# Social norms interventions to reduce alcohol misuse in University or College students (Review)

**Moreira MT, Smith LA, Foxcroft D**


This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2010, Issue 1

http://www.thecochranelibrary.com

## TABLE OF CONTENTS

[Intervention Review]

# Social norms interventions to reduce alcohol misuse in University or College students

Maria Teresa Moreira[1], Lesley A Smith[1], David Foxcroft[1]

[1]School of Health and Social Care, Oxford Brookes University, Oxford, UK

Contact address: Maria Teresa Moreira, School of Health and Social Care, Oxford Brookes University, Jack Straws Lane Marston, Oxford, Oxford OX3 0FL, UK. m.teresa.moreira@googlemail.com.

**Editorial group:** Cochrane Drugs and Alcohol Group.
**Publication status and date:** Edited (no change to conclusions), published in Issue 1, 2010.
**Review content assessed as up-to-date:** 2 May 2007.

**Citation:** Moreira MT, Smith LA, Foxcroft D. Social norms interventions to reduce alcohol misuse in University or College students. *Cochrane Database of Systematic Reviews* 2009, Issue 3. Art. No.: CD006748. DOI: 10.1002/14651858.CD006748.pub2.



## ABSTRACT

### Background

Drinking is influenced by youth (mis)perceptions of how their peers drink. If misperceptions can be corrected, young people may drink less.

### Objectives

To determine whether social norms feedback reduces alcohol misuse in university or college students.

### Search methods

Cochrane Drugs and Alcohol Group Register of Trials; Central; MEDLINE; EMBASE; PsyInfo; CINAHL (up to March 2008).

### Selection criteria

RCT or cluster RCT that evaluate social normative intervention with no intervention, alcohol education leaflet or other non-normative feedback intervention

### Data collection and analysis

2/3 authors extracted data. Included studies were assessed against criteria indicated in the *Cochrane Reviewers Handbook* version 5.0.0.

### Main results

Twenty-two studies were included (7,275 participants).

Alcohol related problems: Significant reduction with Web/computer feedback (WF) (SMD -0.31 95% Cl -0.59 to -0.02), three studies, 278 participants. No significant effect of mailed feedback (MF), individual face-to-face feedback (IFF) or group face-to-face feedback (GFF).

Peak Blood Alcohol Content (BAC) : Significant reduction with WF (SMD -0.77 95% Cl -1.25 to -0.28), two studies, 198 participants. No significant effect of MF or IFF.

Drinking Frequency: Significant reduction with WF (SMD -0.38 95% Cl -0.63 to -0.13), two studies, 243 participants and IFF (SMD -0.39 95% Cl -0.66 to -0.12), two studies, 217 participants. No significant effect of MF.

Drinking Quantity: Significant reduction with WF (SMD -0.35 95% Cl -0.51 to -0.18), five studies, 556 participants and GFF (SMD -0.32 95% Cl -0.63 to -0.02) three studies, 173 participants. No significant effect of MF or IF.

Binge drinking: Significant reduction with WF (SMD -0.47 95% Cl -0.92 to -0.03) one study, 80 participants, IFF (SMD -0.25 95% Cl -0.49 to -0.02) three studies, 278 participants and and GFF (SMD -0.38 95% Cl -0.62 to -0.14) four studies, 264 participants. No significant effect for MF.

BAC: No significant effect of MF and IFF

Drinking norms: Significant reduction with WF (SMD -0.75 95% Cl -0.98 to -0.52 ) three studies, 312 participants.

**Authors' conclusions**

WF and IFF are probably effective in reducing alcohol misuse. No direct comparisons of WF against IFF were found, but WF impacted across a broader set of outcomes and is less costly so therefore might be preferred. Significant effects were more apparent for short-term outcomes (up to three months). For mailed and group feedback, and social norms marketing campaigns, the results are on the whole not significant and therefore cannot be recommended.

## PLAIN LANGUAGE SUMMARY

**Social norms interventions to reduce alcohol misuse in university and college students**

Misuse of alcohol can result in disabilities and death. Alcohol also leads to accidents, fights and unprotected sex. Young people aged 15 to 24 years contribute a high proportion to this burden. University students may not drink as frequently as their non-university peers but they have a tendency to drink excessively when they do. Social norms refer to our perceptions and beliefs about what is 'normal' behaviour. People may believe that their peers drink heavily, which influences their drinking, yet much of peer influence is the result of incorrect perceptions. Normative feedback relies on the presentation of information on these misperceptions, about personal drinking profiles, risk factors, and normative comparisons. Feedback can be given alone or in addition to individual or group counselling.

This systematic review was based on 22 controlled trials involving 7275 college or university students randomly assigned to the social norms intervention or a control group. Interventions delivered using the web or computer, or in individual face-to-face sessions, appeared to reduce alcohol misuse. The evidence was less convincing for group face-to-face sessions. Mailed and group feedback were on the whole no different than with the control intervention. Two large studies showed contradictory results for a social marketing campaign. Only a small number of good quality studies were available for many of the outcomes and analyses, and most of the studies were from the USA. The intensity of the intervention differed between trials as did the control intervention, which was no intervention, educational leaflets or an alcohol educational session. Individual face-to-face feedback typically involved social norms feedback as just one aspect of a broader motivational interviewing intervention. Locations where alcohol outlet density is higher may promote higher consumption through more frequent alcohol promotions and easier access to alcohol, so the effectiveness of an intervention designed to reduce drinking could be expected to be lower in these areas.

## BACKGROUND

### Description of the condition

**Alcohol Misuse**

Alcohol causes 1.8 million deaths (3.2% of total) and 58.3 million (4% of total) Disability-Adjusted Life Years (DALYs) worldwide. Accidental injuries are responsible for about one third of the 1.8 million deaths, while neuro-psychiatric conditions are responsible for nearly 40% of the 58.3 million DALYs (WHO 2008).

The European Union (EU) is the heaviest drinking region of the world, drinking 11 litres of pure alcohol per adult each year (Anderson 2006). More than 1 in 4 deaths among men (aged 15-29 years) and 1 in every 10 deaths among young women in the EU is alcohol related (Rehm 2005). Young people (aged 15-24 years) contribute a high proportion to this burden, with over 25%

of young male mortality and approximately 10% of young female mortality being due to alcohol (Anderson 2006). Some information also exists on the extent of social harm in young people, for example a third of a million (6%) 15-16 year old students in the EU report engaging in fights, and 200,000 (4%) report unprotected sex due to their own drinking (Anderson 2006).

In the USA university and college students have been widely studied for alcohol consumption and related problems (Wechsler 1994; Hingson 2005). In comparison with their peers in the USA, drinking patterns of university students in Europe or other parts in the world have been studied less (Karam 2007).

It is known that university students tend to drink more than their non-university peers (Kypri 2005; Dawson 2004). Despite the fact that their non-university peers drink more frequently, university students have a tendency to drink excessively when they do drink (O' Malley 2002). A study of tertiary students living in halls of residence in New Zealand showed that 60% of males and 58% of females typically drank over the national safe drinking guidelines (Kypri 2002). A survey of alcohol and drug use among UK based dental undergraduates reported that 63% of male students and 42% of female students drank over the national safe drinking guidelines (Underwood 2000). In the USA 31% of college students reported consuming five or less drinks per week, and 12% reported consuming ten or more drinks per week (Grossman 2004).

## Description of the intervention

### Social Norms

The study of the powerful impact that norms have on both thought and behaviour is a well established area of research in the social sciences, most especially in the fields of sociology and social psychology. Social norms refers to our perceptions and beliefs of what is 'normal' behaviour in the people close to us, and these beliefs are influential on behaviour (Berkowitz 2005; Perkins 2003). So, for example, if an individual believes that their peers drink heavily this will, in turn, influence the amount of alcohol that a person drinks. The amount of contact that an individual has with their peer or reference group and how comparable the individual thinks they are to the group can affect how much the perceived group norm influences the individual.There are two different types of norms: injunctive and behavioural norms. The first type (injunctive social norms) is related to a person's viewpoint of what they think to be right based on personal beliefs or morals. The second type (behavioural social norms) refers to what is usually done by others, and how that is influential by providing evidence of what is likely to be effective and adaptive action: by recognizing what the majority of others are doing, one can usually choose efficiently and behave properly.

The gap between actual attitudes or behaviour, and what people think is true about others attitudes or behaviours is described as "misperception". Therefore, a misperception takes place when there is an underestimation or overestimation of the prevalence of behaviours and/or attitudes in a population or group. A person may misperceive society or close group environments in a number of ways that will have an impact on their behaviour (Perkins 2003; Berkowitz 2005). A great amount of research has pointed out that college or university students typically misperceive their peer norms by overestimating the amount of alcohol consumed by peers (Perkins 1996; Perkins 2007;Mcalaney 2007). High levels of misperception were associated with higher personal alcohol consumption (Perkins 1996; Perkins 2007; Mcalaney 2007).

The use of social norms theory in applied prevention and intervention work relies on the fact that much of peer influence is due to incorrect perceptions of attitudes and behaviours. The theory and research supporting it suggests that peer culture can be changed from within rather than struggling against it. This can be used to develop interventions that focus on the three levels of prevention specified as universal, selective and indicated to encourage a reduction in alcohol consumption and related problems. In a student population, universal prevention is directed at all university students without identifying those at risk of abuse. Selective prevention is directed at members of a group in a university setting that are at risk for substance abuse. Indicated prevention is directed at particular individuals who already display signs of an alcohol related problem. Interventions at all three levels of prevention can be combined to create a comprehensive programme that is theoretically based and has mutually reinforcing programme elements (Berkowitz 1997; Berkowitz 2005).

Conceptual and empirical studies on the role of social norms in college student alcohol use, and prevention strategies to counter misuse, have been reviewed by Perkins (Perkins 2002). The classic statements in sociology regarding how fundamental norms are to the understanding of social order as well as to variation in human behaviour are also noted by the author. Social norms interventions have typically come in one of two forms: social marketing or individual normative feedback. Social marketing approaches rely on universal, mass communication methods for educating students regarding actual drinking behaviours. Although social marketing approaches have the advantage of reaching a larger audience, they can be costly and are limited by being relatively impersonal and assuming that students will both see and carefully process the information (Walters 2000). Individual normative feedback is personalised and may provide a more relevant and powerful intervention.

Personalized normative feedback interventions provide students with information about actual student drinking norms. Feedback also provides comparisons between the students drinking pattern and the actual drinking norm and perceptions of the norm with the actual drinking norm (Lewis 2006). A personal drinking profile is given to the students via email, letter or in person with students quantity of alcohol consumed, average spent on alcohol, calorie intake; their risk factors (e.g., genetic risk of alcoholism, negative consequences); and normative comparisons (e.g., beliefs about peers drinking, amount consumed in relation to peers). Feedback

can then be given as as a stand-alone intervention or as an adjunct to an individual or group counselling session.

### How the intervention might work

If health professionals, prevention specialists, colleges and universities are to implement such interventions into practice, clear evidence on their effectiveness and long term benefits is required, especially regarding efficacy in reducing hazardous and harmful drinking amongst university and college students. There have been some other reviews that focus on social norms interventions (Bewick 2008, Walters 2004): Bewick 2008 reviewed the published literature on the effectiveness of web-based interventions intended to reduce consumption of alcohol and/or prevent alcohol abuse. The review showed inconsistent evidence on the effectiveness of screening and brief intervention (eSBI) for alcohol use. Walters 2004 reviewed published studies that have used feedback as a greater part of an alcohol intervention for college students. Feedback appeared to change normative perceptions of drinking and was possibly more effective among students who drink for social reasons. The addition of an individual counselling or group session did not seem to increase the short-term effect of the feedback.

### Why it is important to do this review

Individual RCTs evaluating social norms interventions show inconsistent results, and none of the previous reviews were conducted according to Cochrane methodology.

## OBJECTIVES

To determine whether social norms interventions reduce alcohol misuse compared with a control (assessment only / no-intervention) or other educational or psychosocial interventions in university or college students.

## METHODS

### Criteria for considering studies for this review

#### Types of studies

We included all randomised control trials with individual or cluster designs.

#### Types of participants

We considered trials that included students from university or college settings.

#### Types of interventions

**Social norms intervention:**

- Universal personalised normative feedback to individuals, where all students are asked to participate regardless of drinker status or risk level
- Targeted interventions focusing on members of a particular group, such as first-year students, fraternity and sorority members, athletes, members of an academic class, or individuals who are deemed to be at higher risk of alcohol problems
- Social Norms Marketing Campaigns, e.g. community-wide electronic and/or print media campaigns that refer to normative drinking patterns.

