available intervention involving assessment and feedback Duration: short Delivery (e.g., via app, computer): computer Comparator: no treatment control Number randomised: n = 62 Duration: not reported Delivery: not reported.
Outcomes	Primary outcomes: Number of days used marijuana in the last 90 days. Time points for assessment: baseline, 3, and 6 months follow-up
Notes	Date of study: not reported Funding source: This research was supported in part by a grant from the National Institute on Drug Abuse, R34 DA029227-01A1 to the first author Declaration of interest among the primary researchers: The authors state that there are no conflicts of interest

Studies on alcohol and cannabis

Christoff 2015

Methods	**Design:** 4-armed RCT in college students in Brazil
Participants	**Total number randomised:** N= 458 **Mean age:** 24 (SD: 5.4) **Gender:** 57.7 % female **Education:** undergraduate students **Ethnicity:** not reported **Inclusion criteria:** undergraduate students, ≥18years **Exclusion criteria:** engaging in other substance treatments/programs before or during the study
Interventions	**Intervention 1:** (Number randomised): n= 128 **Description:** Computer ASSIST (Alcohol Smoking and Substance Involvement Screening Test). ASSIST is based on the traditional motivational interview using some main elements: Feedback, Responsibility, Advice, Menu of Options, Empathy, and Self-Efficacy (FRAMES) **Duration:** ~20 minutes **Delivery (e.g., via app, computer):** web page **Intervention 2:** (Number randomised): n= 106 **Description:** non-computerized ASSIST **Duration:** 5-20 minutes **Delivery (e.g., via app, computer):** web page **Comparison:** (Number randomised): n= 99 **Description:** assessment only control **Duration:** 5 minutes

	Delivery: web page We compared intervention 1 to the comparison group
Relevant outcomes	**Primary outcomes:** ASSIST substance involvement scores **Secondary outcomes:** none reported **Time points for assessment:** 3 months
Notes	**Date of study**: not reported **Funding source**: "No specific funding for this study was provided, only the institutional (UFPR) support was given." **Declaration of interest among the primary researchers**: "All authors declare that they have no conflicts of interest."

Jonas 2012

Methods	RCT from Germany. Users of alcohol and cannabis who use drugcom.de that is an information web page, provided by the Bundeszentrale fuer gesundheitliche Aufklärung.
Participants	Total number randomised: N=302 Mean age: 24.2 (SD: 5.8) Gender: Male=65.2 %, female: 34.8 Education: Upper secondary education: 69.0 % Ethnicity: Not reported Inclusion criteria: Participants between 18 and 35 years, characterized by problematic use of cannabis and alcohol Exclusion criteria: Users which gave contradictive replies, or who were already in professional treatment.
Interventions	Intervention (Number randomised): n = 150 (alcohol n = 117, cannabis n = 33) Description: MI-Chat. Counselling activities provided by professional counsellors with an additional qualification in MI. The aim of the MI-intervention was to increase motivation for change in terms of alcohol and cannabis use among the participants. Quality check Duration: Mean: 28.9 minutes (SD: 20.2)

	Delivery (e.g., via app, computer): Chat, professional counsellors with and additional qualification in MI **Comparison** (Number randomised): (n = 152) **Description**: Chat. Student assistants queried participants according to the self-evaluation and the results of that evaluation. Chat-talks were verified by the project leader **Duration:** Mean = 10.6 minutes (SD: 10.3) **Delivery:** Chat, student assistants who had received some training to supervise the chat
Outcomes	**Primary outcome:** Alcohol consumption frequency during the last 30 days, cannabis consumption frequency (in days) during the last 30 days **Secondary outcome:** Alcohol consumption in gram, heavy drinking episodes during the last 7 days **Time points for assessment:** Baseline, 1 and 3 months follow-up
Notes	**Date of study:** From 30.9.2010 to 28.2.2011 **Funding source:** Bundeszentrale fuer gesundheitliche Aufklärung (BZgA) **Declaration of interest among the primary researchers:** not reported

Towe 2012

Methods	RCT in college in USA (Virginia)
Participants	**Total number randomised:** N = 82 **Mean age:** 19.6 years (SD not reported) **Gender**: 47.6% female **Education**: 26.8% in first year of college, and 37.8% in second year, 14.6% in third year and 20.7% in fourth year or higher **Ethnicity**: 87.8% Caucasian, 2.4% Asian or Asian American, 1.2% African American, 1.2% Hawaiian or Pacific Islander, and 7.4% Multi-Racial or Other. 6% were Hispanic or Latino **Inclusion criteria:** ≥18 years, at least six days of marijuana use in the past 30 days, and endorsing at least one problem associated with marijuana use.