**Control intervention:**

- No social norms intervention - assessment only, questionnaire used to measure alcohol consumption or alternative educational or psychosocial intervention

#### Types of outcome measures

The following primary and secondary outcome measures were of interest:

##### Primary outcomes

1. Alcohol use and misuse as measured by self-reported measures of consumption (e.g. self reported daily drinking questionnaire), including quantity-frequency measures (e.g. quantity frequency scale), binge drinking (e.g. 4 or more drinks for women or 5 of more drinks for men), calculated blood alcohol content (BAC), calculated Peak BAC and drinking norms (e.g. drinking norms rating form).

##### Secondary outcomes

Measures of alcohol related problems (e.g. Rutgers Alcohol Problems Index) that include questions regarding:

1. Adverse legal events as a consequence of alcohol i.e. violence, driving offences
2. Inappropriate risky behaviours (e.g. sex without use of condom)
3. Alcohol related injuries
4. Illicit drugs consumption (e.g. marijuana, cocaine)

## Search methods for identification of studies

### Electronic searches

Databases searched were:

1. Cochrane Drugs and Alcohol Group, Register of Trials (2008); searched using the following terms: diagnosis = alcohol and intervention = social norms
2. Cochrane Central Register of Controlled Trials (*The Cochrane Library* 2008, issue 3)
3. MEDLINE (January 1966 to March 2008)
4. EMBASE (January 1988 to March 2008)
5. PsyInfo (1985 to March 2008)
6. CINAHL (1982 to March 2008)

For the identification of studies included in this review detailed search strategies were used for each database searched. These were based on the search strategy developed for MEDLINE but revised appropriately for each database to take account of differences in controlled vocabulary and syntax rules. The search strategies are available in Appendix 1 and Appendix 2.

### Searching other resources

Unpublished reports, abstracts, brief and preliminary reports were considered for inclusion on the same basis as published reports. There was no restriction based on language or date.

## Data collection and analysis

### Selection of studies

Two authors (TM and DF) read all titles and/or abstracts resulting from the search process and eliminated any obviously irrelevant studies. Full copies of the remaining potentially relevant studies were obtained. Two authors (TM and DF) acting independently classified these as clearly relevant, meets all inclusion criteria therefore include, clearly irrelevant therefore exclude, or insufficient information to make a decision, whereby we contacted the authors for further information to aid the decision process. Decisions were based on inclusion criteria i.e. types of studies, types of participants, interventions and outcome measures used. Differences in opinion were resolved through consensus or referral to a third reviewer (LS).

### Data extraction and management

Two independent authors (TM and DF) extracted data from published sources using a standard data recording form. Data extraction forms were piloted using a representative sample of studies. Where differences occurred these were resolved through discussion. Where required, we obtained additional information through contact with the original authors. We entered information from the data extraction forms into the Cochrane Collaboration software (RevMan version 5.0.15).

### Assessment of risk of bias in included studies

Three authors (TM, DF and LS) independently assessed included trials. Key variables or indicators of methodological quality were considered as follows. Also all components looked at, including outcome reporting bias where added to the risk of bias table and shown in the appropriate figures (see Figure 1 and Figure 2).

**Figure 1. Methodological quality graph: review authors' judgements about each methodological quality item presented as percentages across all included studies.**

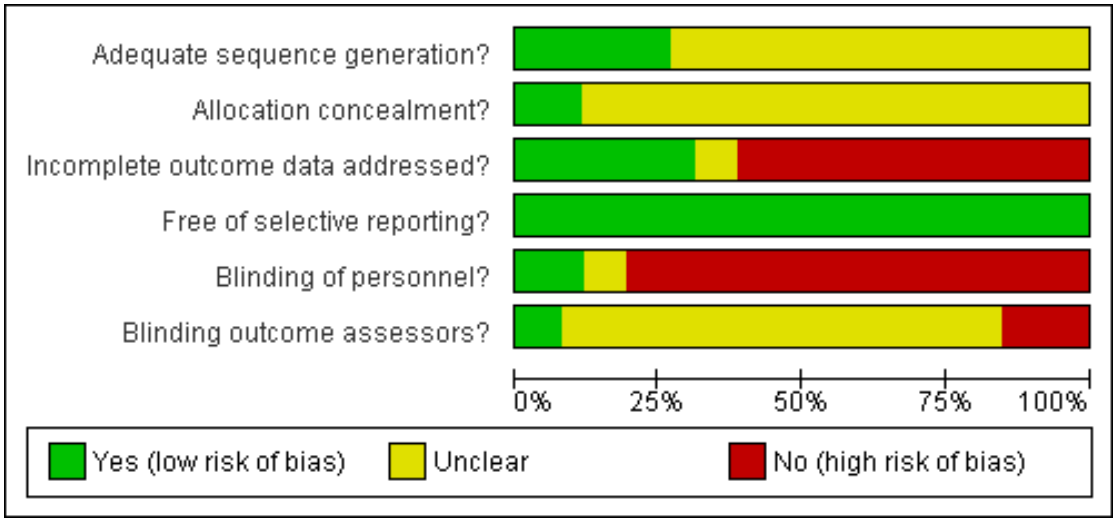
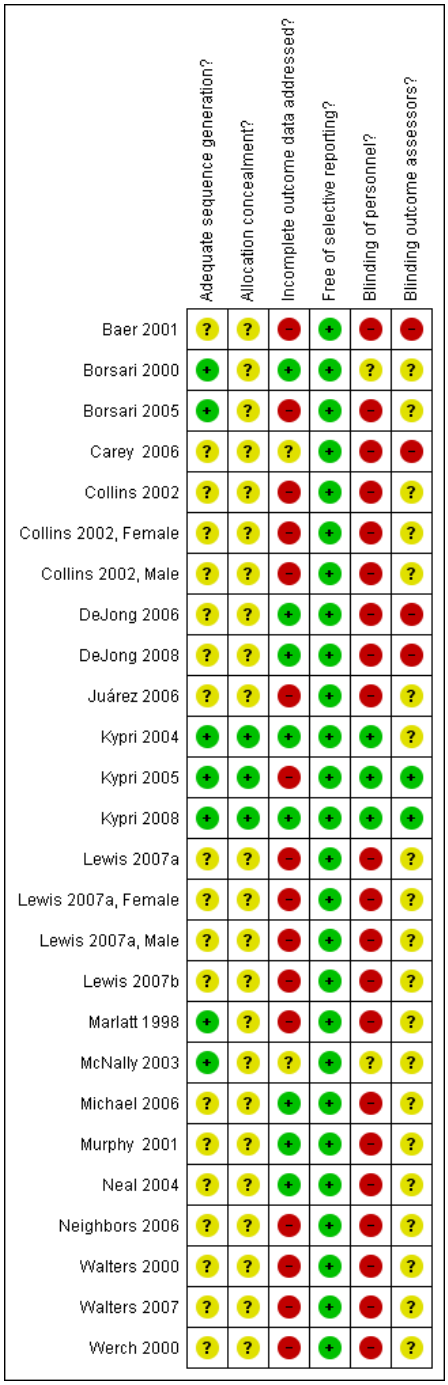


**Figure 2. Methodological quality summary: review authors' judgements about each methodological quality item for each included study.**



The recommended approach for assessing risk of bias in studies included in Cochrane Reviews is based on the evaluation of six specific methodological domains (namely, sequence generation, allocation concealment, blinding, incomplete outcome data, selective outcome reporting and other issues). For each study the six domains are analysed, described as reported in the study and a final judgment on the likelihood of bias is provided. This is achieved by answering a pre-specified question about the adequacy of the study in relation to each domain, such that a judgement of "Yes" indicates low risk of bias, "No" indicates high risk of bias, and "Unclear" indicates unclear or unknown risk of bias. To make these judgments we used the criteria indicated by the handbook and their applicability on the addiction field. For a detailed description of the criteria used see *Cochrane Reviewers Handbook* version 5.0.0 (Higgins 2008).

For the review we have chosen as relevant the following domains: sequence generation, allocation concealment (avoidance of selection bias), incomplete outcome data, selective outcome reporting, blinding of study personnel and blinding of outcome assessment. Blinding of participants was not possible because of the nature of the intervention, though in some studies study personnel could be blinded and in almost all studies it was not clear if the outcome assessment was blind.

For studies where there was a higher risk of bias (possibility of failed randomisation) sensitivity analyses were carried out to examine the impact of inclusion / exclusion on the findings of the review.

### Measures of treatment effect

A standardized mean difference (SMD) estimate was more appropriate for this review since outcomes were typically reported as scale scores. There was large variation between trials:intervention mode, control groups, outcome measures and follow-up periods resulting in high heterogeneity ( $I^2$) .

Study follow-up periods were arbitrarily categorised as: 1 - short-term follow -up period defined as data collected up to three months after intervention; medium-term follow-up defined as data collected from greater than or equal to four months to 16 months after intervention; and long-term follow-up defined as data collected from greater than or equal to 17 months or more following the intervention. For each significant effect size found in the meta-analysis we have also calculated and reported the proportion of students in the intervention condition that had a changed outcome score, based on conversion of the SMD into a Z score and expressed as percentage (%) of participants that changed (typically decreased) their scores. Where possible we also have calculated from the SMD point estimate the reduction in the outcome score and in order to do this we used the standard deviation (sd) for each outcome measure from large sample studies: Carey 2004 (n=391) (RAPI: sd 0.62; Peak BAC: sd 0.11; Frequency-Quantity questionnaire: sd 3 for Frequency and sd 11.3 for Quantity; binge drinking self-report questionnaire: sd 4.4; and DeJong 2006 (n= 2921) (drinking norms questionnaire: sd 3.6).

### Assessment of heterogeneity

The heterogeneity test results were also considered alongside a qualitative assessment of the combinability of studies in this review. Heterogeneity of studies was problematic, making pooling of effects across delivery modes more difficult to interpret. A random effect model was used, but since meta-analysis across all studies and intervention types was not plausible, analysis by delivery mode was performed.

### Data synthesis

The outcome measures from the individual trials were combined through meta-analysis where possible (comparability of intervention and outcomes between trials) using a random effect model. A generic inverse variance method was also used for one analysis, to be able to include one study that met inclusion criteria but did not present means and standard deviations in their final results.

## RESULTS

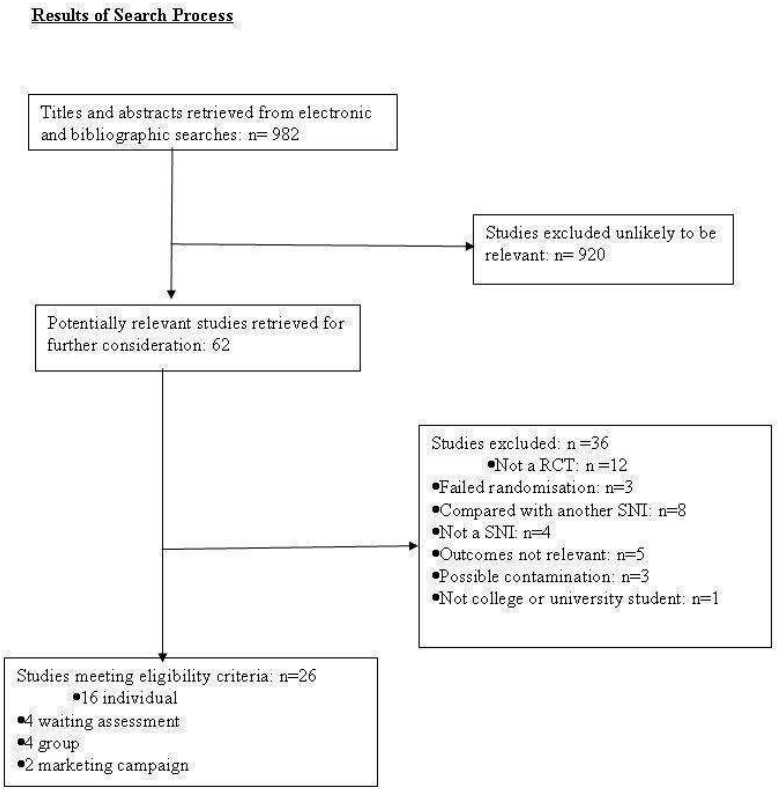
### Description of studies

See: Characteristics of included studies; Characteristics of excluded studies; Characteristics of studies awaiting classification.

### Results of the search

The literature search identified 59 studies that initially appeared to meet our inclusion criteria acquired in full text for more detailed evaluation from a total of 982 titles and abstracts. Of the final studies that met the eligibility criteria four studies are awaiting assessment; authors were emailed and one did not have the data available because of moving to another institution and three did not reply to the email. *See* Figure 3

**Figure 3.**




## Included studies

The final sample of 22 included studies (plus four waiting assessment) were grouped into five subtypes of social norms interventions, representing alternative delivery modes: (i) mailed feedback, (ii) web feedback, (iii) individual feedback (iv) group face-to-face feedback and (v) a social marketing campaign. General characteristics of the selected trials and methods used for the intervention are summarized in tables as characteristics of included studies and type of interventions. Overall a total of 9, 080 participants (26 studies) were allocated to a social norms intervention or to a control group. Students were mainly recruited from psychology classes and interventions mostly targeted at high risk drinkers. Two studies with a high sample size recruited students from all years and all courses (DeJong 2006; DeJong 2008).

The interventions were delivered in different ways (see Table 1), varying from brief normative mailed or web/computer delivered feedback to motivational individual or group sessions that included normative feedback. These sessions varied between mailed delivered feedback (e.g. Walters 2000), a single 45 minute session (e.g.Neal 2004), and a two hour single session (e.g.Walters 2000). Two studies used a three year social marketing campaign before follow-up assessment (DeJong 2006; DeJong 2008). In addition interventions varied from no session (paper feedback) to two in person sessions, all of which suggests differences in intensity of intervention. Two studies also performed a booster session after initial intervention, mailing students with personalised normative feedback at two years (Baer 2001; Marlatt 1998) and extra additional motivational interviews for 34 of the participants, most done by phone at two-year follow-up (Baer 2001). Two studies used gender specific delivered normative feedback (Collins 2002;Lewis 2007a).

The duration of the motivational normative interventions varied from 45 minutes (Neal 2004) to 175 minutes (Michael 2006) and included between one (Murphy 2001; Carey 2006; Juárez 2006; Borsari 2005) to two (Michael 2006; Neal 2004;McNally 2003) sessions. Two studies (Borsari 2000; Marlatt 1998) did not state the duration of the intervention.

The five subtypes of intervention are described separately below.

Mailed Feedback

Four studies with 893 participants evaluated a mailed normative feedback intervention for college or university students (Collins 2002; Juárez 2006; Walters 2000; Werch 2000). Three studies recruited from a psychology department (Collins 2002; Juárez 2006; Walters 2000). Two of these studies recruited high risk drinkers only (Collins 2002; Juárez 2006), and one from a first year student population (Werch 2000). The comparison groups for these studies varied and included no intervention (Walters 2000), an alcohol educational session (Werch 2000), a mailed alcohol education leaflet (Collins 2002), or a motivational interview (Juárez 2006).

Web/computer delivered feedback

Seven studies with 1721 participants evaluated a web/computer normative feedback intervention. Three studies recruited high risk drinkers only from a psychology department (Lewis 2007a; Neighbors 2006; Neighbors 2004); three studies recruited from a university health service (Kypri 2005; Kypri 2004; Kypri 2008) and two more recruited freshman students only (Lewis 2007b; Walters 2007). The comparison groups received no intervention (Kypri 2005; Lewis 2007a; Lewis 2007b; Neighbors 2006; Walters 2007) or an alcohol education leaflet (Kypri 2004; Kypri 2008).

Individual face-to-face feedback

Eight studies with 1101 participants included individual normative feedback as part of a motivational interview intervention. Two studies recruited university high risk drinkers (Carey 2006;Murphy 2001); one study recruited mandated students (students with infractions of college alcohol and drug policy) (Borsari 2005); one recruited from fraternities (Larimer 2001); one recruited all university students (Wood 2007); and two recruited freshman students (Baer 2001; Marlatt 1998). The comparison groups received no intervention (Carey 2006; Marlatt 1998) or a single alcohol education session (Borsari 2005; Larimer 2001; Murphy 2001)

Group face-to-face feedback

Four studies with 422 participants evaluated a group normative feedback intervention. Three studies recruited from a psychology department (Borsari 2000; McNally 2003; Neal 2004). Two of these studies recruited high risk drinkers only (Juárez 2006; Neal 2004;) and one study recruited freshman classes (Michael 2006). The comparison group received either no intervention (Borsari 2000; McNally 2003; Michael 2006) or a personal striving assessment session (Neal 2004).

Marketing campaign

Two studies with 4943 participants evaluated a social norm marketing campaign. One study selected 18 institutions(DeJong 2006) and the other 14 institutions (DeJong 2008). The control consisted of matched institutions which did not use a social norm campaign or intervention during the study.

Several studies reported outcomes for more than one follow-up period (Borsari 2005; Carey 2006; Collins 2002; Kypri 2004; Lewis 2007b; Marlatt 1998; Murphy 2001; Neighbors 2004; Walters 2007; Wood 2007). The follow-up periods of included studies varied from the immediate post-intervention period (Neal 2004) to 12 months (Carey 2006; Kypri 2008; Lewis 2007b; Marlatt 1998;) and longer: one study followed up participants for more than a year (Marlatt 1998); two studies had a follow-up of three years (DeJong 2006; DeJong 2008); and one followed-up their students for four years (Baer 2001).

Seven major outcomes were used in this systematic review to evaluate the effectiveness of social norms interventions that were reported by the studies: (1) alcohol related problems; (2) calculated peak BAC, the maximum alcohol blood concentration reported during a usual drinking episode, using the formula [number of drinks / 2) * (9 / weight for men or 7.5 / weight for women) - (0.016 * hours drinking)]; (3) frequency of drinking, reporting the number of days in the typical week or month they drank; (4) quantity of drinking, reporting the typical number of drinks each day of the typical week or number of drinks per week in the past month; (5) binge drinking, reporting the frequency of heavy drinking; (6) calculated BAC, reporting the typical blood alcohol concentration during a usual drinking episode using the formula [(number of drinks / 2) * (9 / weight for men or 7.5 / weight for women) - (0.016 * hours drinking)]; and (7) drinking norms, reporting the perceived number of drinks consumed per occasion by a typical student. No gold standard diagnostic measures of alcohol abuse or dependence were reported in any of the studies included in this review.

Countries in which the studies were conducted

All of the studies were conducted in the USA , with the exception of three studies conducted in New Zealand (Kypri 2005; Kypri 2004; Kypri 2008).

## Excluded studies

Thirty-six studies were excluded because they did not meet our inclusion criteria:

- Not a randomised controlled trial (12 studies: Bendtsen 2006; Dimeff 2000; Graham 2004; Granfield 2005; Granfield 2002; Hanewinkel 2005; LaBrie 2007; Maney 2002; Martens 2007; Steffian 1999;Thombs 2002; Walker 2002;);
- Failed randomization (3 studies: Agostinelli 1995; Barnett 1996; Trocker 2004)
- Compared a social norm group with another social norm group intervention (8 studies: Barnett 2007; Gregory 2001; Murphy 2004;Murphy 2005; Saitz 2007; Tevyaw 2007; White 2006;White 2007);
- Trial evaluated an eligible intervention but did not record any outcomes relevant to this review (5 studies: Collins 2005; Kypri 2003; Lysaught 2004; Nye 1997; Schulenberg 2001)
- Intervention was not a social norm (4 studies: Baer 1992; Curtin 2001; Kypri 2007; Ståhlbrandt 2007);
- Social norms media campaign present at the time of the

RCT, indicates possible contamination of the control group (3 studies: Larimer 2007; Smith 2004; Stamper 2004)

- Participants were not university or college students (1 study: Wild 2007);

## Risk of bias in included studies

Concerns about possibly failed randomisation (Juárez 2006; McNally 2003; Walters 2000,) led us to perform sensitivity analyses for the relevant outcomes. In other instances we didn't explore the effect of bias via sensitivity analysis because of the small number of studies in pooled analyses and the fact that most studies were susceptible to other forms of bias.
See Figure 1 and Figure 2.

### Allocation

All studies were stated to have been randomised. Only seven of the randomised trials provided information on the generation of the random sequence, by computer random number generation (Kypri 2004; Kypri 2005; Kypri 2008; Lewis 2007a; Lewis 2007b;), flip of a coin (Borsari 2000) and randomisation table (McNally 2003) and were judged at low risk of bias. Two studies matched participant institutions before randomisation (DeJong 2006; DeJong 2008). Allocation concealment refers to the technique used to implement the sequence not to generate it and the majority of studies in this review gave a minimal description with no account of the allocation concealment mechanism, making it unclear to evaluate, and, therefore, all studies were rated "unclear" for allocation concealment, with the exception of three studies (Kypri 2004; Kypri 2005; Kypri 2008): selection bias cannot be ruled out.
In sum:
Allocation concealment:

- low risk of bias, 3 studies
- unclear risk of bias, 19 studies
- high risk of bias, 0 studies

Sequence generation:

- low risk of bias, 7 studies
- unclear risk of bias, 15 studies
- high risk of bias, 0 studies

### Blinding

The nature of the interventions evaluated in these trials makes blinding of participants virtually impossible. In many cases interventions were delivered by the researchers, who were, therefore, not blind to study group. One study mentioned attempts to blind practitioners by not informing research staff of group allocation during intervention or follow-up (Kypri 2004). Blinding was divided in three main groups: blinding of participant personnel and outcome assessor.

Blinding of participants

- low risk of bias, 0 studies
- unclear risk of bias, 0 studies
- high risk of bias, 22 studies

Blinding of personnel:

- low risk of bias, 3 studies
- unclear risk of bias, 0 studies
- high risk of bias, 19 studies

Blinding of outcome assessor:

- low risk of bias, 2 studies
- unclear risk of bias, 15 studies
- high risk of bias, 5 studies

### Incomplete outcome data

Losses to follow-up were generally low to moderate (0 to 35%). Three studies reported no loss to follow-up ( Borsari 2005; Michael 2006; Neal 2004;). The highest loss of participants was 35% at six months follow-up (Collins 2002). Some studies reported moderate rates of loss to follow-up even within a short time after randomisation. No major differences were noted in follow-up rates between the arms of any trial. Follow-up rates are reported in the table of included studies. Studies were classified as low risk of bias if attrition was lower than 10% or moderate risk of bias if attrition was between 10% and 40% and ITT analysis performed. Moredate attrition with no ITT and high attrition (>40%) were rated as high risk of bias.
The majority of studies describe the completeness of outcome data, including attrition and exclusions from analysis. One study had very low attrition (Kypri 2004) and seven studies addressed this issue by performing an Intention-to-treat analysis (ITT) (Borsari 2000; ;DeJong 2006; DeJong 2008; Kypri 2008; Michael 2006; Murphy 2001; Neal 2004; ). Twelve studies had moderate attrition and no ITT performed, being classified as high risk of bias.
In sum:
Incomplete outcome data:

- low risk of bias, 8 studies
- unclear risk of bias, 2 studies
- high risk of bias, 12 studies

Free of selective outcome reporting:

- low risk of bias, 22 studies
- unclear risk of bias, 0 studies
- high risk of bias, 0 studies

### Other potential sources of bias

**Analysis in randomised groups**
There were no reported cases of participants being analysed in the incorrect group in the included studies.
**Statistical analyses**

Most studies used methods such as analysis of covariance for their statistical analysis, modelling the outcome variables as a function of baseline characteristics, time and group allocation. Results were typically presented as a mean value with standard deviation per group. Two studies (Lewis 2007a; Collins 2002) reported outcomes for men and woman separately.

## Effects of interventions

Seven alcohol use and misuse outcomes, according to three different follow-up periods, and grouped according to delivery mode (mailed feedback, web feedback, individual face-to-face, group face-to-face) are presented below. Results from studies of a social norm marketing campaign are only presented for >17 months follow-up. Gender specific results are presented with up to three month follow-up period only. Heterogeneity of studies over the immediate short-term and over the longer-term was problematic, making pooling of effects across delivery modes more difficult to interpret. Although heterogeneity across delivery modes was less problematic in the medium-term we have also refrained from reporting and commenting on these pooled effects to maintain consistency with our decision for pooled analysis over the two other follow-up periods.

One study (McNally 2003) reported outcomes for a subgroup analysis of "at risk drinkers" after randomisation. It was not clear that this was a planned sub-group analysis, and no stratification by sub-group was undertaken in the design of the study. Sample sizes in subgroup analyses are frequently small and subgroup analyses can therefore lack statistical power. They are also subject to the multiple comparison problem. Therefore a sensitivity analysis was performed with this study for all relevant outcomes (Alcohol related problems, Quantity and Binge drinking).