	Exclusion criteria: not reported
Interventions	Intervention: personalized feedback report (Number randomised): n = 41 Description: personalized normative feedback based on the participant's responses to assessments of marijuana use. Graphics showed the participant's reported amount om time spent using marijuana, amount of money spent on marijuana and other variables related to marijuana use. The participant's top five life goals were presented, along with their ratings of how their marijuana use impacts these goals. Duration: 15 minutes Delivery (e.g., via app, computer): web Comparison: (Number randomised): n=41 Description: non-personalized educational information about marijuana Duration: 15 minutes Delivery: web
Outcomes	Primary outcomes: problems associated with marijuana use Secondary outcomes: self-reported days of marijuana use, CUPIT score (Cannabis Use Problems Identification Test), number of reported DSM-IV criteria (Diagnostic and Statistical Manual of Mental Disorders, fourth edition) Time points for assessment: baseline, 1 month, 3 months
Notes	Date of study: Data collection occurred across the Fall 2011 and Spring 2012 semesters Funding source: (probably) Virginia Polytechnic Institute and State University Declaration of interest among the primary researchers: not reported

Methods	RCT in Community Health Clinics in urban areas in the Midwest, Michigan, USA.
Participants	Total number randomised: N = 328 (completed baseline). Mean age: 16.3 (SD: 1.6) Gender: 33.5% male Education: not reported Ethnicity: 60.7% African-American, 11.0% Hispanic ethnicity. Inclusion criteria: Age 12-18 presenting to federally-qualified community health clinics in urban areas in the Midwest and reporting cannabis use. Exclusion criteria: Not explicitly stated
Interventions	Intervention 1: Computer-based intervention (CBI) (Number randomised): n = 100 Description: 'The CBI was a stand-alone interactive animated program with touch screens. A selected virtual buddy guided participants through the program and provided audio feedback (via headphones)…during the decisional balance exercise the participants selected reasons for staying away from cannabis and the buddy provided affirmation and summaries. During the role plays, participants watched animated situations, and then were asked to make a behavioural choice. If a participant chose a negative option (e.g. smoking cannabis, they were asked to consider the consequences in relation to their goals. Once a positive choice was made, the animation resumed, modelling this selection." Duration: not reported. Delivery (e.g., via app, computer): Web-based Intervention 2: Therapist brief intervention (number randomised): n = 118 Description: Brief Motivational Intervention (BMI-T): social worker/therapist-delivered intervention Duration: 25 minutes Delivery: by social worker/therapist

	Comparison: Control (Number randomised): (n = 110) Description: "Participants in the control were handed a tri-fold brochure containing warning signs of cannabis problems, resources (substance use treatment, suicide hotlines, employment services, leisure activities) and cannabis information web sites. This 'enhanced usual care' control (clinics did not routinely provide this information) was chose for ethical reasons)." Duration: not reported Delivery: brochure We compared the computer intervention to the educational control We also compared the computer intervention to the therapist intervention
Outcomes	Primary outcomes: frequency of cannabis use, frequency of other drug use, frequency of alcohol use measured using Add Health Items Secondary outcomes: Not clear what were primary and secondary. Time points for assessment: baseline, 3, 6, and 12 months follow-up
Notes	Date of study: April 2007 to December 2009. Funding source: This project was supported by a grant (#DA020075) from the National Institute of Drug Abuse (NIDA). Trial registration: ClinicalTrials.gov Identifier NCT01329315 Declaration of interest among the primary researchers: "The authors do not have any conflicts of interest to declare."