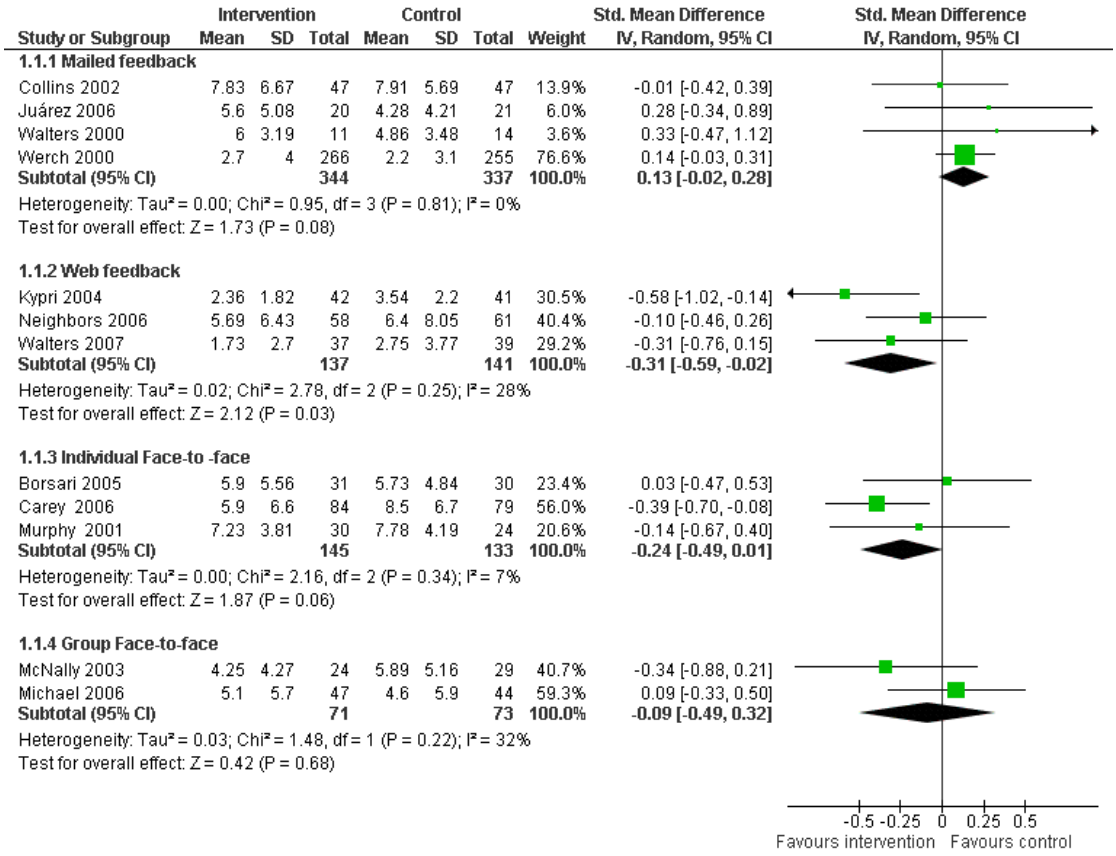
Out of the 26 studies that met eligibility criteria four are waiting assessment (Larimer 2001; Neighbors 2004; Saunders 2004; Wood 2007). Authors were contacted to supply further or missing data but did not reply or data was not available. The results from those papers will not be commented on in this section. The results are being reported for 7,275 participants after removal of 1,813 participants from the four studies waiting assessment.

**(A) Immediate short-term outcomes (Up to 3 months follow-up)**

(1) Alcohol related problems See Figure 4

Twelve studies with 1328 participants reported measures of alcohol related problems. No significant effect was found for mailed feedback (SMD 0.13 95% CI -0.02 to 0.28), with four studies and 681 participants. With 278 participants and three studies web/computer feedback showed a significant effect (SMD -0.31 95% CI -0.59 to -0.02); equivalent to 62% of students reporting a reduction in alcohol related problems and a reduction of 1.2 points in the RAPI Score, assuming a sd of 6.2 (Carey 2004). With three studies and 278 participants, no significant effect was found for individual face-to-face feedback compared with a control (SMD -0.24 95% CI -0.49 to 0.1) and for group face-to-face feedback (SMD -0.09 95% CI -0.49 to 0.32), with two studies and 91 participants.

**Figure 4. Forest plot of comparison: Alcohol Related Problems - up to 3 months**



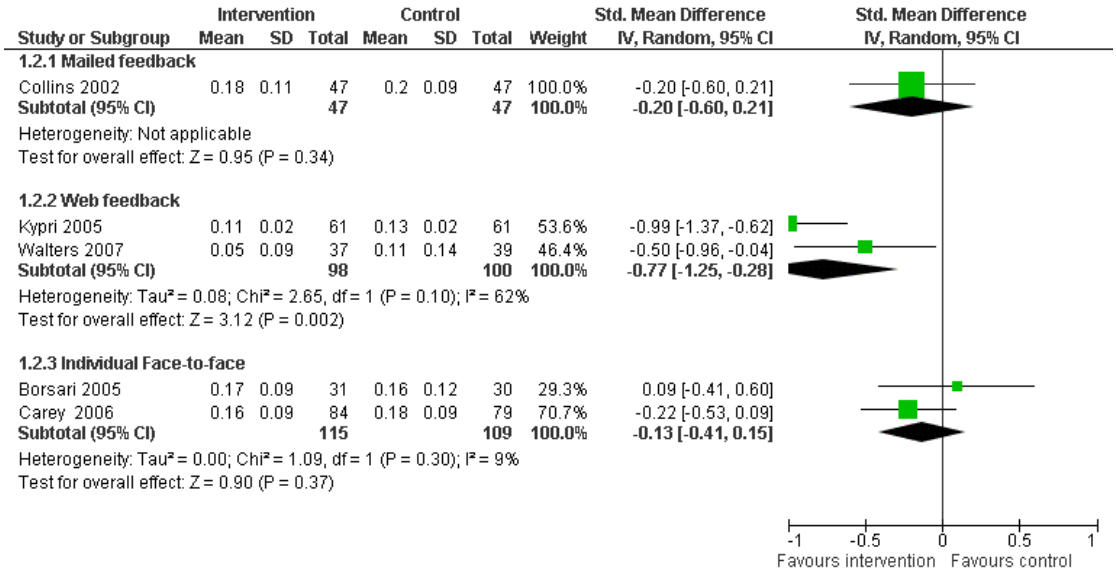

Sensitivity analysis was performed for group face-to-face feedback, by excluding one study considered high risk of bias ( McNally 2003) but no changes on the pooled estimate was found with SMD -0.09 95% Cl -0.33 to 0.50.

For mailed feedback intervention the results show that three studies favoured the control group. Closer inspection of the studies showed that there were some baseline differences for alcohol related problems in two of the studies (Juárez 2006, Walters 2000). In these two studies follow-up results suggested that the control group had a better outcome than the intervention, with fewer alcohol related problems at baseline. We therefore conducted a sensitivity analysis by excluding these two studies but there wasn't a substantive change in the pooled estimate (SMD 0.12 95% Cl -0.04 to 0.27).

(2) Peak BAC See Figure 5

Five studies reported peak BAC with 516 participants. The results showed no significant effect of mailed feedback, with only one study and 94 participants reporting peak BAC (SMD -0.20 95% Cl -0.60 to 0.21), but a significant effect was found for web/computer feedback (SMD -0.77 95% Cl -1.25 to -0.28), with two studies and 198 participants, indicating that 78% of students reported a reduction in Peak BAC with a reduction of 0.14 points, assuming a sd of 0.11 (Carey 2004), but a high level of heterogeneity (62.2%) was shown. With 224 participants in two studies, individual face-to-face feedback showed no effect (SMD -0.13 95% Cl -0.41 to 0.15). No study reported this outcome for the group face-to-face feedback intervention.

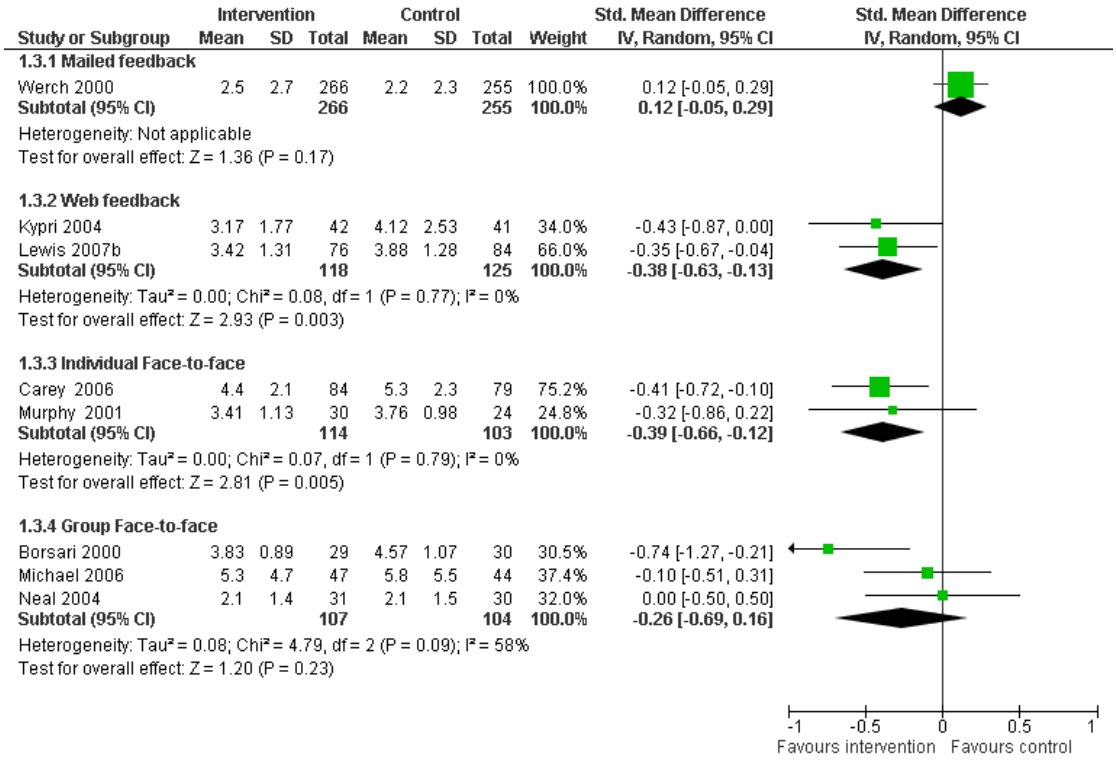
**Figure 5. Forest plot of comparison: Peak BAC - Up to 3 months.**




(3) Frequency See Figure 6

Eight studies with 1192 students reported frequency of drinking with follow-up by three months. With only one study and 521 participants, no significant effect was found on frequency of drinking for mailed feedback (SMD 0.12 95% CI -0.05 to 0.29). Web/computer feedback, with only two studies and 243 participants, showed a significant effect (SMD -0.38 95% CI -0.63 to -0.13), equivalent to 65% of students reporting a reduction in their frequency of drinking with a reduction of 0.9 points, assuming a sd of 3 (Carey 2004) in the frequency-quantity questionnaire. Individual face-to-face feedback also had a significant effect in reducing frequency of drinking of college or university students (SMD -0.39 95% CI -0.66 to -0.12) with two studies and 217 participants, indicating that 63% of students reported a reduction in their frequency of drinking, but no significant effect was found for group face-to-face feedback with three studies and 211 participants reporting a frequency outcome (SMD -0.26 95% CI -0.69 to 0.16), with heterogeneity of 58.2%.

**Figure 6. Forest plot of comparison: Frequency - Up to 3 months.**




(4) Quantity of drinking See Figure 7

Quantity of alcohol consumption outcomes were reported in fourteen studies with 1663 participants. With three studies and 656 participants no significant effect was found on quantity of drinking for mailed feedback (SMD -0.10 95% CI -0.47 to 0.26), with a high level of heterogeneity (65 %), but there was a significant effect of web/computer feedback (SMD -0.35 95% CI -0.51 to -0.18) with five studies and 556 participants, equivalent to 64% of students reporting a reduction in the quantity of their drinking with a reduction of 3.4 points, assuming a sd of 11.3 (Carey 2004) in the frequency-quantity questionnaire. With three studies and 278 participants no significant effect was found for individual face-to-face feedback (SMD -0.20 95% CI -0.44 to 0.03). Group face-to-face feedback showed a significant effect (SMD -0.32 95% CI -0.63 to -0.02) equivalent to 63% of students reporting a reduction in their quantity of drinking, with three studies and 173 participants. Sensitivity analysis was performed for for group face-to-face feedback,by excluding one study considered high risk of bias (McNally 2003) but no changes on the effect was found with SMD -0.38 95% CI -0.74 to -0.01.

(5) Binge drinking See Figure 8

Ten studies reported binge drinking outcomes, with 1237 participants. With two studies and 615 participants, mailed feedback showed no significant effect on reduction of binge drinking (SMD -0.07 95% CI -0.50 to 0.36) with a high level of heterogeneity found (74.6 %) in a random effect analysis. Only one study and 80 participants, a web/computer feedback intervention showed a significant effect (SMD -0.47 95% CI -0.92 to -0.03) equivalent to 68% of students reporting a reduction in their binge drinking and a reduction of 2.2 points on the self-report questionnaire, assuming a SD of 4.4 (Carey 2004). A significant effect was found for both individual face-to-face feedback (SMD -0.25 95% CI -0.49 to -0.02) with 278 participants and three studies, with 60% of students reporting a reduction in their binge drinking and group face-to-face feedback (SMD -0.38 95% CI -0.62 to -0.14) with four studies and 264 participants, 65% of students reporting a reduction in binge drinking. Sensitivity analysis was performed for group face-to-face feedback, by excluding one study considered high risk of bias (McNally 2003) but no changes on the effect was found with SMD -0.38 95% CI -0.65 to -0.1.

**Figure 7. Forest plot of comparison: Quantity of drinking - Up to 3 months.**

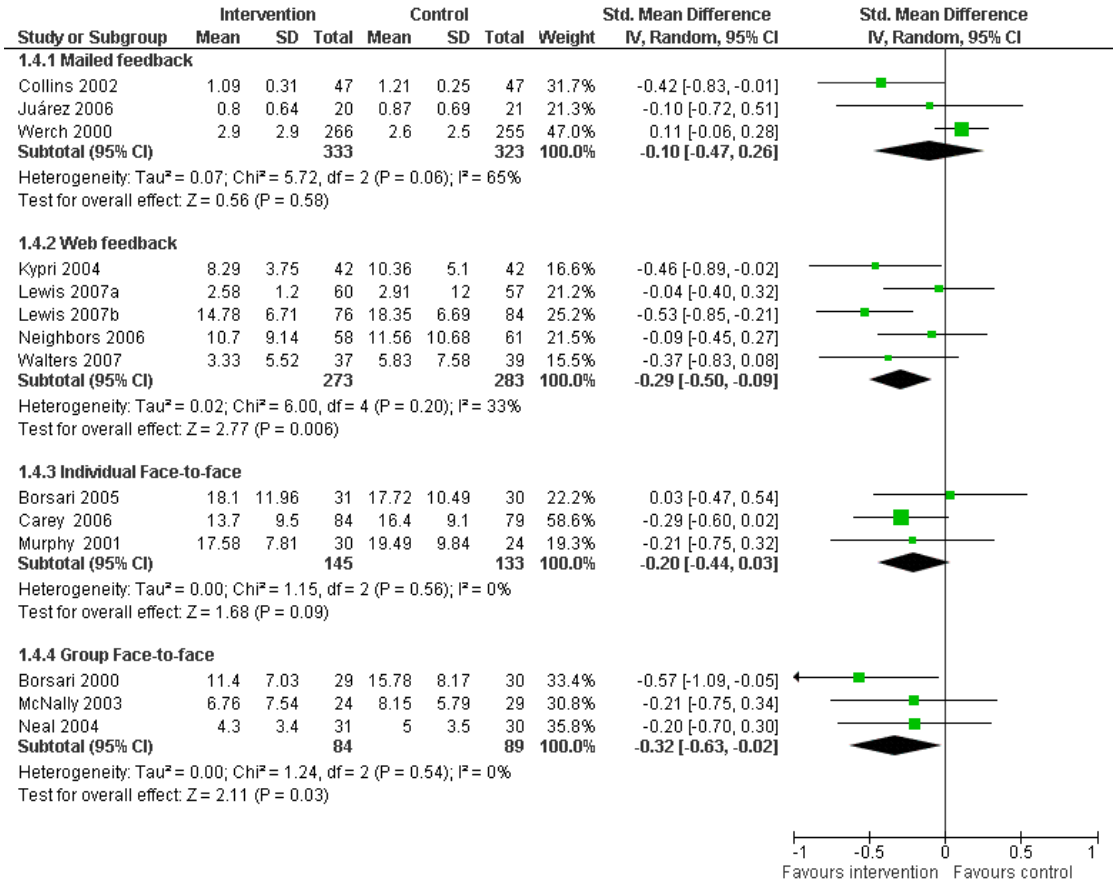
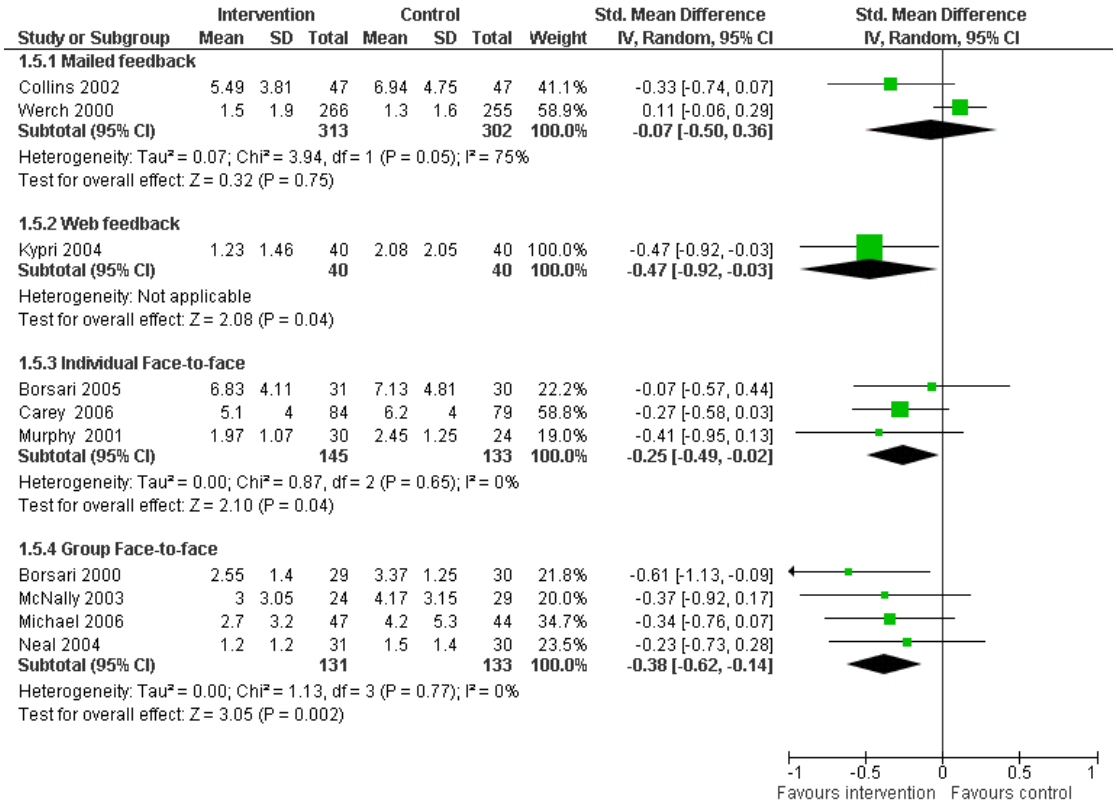


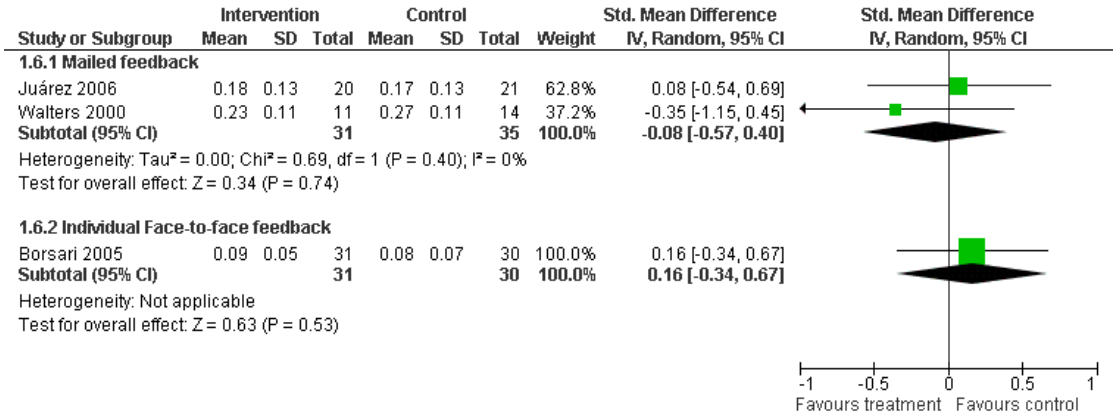
**Figure 8. Forest plot of comparison: Binge drinking - Up to 3 months.**




(6) BAC See Figure 9

With three studies and 127 participants, no significant effect was found for BAC levels. Mailed feedback had only two studies and 66 participants with pooled SMD -0.08 95% Cl -0.57 to 0.40 and Individual face-to-face feedback with one study and 61 participants and a SMD 0.16 95% Cl -0.34 to 0.67.

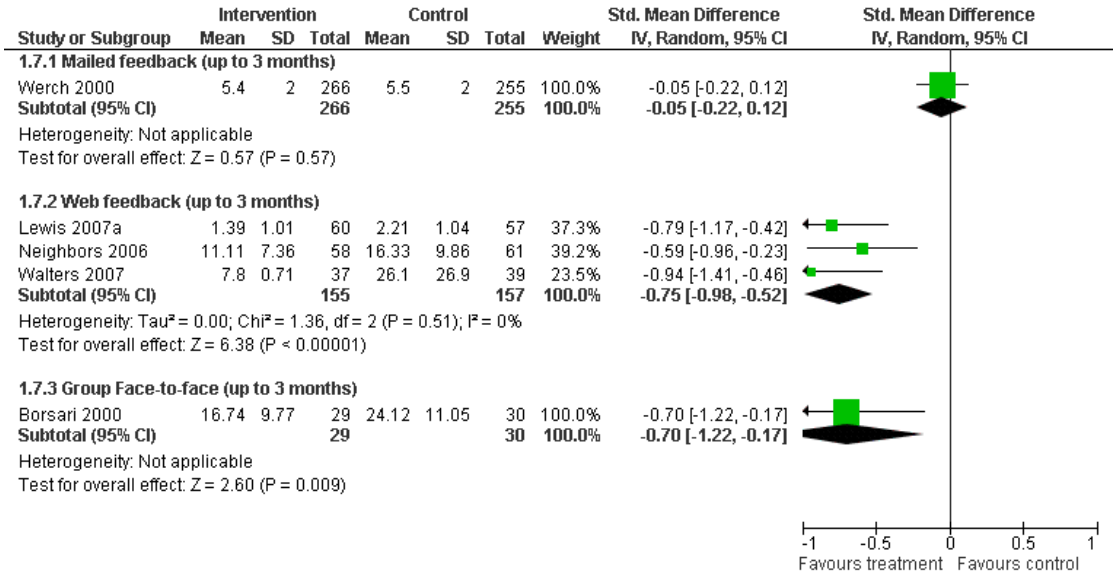
**Figure 9. Forest plot of comparison: BAC - Up to 3 months.**




(7) Drinking norms See Figure 10

Four studies reported results for drinking norms with 892 participants. No significant effect was found in the only study and 521 participants reporting mailed feedback (SMD -0.05 95% Cl -0.22 to 0.12). A significant effect on drinking norms was found for web/computer feedback with (SMD -0.75 95% Cl -0.98 to -0.52) in three studies and 312 participants, indicating that 77% of students reported improvements in their perceived drinking norms with a reduction of 4.3 points, assuming a sd of 3.6 (DeJong 2006) in the drinking norms questionnaire. No study reported this outcome for the individual face-to-face feedback. Group face-to-face feedback, with only one study and 59 participants, showed a significant effect on drinking norms (SMD -0.70 95% Cl -1.22 to -0.17), that is 76% of students reported a reduction in their perceived peer drinking norms.