APPENDIX 5. CHARACTERISTICS OF EXCLUDED STUDIES

Alfonso 2013

Reason for exclusion	Wrong population: did not exclusively focus on high-risk drinkers

Andersson 2009

Reason for exclusion	Missing results: there are no results for group differences in alcohol consumption

Armitage 2014

Reason for exclusion	Wrong intervention: wrong route of administration

Baguley 2013

Reason for exclusion	Missing results: conference abstract with lack of information

Bannink 2014

Reason for exclusion	Wrong intervention

Becker 2014

Reason for exclusion	Wrong patient population

Bendtsen 2012

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Berglund 2012

Reason for exclusion	Not alcohol as outcome

Bernstein 2015

Reason for exclusion	Missing results: conference abstract with lack of information

Bersamin 2007

Reason for exclusion	Wrong population: did not exclusively focus on high-risk drinkers

Bewick 2008

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Bewick 2013

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Bingham 2010

Reason for exclusion	Wrong population: did not exclusively focus on high-risk drinkers

Bingham 2011

Reason for exclusion	Wrong population: did not exclusively focus on high-risk drinkers

Blow 2015

Reason for exclusion	Missing results: conference abstract with lack of information

Bogenschutz 2014

Reason for exclusion	Wrong patient population

Borsari 2014

Reason for exclusion	Wrong intervention

Braitman 2015

Reason for exclusion	Wrong intervention: wrong dose

Bryant 2010

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Bryant 2013

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Burner 2015

Reason for exclusion	Missing results: conference abstract with lack of information

Cadigan 2015

Reason for exclusion	Missing results: conference abstract with lack of information

Carey 2006

Reason for exclusion	Wrong intervention: not a brief intervention

Carey 2011

Reason for exclusion	Wrong intervention: intervention lasted longer than one hour

Champion 2016

Reason for exclusion	Wrong population: participants were too young (13 years)

Clarke 2015

Reason for exclusion	Missing results: conference abstract with lack of information

Croom 2009

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Croom 2014

Reason for exclusion	Wrong patient population

Cunningham 2009

Reason for exclusion	Wrong outcome: did not include alcohol or cannabis use as primary outcome. Only secondary outcomes (e.g., self-efficacy, readiness to change, etc.) were measured

Cunningham 2012a

Reason for exclusion	Wrong outcome: the outcome was AUDIT-C, which is not a direct assessment of alcohol quantity

Cunningham 2012b

Reason for exclusion	Wrong outcome: the outcome was AUDIT-C, which is not a direct assessment of alcohol quantity

Cunningham 2015a

Reason for exclusion	Wrong patient population

Cunningham 2015b

Reason for exclusion	Missing results: conference abstract with lack of information

Deady 2016

Reason for exclusion	Missing results: conference abstract with insufficient information

Deluca 2015

Reason for exclusion	Wrong study design. Study protocol

Donovan 2015

Reason for exclusion	Wrong intervention. Wrong dose

Doumas 2008a

Reason for exclusion	Wrong population: The study population included all employees between 18 and 24 years using drinking risk-status as a moderator

Doumas 2008b

Reason for exclusion	Wrong population: did not exclusively focus on high-risk drinkers

Doumas 2010

Reason for exclusion	Wrong population: group of high-risk drinkers < 50 % (25%)

Doumas 2011

Reason for exclusion	Wrong population: did not exclusively focus on high-risk drinkers

Doumas 2013

Reason for exclusion	Wrong population: participants were too young. They were 9th grade students. Mean age was 14.21 years

Doumas 2014a

Reason for exclusion	Wrong patient population

Doumas 2014b

Reason for exclusion	Wrong patient population

Doumas 2014c

Reason for exclusion	Wrong patient population

Duncan 2000

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Edwards 2014

Reason for exclusion	Missing results: conference abstract with lack of information

Edwards 2015

Reason for exclusion	Missing results: conference abstract with lack of information

Elliot 2012a

Reason for exclusion	Wrong population: participants were not risky alcohol or marijuana users