**Figure 10. Forest plot of comparison:Drinking Norms - Up to 3 months.**

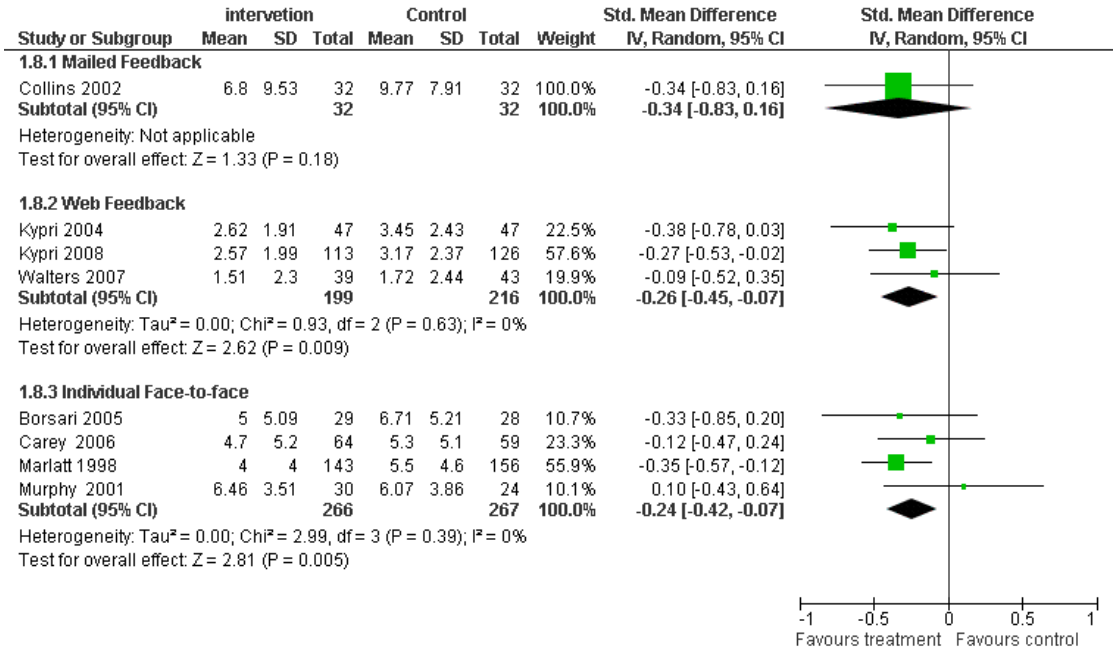



**(B) Medium term outcomes (4 to 16 months follow-up)**

(8) Alcohol related problems See Figure 11

Eight studies reported alcohol related problems at 4 to 16 months follow-up, with 1012 participants. There was no effect of mailed feedback with only one study and 64 particiants reporting an alcohol related problems outcome measure (SMD -0.34 95% CI -0.83 to 0.16). Web/computer feedback, with three studies and 415 participants, showed a significant effect, (SMD -0.26 95% CI -0.45 to -0.07), equivalent to 60% of students reporting a reduction in alcohol related problems. With five studies and 533 participants, individual face-to-face feedback showed a significant effect, (SMD -0.24 95% CI -0.42 to -0.07), equivalent to 61% of students reporting a reduction in alcohol related problems and a reduction of 0.6 point in the RAPI Score, assuming a sd of 6.2 (Carey 2004). No study reported this outcome for the group face-to-face intervention.

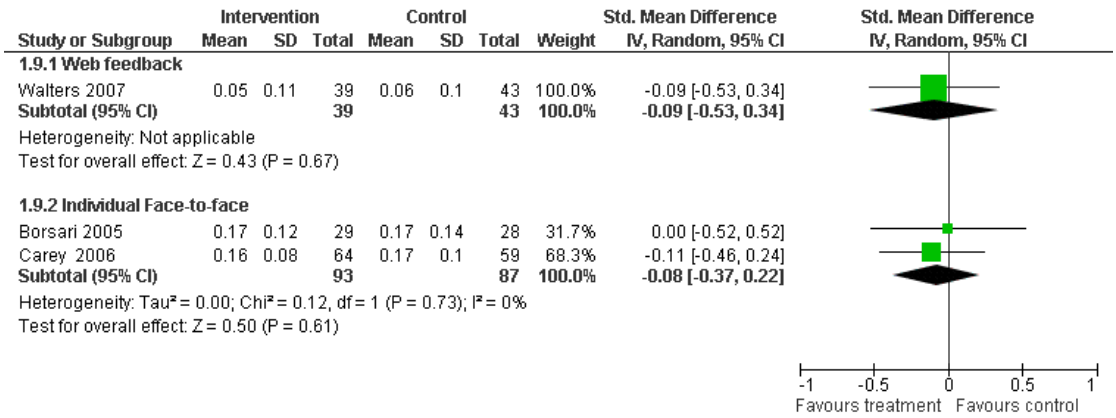
**Figure 11. Forest plot of comparison: Alcohol related problems - 4 to 16 months.**




(9) Peak BAC See Figure 12

Four studies reported peak BAC with 327 participants. Mailed feedback showed no significant effect (SMD -0.24 95% CI -0.72 to 0.25) with only one study and 65 participants, nor did web/computer feedback (SMD -0.09 95% CI -0.53 to 0.34) with ne study and 82 participants or individual face-to-face feedback (SMD -0.08 95% CI -0.37 to 0.22) with two studies and 180 participants. No study reported this outcome for the group face-to-face intervention.

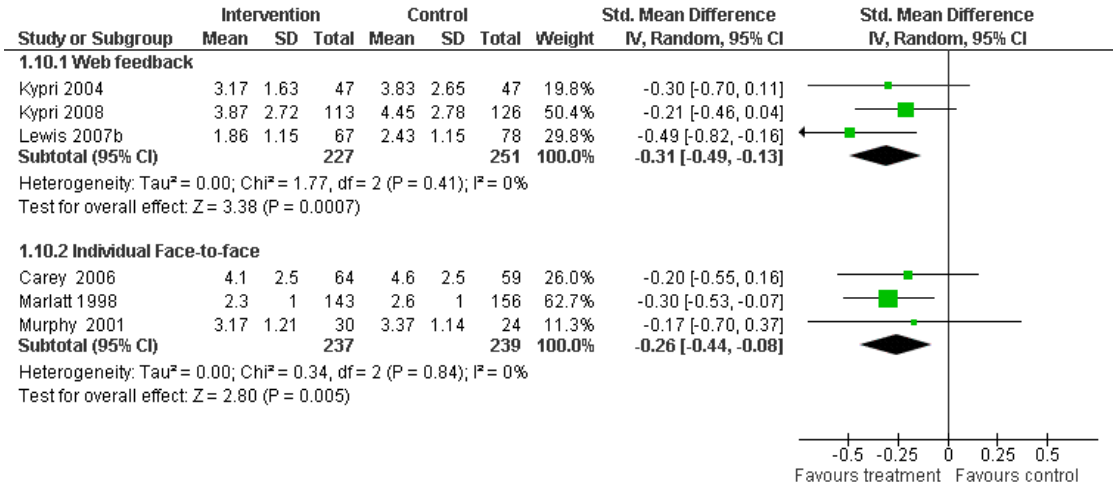
**Figure 12. Forest plot of comparison:Peak BAC - 4 to 16 months.**



(10) Frequency See Figure 13

Six studies with 954 students reported frequency of drinking. With results from only two delivery modes available, both showed a significant effect: web/computer feedback, (SMD -0.31 95% CI -0.49 to -0.13), with three studies and 478 participants, equivalent to 62% of students reporting a reduction in their frequency of drinking and individual face-to-face feedback, (SMD -0.26 95% CI -0.44 to -0.08) with three stuides and 476 participants, equivalent to 61% of students reporting a reduction in their frequency of drinking with a reduction of 0.6 points, assuming a sd of 3 (Carey 2004) in the frequency-quantity questionnaire.

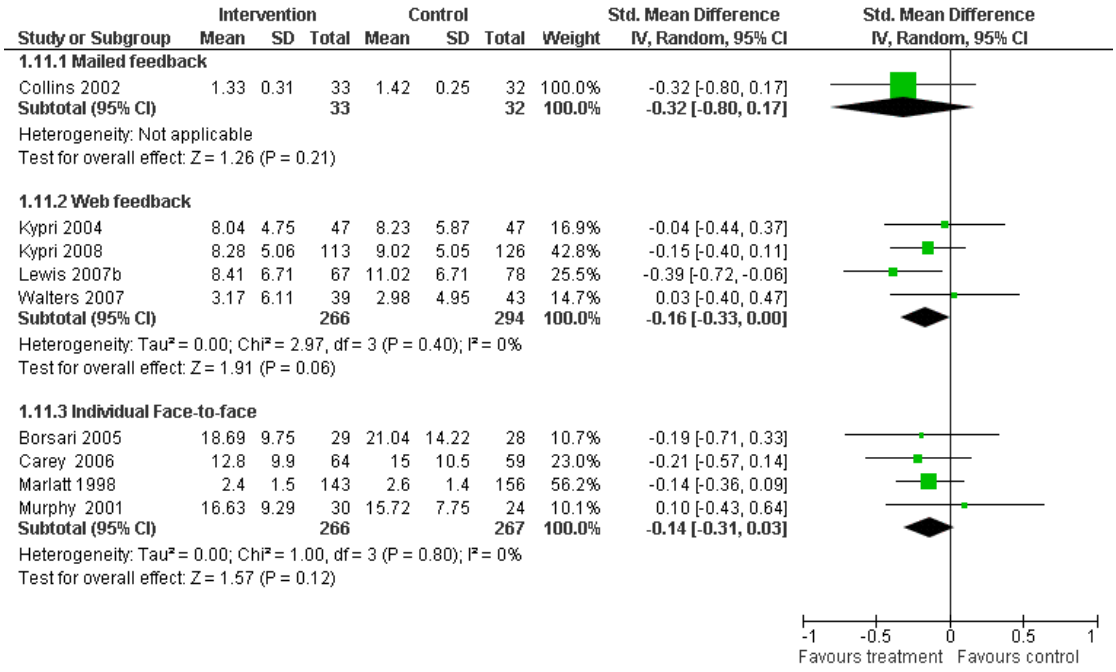
**Figure 13. Forest plot of comparison: Frequency - 4 to 16 months.**




(11) Quantity of drinking See Figure 14

This outcome was reported in nine studies with 1158 participants. Mailed feedback showed no significant effect, (SMD -0.32 95% CI -0.80 to 0.17) with one study and 65 participants. With four studies and 560 participants web/computer feedback showed a just significant effect, (SMD -0.16 95% CI -0.33 to 0.00), equivalent to 56% of students reporting a reduction in their quantity of drinking and with a reduction of 1 point, assuming a sd of 11.3 (Carey 2004) in the frequency-quantity questionnaire. Individual face-to-face feedback showed no significant effect, (SMD -0.14 95% CI -0.31 to 0.03) with four studies and 533 participants. No study reported this outcome for the group face-to-face intervention.

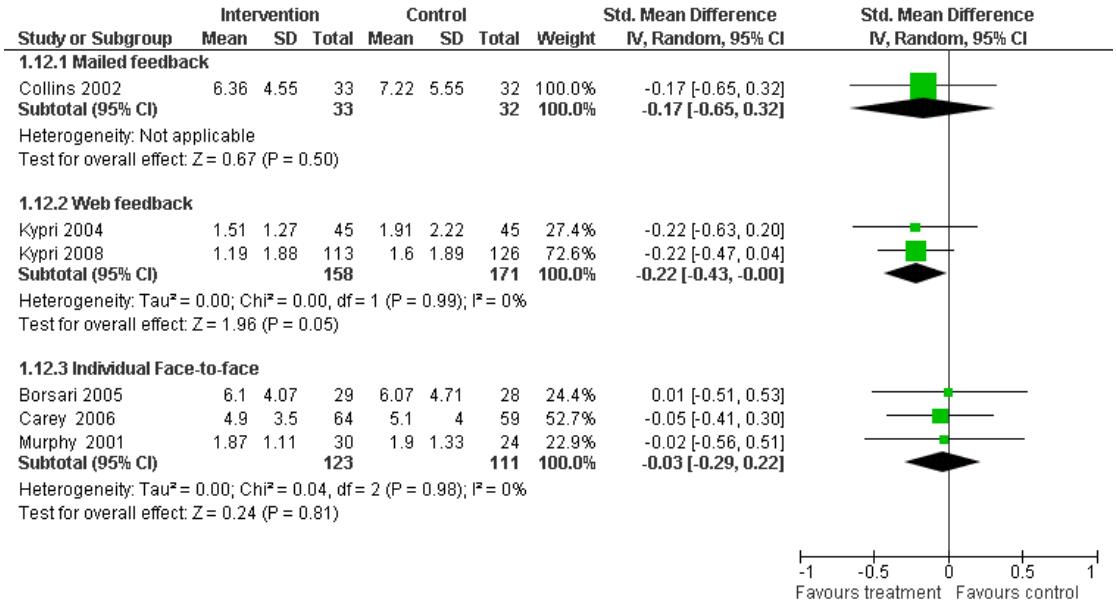
**Figure 14. Forest plot of comparison: Quantity of drinking - 4 to 16 months.**




(12) Binge drinking See Figure 15

Six studies reported binge drinking outcomes with 628 participants. With one study and 65 participants, no effect was found for mailed feedback (SMD -0.17 95% CI -0.65 to 0.32). With 329 participants and two studies web/computer feedback had a just significant effect (SMD -0.22 95% CI -0.43 to 0.00), equivalent to 59% of students reporting a reduction in their binge drinking and a reduction of 0.5 points on the self-report questionnaire, assuming a sd of 4.4 (Carey 2004). No significant effect was found for individual face-to-face feedback (SMD -0.03 95% CI -0.29 to 0.22) with three studies and 234 participants. No study reported this outcome for the group face-to-face intervention.

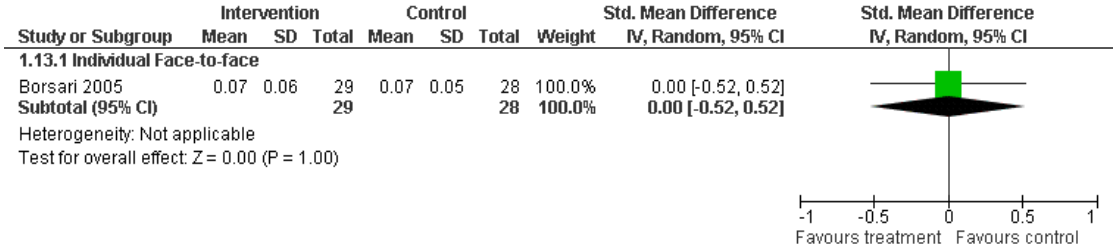
**Figure 15. Forest plot of comparison: Binge drinking - 4 to 16 months.**




(13) BAC see Figure 16

With only one study and 57 participants, no significant effect was found on BAC levels (SMD 0.00 95% CI -0.52 to 0.52).

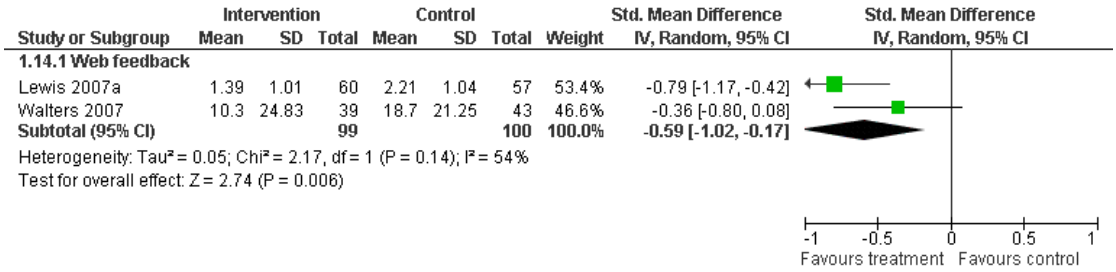
**Figure 16. Forest plot of comparison: BAC - 4 to 16 months.**




(14) Drinking norms see Figure 17

With only one study and 82 participants, no significant effect was found on perception of drinking norms (SMD -0.36 95% CI -0.80 to 0.08).

**Figure 17. Forest plot of comparison: Drinking Norms - 4 to 16 months.**




**(C) Longer term outcome (17+ months follow-up)**

(15) Alcohol related problems

All three studies reporting longer term outcomes had results for alcohol related problems. SMD was 0.31 (95% CI 0.06 to 0.56) for individual face-to -face feedback with one study and 363 participants showing a significant effect for students who did not receive the intervention, i.e. a reduction in alcohol related problems in the control group compared with the intervention group equivalent to 1 point in the RAPI Score, assuming a sd of 6.2 (Carey 2004). The SMD for the social marketing campaign was not pooled because of a high level of heterogeneity (83.1%; p= 0.01), The DeJong 2006SMD was -0.10 (95% CI -0.17 to -0.03)and the DeJong 2008 SMD was 0.04 (95% CI -0.05 to 0.13).

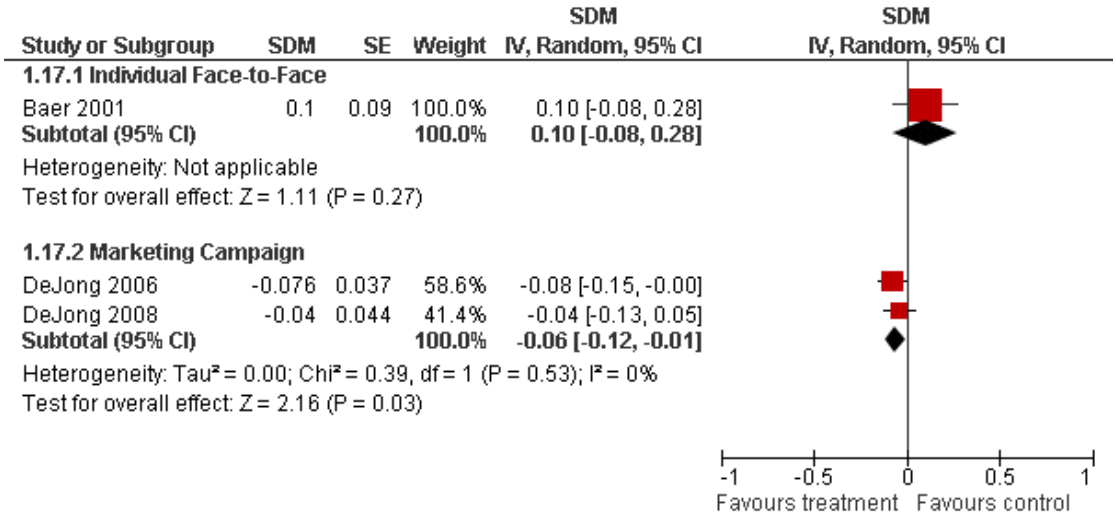
(16) Frequency of drinking

Frequency of drinking was reported by all three studies. The SMD for individual face-to-face feedback was 0.06 (95% CI -0.18 to 0.30) with only one study and 363 participants, no significant effect was found. The SMD for the social marketing campaign was not pooled because of a high level of heterogeneity (98.6%; p<0.00001). The DeJong 2006 SMD was -0.46 (95% CI -0.53 to -0.39) and the DeJong 2008 SMD was 0.03 (95% CI -0.06 to 0.11).

(17) Quantity of drinking see Figure 18

Quantity of drinking was reported by all three studies. The SMD for individual face-to-face feedback was 0.10 (95% CI -0.08 to 0.28),with only one study and 363 participants no significant effect found. To maintain consistency for the long term outcome, the SMD for the social marketing campaign was not pooled even though heterogeneity was low (0.00%; p=0.53). The DeJong 2006 SMD was -0.08 (95% CI -0.15 to -0.00) and the DeJong 2008 SMD was -0.04 (95% CI -0.13 to 0.05).

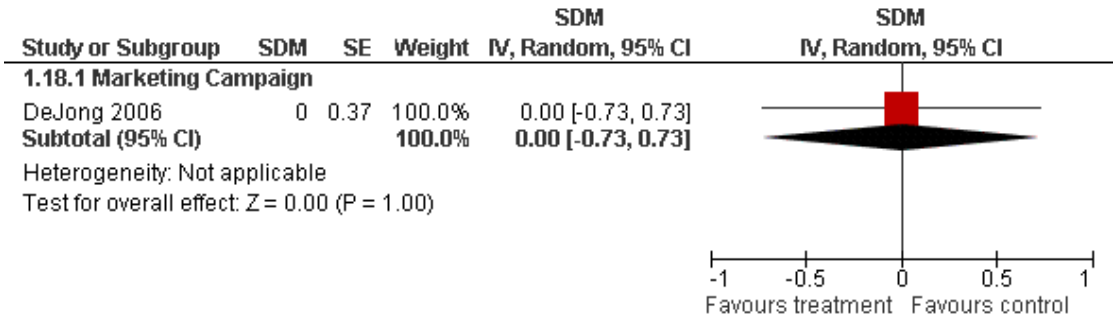
**Figure 18. Forest plot of comparison: Quantity of Drinking + 17 months.**



(18) BAC see Figure 19

Only one study with 2901 participants reported BAC: the SMD was 0.00 (95% CI -0.73 to 0.73) showing no significant effect of the intervention for BAC compared with control.

**Figure 19. Forest plot of comparison: BAC + 17 months.**




(19) Drinking norms

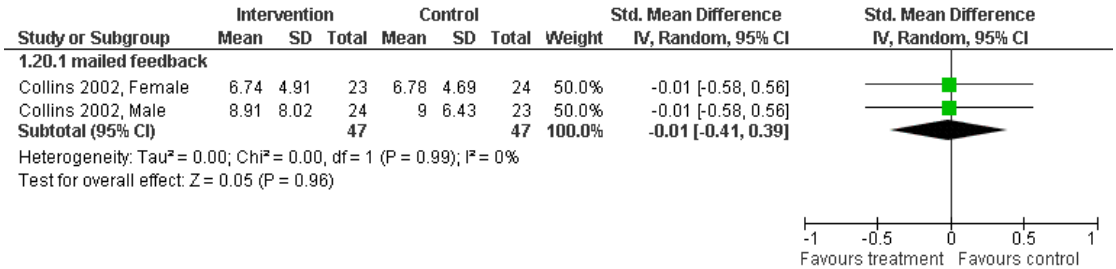
Two studies with 4943 participants reported data for the drinking norms outcome: the studies were not pooled because of the high level of heterogeneity (88.8%; p= 0.003). The DeJong 2006 SMD was -0.15 (95% CI -0.22 to -0.07) and the DeJong 2008 SMD was 0.03 (95% CI -0.06 to 0.11).

**(D) Immediate short-term outcomes (Up to 3 months follow-up) - Gender Specific intervention**

(20) Alcohol related problems see Figure 20

With only one study with 94 participants no significant effect was found on mailed feedback for the gender specific intervention in both male (SMD -0.01 95% CI -0.58 to 0.56) or female (SMD -0.01 95% CI -0.58 to 0.56) participants with a combined SMD -0.01 95% CI -0.41 to 0.39.

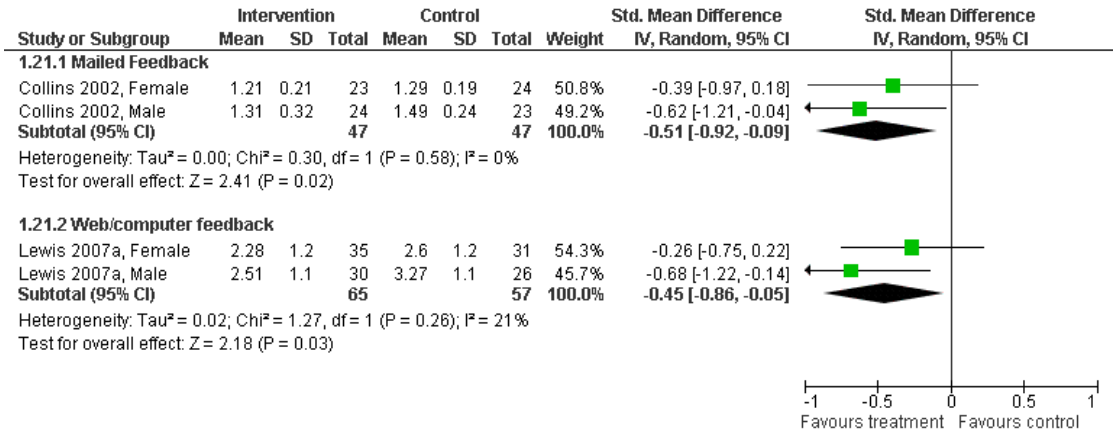
**Figure 20. Forest plot of comparison: Alcohol related problems - gender specific.**



(21) Quantity of drinking see Figure 21

With two studies and 216 participants reporting quantity of drinking results for a gender specific intervention, a significant effect for male participants was found for mailed feedback (SMD -0.62 95% Cl -1.21 to -0.04), with one study and 47 male participants, equivalent to 73% of male students reporting a reduction in their quantity of drinking with a reduction of 10 points, assuming a sd of 11.3 (Carey 2004) in their frequency-quantity questionnaire. These were similar for web/computer feedback where a significant effect was found for the male participants (SMD -0.69 95% Cl -1.22 to -0.14) with one study and 56 male participants, equivalent to 75% of male students reporting a reduction in their quantity of drinking. No effect was found for female participants for mail feedback with SMD -0.39 95% Cl -0.97 to 0.18, with one study and 47 participants and for web/mail feedback with SMD -0.26 95% Cl -0.75 to 0.22, one study and 66 participants.