Epton 2014

Reason for exclusion	Wrong patient population

Fazzino 2016

Reason for exclusion	Wrong intervention. Wrong comparator

Gilbertson 2013

Reason for exclusion	Wrong population: not high-risk drinkers

Gilbertson 2015

Reason for exclusion	Missing results: conference abstract with lack of information

Hester 2005

Reason for exclusion	Wrong population: participants were too old: mean age was 45-46 years old

Hester 2011

Reason for exclusion	Wrong population: participants were too old. Average age were 48.7 and 52.1 years old in the two arms, respectively

Hester 2013a

Reason for exclusion	Wrong population: participants were too old. Mean age was 44.1 years

Hester 2013b

Reason for exclusion	Wrong population: participants were too old

Hides 2014

Reason for exclusion	Wrong study design. Study protocol

Hustad 2009

Reason for exclusion	Wrong population: not high-risk drinkers

Hustad 2010

Reason for exclusion	Wrong population: did not exclusively focus on high-risk drinkers

Jander 2016

Reason for exclusion	Wrong patient population

Juarez 2006

Reason for exclusion	Not a computerized intervention

King 2014

Reason for exclusion	Missing results: conference abstract with lack of information

Kypri 2005

Reason for exclusion	Wrong population: did not focus on high-risky drinkers

LaBrie 2008

Reason for exclusion	Wrong population: the study includes students in general, not high-risky drinking students

Lane 2012

Reason for exclusion	Wrong intervention: the study looks at interventions with an approximate length of 90 minutes. We excluded the study as it does not deal with computerized brief interventions

Larimer 2013

Reason for exclusion	Wrong population: not high-risk drinkers

Lau-Barraco 2008

Reason for exclusion	Wrong intervention: the study looks at interventions with a duration of more than 60 minutes. We excluded the study as it does not deal with computerized brief interventions

Lee 2014

Reason for exclusion	Wrong patient population

Leffingwell 2007

Reason for exclusion	Missing results: conference abstract with insufficient results and the authors have not responded to requests for data

Lettow 2015

Reason for exclusion	Wrong patient population

Lovecchio 2010

Reason for exclusion	Wrong intervention: not a brief intervention

Lovecchio 2010a

Reason for exclusion	Wrong intervention: not a brief intervention

Maio 2005

Reason for exclusion	Wrong population: universal intervention in that patients aged 14 to 18 years presenting to the ED within 24 hours after an acute minor injury were enrolled regardless of previous alcohol experience

Martens 2009

Reason for exclusion	Wrong population: not high-risk drinkers

Martens 2010

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Mathews 2007

Reason for exclusion	Wrong population: participants were not high-risk drinkers. Outcomes were not alcohol use

McCambridge 2013

Reason for exclusion	Wrong population: participants were not high-risk drinkers

McCambridge 2014

Reason for exclusion	Wrong patient population

McGeary 2014

Reason for exclusion	Wrong intervention. Wrong dose

Meier 1988

Reason for exclusion	Wrong population: did not exclusively focus on high-risk drinkers

Merrill 2016

Reason for exclusion	Wrong outcomes

Miller 2001

Reason for exclusion	Wrong intervention: not brief intervention (>90 minutes). Not exclusively high-risk drinkers

Miller 2013

Reason for exclusion	Wrong design. Letter to editor

Miller 2015

Reason for exclusion	Wrong design

Miller 2016

Reason for exclusion	Wrong patient population

Monti 2007

Reason for exclusion	Not a computerized intervention

Moore 2005

Reason for exclusion	Wrong population: did not exclusively focus on high-risk drinking students

Moore 2012

Reason for exclusion	Wrong population: participants were not high-risk drinkers. Outcomes were not alcohol use

Moore 2013

Reason for exclusion	Wrong intervention. Wrong dose

Moreira 2012

Reason for exclusion	Wrong population: did not exclusively focus on high-risk drinkers

Murphy 2004

Reason for exclusion	Not a computerized intervention

Musiat 2014

Reason for exclusion	Wrong intervention. Wrong dose

Neighbors 2009a

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Neighbors 2011

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Neighbors 2011a

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Ondersma 2005

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Ondersma 2007

Reason for exclusion	Wrong population: half of the participants were older than 25 years old

Ondersma 2011

Reason for exclusion	Wrong population: half of the participants were older than 25 years old

Ondersma 2014

Reason for exclusion	Wrong population: half of the participants were older than 25 years old

Palfai 2015

Reason for exclusion	Wrong study design

Paschall 2006

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Paschall 2011

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Paschall 2011a

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Paschall 2014

Reason for exclusion	Wrong intervention. Wrong dose

Patrick 2014

Reason for exclusion	Wrong intervention. Wrong dose

Pedersen 2012

Reason for exclusion	Wrong population: participants were not high-risk drinkers

Pemberton 2011

Reason for exclusion	Wrong population: 54.5 percent were older than 25 years

Reid 2015

Reason for exclusion	Wrong intervention: intervention was not brief (2 hours)

Riordan 2015

Reason for exclusion	Wrong intervention

Rodriguez 2015

Reason for exclusion	Wrong study design

Rooke 2014

Reason for exclusion	Wrong patient population

Schaub 2015

Reason for exclusion	Wrong population: many participants were in their 40s.

Schinke 2010

Reason for exclusion	Wrong population: the participants were too young (less than 11 years old)

Schuckit 2015

Reason for exclusion	Wrong intervention: not a brief intervention

Schulz 2014

Reason for exclusion	Wrong patient population

Schwartz 2014

Reason for exclusion	Wrong patient population

Schwinn 2015

Reason for exclusion	Wrong patient population

Shakeshaft 2014

Reason for exclusion	Wrong intervention

Shrier 2014

Reason for exclusion	Wrong study design

Sinadinovic 2014

Reason for exclusion	Wrong patient population

Spijkerman 2010

Reason for exclusion	Could not compute effect size

Steers 2015

Reason for exclusion	Missing results: conference abstract with lack of information

Strohman 2015

Reason for exclusion	Wrong intervention. Wrong dose

Strohman 2016

Reason for exclusion	Wrong outcomes

Terlecki 2015

Reason for exclusion	Wrong intervention

Tossman 2008

Reason for exclusion	Wrong intervention: not a brief intervention

Tossman 2011

Reason for exclusion	Wrong intervention: the intervention was too long: 50 days

Van Lettow 2015

Reason for exclusion	Wrong population: participants were too old; mean age was 37 years

Voogt 2014

Reason for exclusion	Wrong intervention. Wrong dose

Wall 2008

Reason for exclusion	Wrong design: retrospective post-test only design

Walton 2008

Reason for exclusion	Wrong population: average age was 27.8 years

Walton 2009

Reason for exclusion	Wrong outcomes: outcomes were attitudes and self-efficacy etc.

Walton 2014

Reason for exclusion	Wrong patient population

Walton 2015a

Reason for exclusion	Wrong outcomes

Walton 2015b

Reason for exclusion	Missing results: conference abstract with lack of information

White 2007

Reason for exclusion	Wrong intervention: not a computerized intervention

Wiers 2015a

Reason for exclusion	Wrong population: participants were too old (> 40 years)

Wiers 2015b

Reason for exclusion	Wrong patient population

CampbellCollaboration

About this review

Alcohol abuse and use of recreational drugs among young people are significant public health concerns. These should be adddressed by effective interventions that provide assistance and counselling to drug and alcohol users.

A computerized brief intervention is any preventive or therapeutic activity delivered through online or offline electronic devices, such as a mobile phone, and administered within an hour or less, even a few minutes, of the substance abuse. Such interventions aim to reduce alcohol abuse or drug abuse in general. This review assesses research on the effectiveness of early, computerized brief interventions on alcohol and cannabis use by young people who abuse either one or both of these substances.

The Campbell Collaboration
info@campbellcollaboration.org
Phone: (+47) 23 25 50 00

Mailing address:
P.O. Box 4404, Nydalen
N-0403 Oslo, Norway

Visiting address:
Pilestredet Park 7
(Entrance from Stensberggata)

Website:
www.campbellcollaboration.org