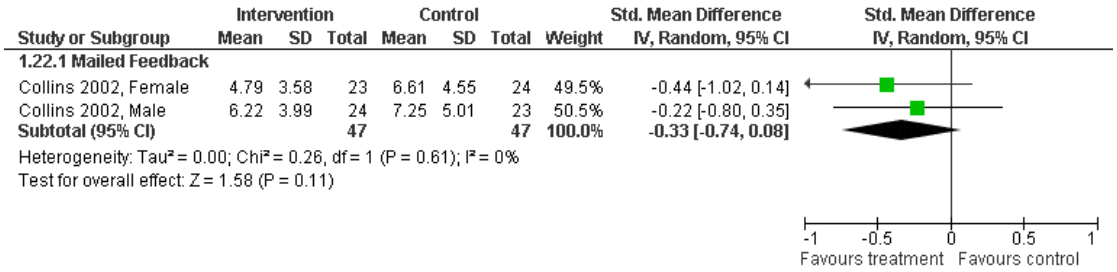
**Figure 21. Forest plot of comparison: Quantity of drinking - gender specific.**




(22) Binge drinking see Figure 22

With only one study with 94 participants no significant effect was found of mailed feedback for a gender specific intervention in both male (SMD -0.22 95% Cl -0.80 to 0.35) or female participants (SMD -0.44 95% Cl -1.02 to 0.14).

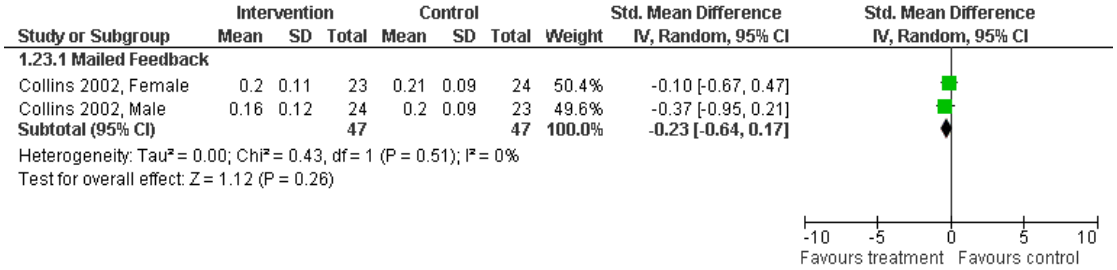
**Figure 22. Forest plot of comparison: Binge drinking - gender specific.**




(23) Peak BAC see Figure 23

With only one study with 94 participants no significant effect was found of mailed feedback for a gender specific intervention in both male (SMD -0.37 95% Cl -0.95 to 0.21) or female participants (SMD -0.10 95% Cl -0.67 to 0.47).

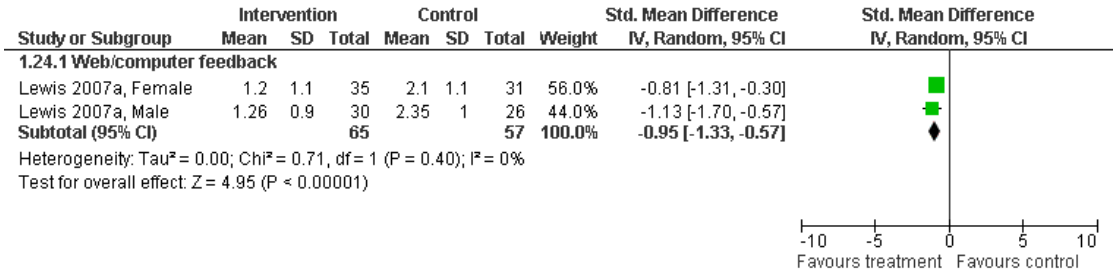
**Figure 23. Forest plot of comparison: Peak BAC - gender specific.**




(24) Drinking norms see Figure 24

With only one study with 122 participants a significant effect was found of mailed feedback for a gender specific intervention in males (SMD -1.13 95% Cl -1.70 to -0.57), equivalent to 87% of male students reporting a reduction in their perceived drinking norms with a reduction of 8.6 points, assuming a sd of 3.6 (DeJong 2006) in the drinking norms questionnaire and similar for female participants with SMD -0.81 95% Cl -1.31 to -0.30, equivalent to 79% of female students reporting improvements in their perceived drinking norms and an overall drop of 5 points in the drinking norms questionnaire, assuming a sd of 3.6 (DeJong 2006).

**Figure 24. Forest plot of comparison: Drinking Norms - gender specific.**




See Table 2 for a summary of the results of the social norms outcomes.

# DISCUSSION

## Summary of main results

This systematic review based on 22 trials enrolling 7,275 participants shows that a social norms intervention delivered by web or computer or via individual face-to-face sessions (for some outcomes) is more effective than a control intervention, typically consisting of a leaflet with drinking related advice, for reduction of alcohol misuse in college or university students. Significant effects were more apparent for short term outcomes (up to three months). However, there was some evidence of effect continuing through to medium-term follow-up from four to sixteen months, particularly for web/computer feedback.

For a social norms intervention delivered in a group face-to-face session compared with no intervention (Juárez 2006; McNally 2003; Michael 2006) or a personal striving assessment session (Neal 2004) the evidence was less convincing. For short term follow-up, we can see a significant reduction in binge drinking, quantity of alcohol consumed and drinking norms (reduction in misperception of drinking). However, the latter finding was based on only one study with 59 participants. There were no results for medium- or longer-term follow-up.

We found no evidence supporting the effectiveness of a social norms intervention delivered in a mailed format, though there was little data for many outcomes; particularly for medium term follow-up, and no data for long-term follow-up. Based on final scores without adjustment for baseline differences, the pooled effect estimate indicates that the given intervention did not improve outcomes in the social norm group but contrarily improved outcome in the control group in some studies (e.g. Werch 2000 for all outcomes), even after sensitivity analysis that tried to reduce bias introduced by studies with baseline differences.

On the face of it, intervention characteristics seemed to predict variability in outcomes. Specifically, interventions delivered via the web/computer or individual face-to-face (for some outcomes only) appeared to be successful at reducing alcohol misuse. For other intervention the results are mixed, but for most outcomes the results are non significant (Table 2). However, only a small number of good quality studies were available for many of the outcomes and analyses in this review.

Furthermore, as individual face-to-face feedback typically involved social norms feedback as just one aspect of a broader motivational interviewing intervention, it is not possible to comment on the contribution that social norms feedback made distinct from the contribution of other aspects of this intervention, for example, the motivational interview itself. Also, it is not possible to infer from these data which delivery mode is most effective, via web/computer or individual face-to-face sessions, as no studies directly compared these two options.

## Overall completeness and applicability of evidence

Estimates of treatment effects for continuous outcomes in published articles are reported either as mean final values or mean changes in outcome during the trial period (or occasionally both). As estimates of differences in change scores and differences in final values are on average equal, either can, in theory, be used and pooled in an analysis. The weight each study is given in such an analysis relates inversely to the precision of the estimate of treatment effect. Change scores can give more precise estimates of treatment effects as they remove a component of between participant variability. However, they are also based on two measurements, and thus have twice the measurement error compared with final scores. There are situations when use of a final score in a meta-analysis will give a misleading result; this is when there is an apparent difference in the baseline scores for a particular outcome. This is the case in the meta-analysis of mailed feedback for alcohol related problems with two studies (Juárez 2006; Walters 2000;), where the difference in mean scores at follow-up showed a greater reduction in drinking score in controls compared with the mailed feedback intervention group. We therefore conducted a sensitiv-

ity analysis by excluding the two studies with unreliable data: we used the final score and estimated an effect with and without the two questionable studies, and no significant effect was found for mailed feedback or in the pooled estimate when we conducted a sensitivity analysis by excluding the two studies with unreliable data.

We did find that a social norms intervention appears to be ineffective using some delivery modes. One possible explanation for this fact is that students who receive mailed feedback do not actually read the information sent to them (Walters 2000); this could be due to lack of interest or simply that they consider it to be junk mail. This finding was surprising in light of the review by Walters 2004 claiming that it seems that feedback can be effective when delivered by mail. However, allowing other studies apart from randomised trials in their review may have affected their final results. A possible explanation for the lack of effectiveness for group face-to-face feedback for some outcomes, compared to individual face-to-face feedback, for example, could be related to the participation of high risk students in the group intervention. This may give students a feeling that their drinking is not the norm, compared with the general student population, but only in line with the alcohol consumption of that specific group (Walters 2000). This may therefore not motivate the intervention group to change their behaviour, because they feel that their behaviour is the norm (when alongside the high risk intervention group): they are therefore receiving the wrong message by having a positive reinforcement from other high risk drinkers in that particular group. Another possible explanation for the apparent lack of effectiveness for group interventions is the small number of studies with small samples and few data and results for many outcomes.

Lastly, two large studies showed contradictory results for the social marketing campaign. Results were inconclusive for the effectiveness of a social norms intervention delivered in the context of a social marketing campaign. Data were available for follow-up at 3 years for two large studies; however, the high degree of heterogeneity across these studies casts doubt on the validity of the pooled estimate and so it was not presented for this review. One possible explanation for the high heterogeneity may be due to the alcohol outlet density around the selected campuses in each study (DeJong 2008). Studies have previously shown an association between alcohol outlet density and alcohol consumption at a population level with higher density associated with higher drinking levels (Gruenewald 2002; Scribner 2000; Wechsler 2002; ). Locations where outlet density is higher may promote higher consumption through more frequent alcohol promotions and easier access to alcohol (Kuo 2003; Weitzman 2003). Therefore, in areas where the outlet density is higher, the effectiveness of an intervention designed to reduce drinking would be expected to be lower, and vice versa (DeJong 2008).

For social norms interventions which were designed specifically for women or men separately, there was no evidence that the gender-specific interventions were more efficient than a general social norms intervention. However, there was limited evidence from only two small studies reporting results for few outcomes.

The importance of the effect sizes generated by the analyses in this review is not easy to interpret - in other words what constitutes a meaningful effect? In general, effect sizes of 0.25 to 0.5 are considered to be small to moderate (Cohen 1988), which would apply to the majority of the outcomes we report. Translating these effect sizes into absolute differences on symptom scales such as RAPI or changes in quantity or frequency of drinking, as we have done in this review, is desirable in order to put these results into context, particularly from a health or social care practitioner or policy maker's perspective.

Limitations of the findings in this review relate to the small number of studies available for many of the analyses, particularly for longer term follow-up, making drawing firm conclusions difficult. Incomplete or inappropriate publication of results is still common and consequently such incomplete results cannot be used in a meta-analysis. Therefore the use of a standard guideline for reporting of results would be useful (Altman 2001). We also found substantial heterogeneity for a number of the analyses, which contributed to our decision not to pool the studies across different delivery modes to produce an overall summary estimate for each outcome. One possible source of the heterogeneity is due to the inclusion of different types of control groups. These varied from no intervention to an alcohol educational session. Another potential source of heterogeneity includes different outcome sales used for a particular outcome, e.g. the Rutgers Alcohol Problem Index (RAPI) or Short Inventory of Problems (SIP) for problem drinking. We were unable to conduct meaningful investigations of the detected heterogeneity due to insufficient studies.

The review may also lack generalizability due to the nature of the samples recruited into the trials. A large number of studies found in this review selected their participants from psychology courses or were delivered to high risk students only. In order to broaden the generalizability of these results, more RCTs are needed involving different and broader populations of students.

## Quality of the evidence

Several sources of potential bias in the individual studies were detected: e.g. lack of blinding of students or researchers, use of self-reported outcome measures. Only a few studies reported how important aspects of study design were conducted, such as concealment of treatment allocation and handling of missing data, making it difficult to assess the risk of bias. Lack of adequate allocation concealment, blinding and analysis is associated with overestimation of intervention effects, and therefore we cannot rule out the possibility that the effects observed in this review may be exaggerated due to methodological limitations.

There is a general agreement about the process of randomisation in order to distribute the groups as equally as possible. There is also a universal understanding that the groups being studied should

be as similar as possible and the only difference between them should be what is being studied. Nevertheless, what appears to get much less consideration in many studies in prevention research is treatment of missing data (e.g. loss to follow-up). Intent-to-treat analysis that includes in the analysis all students randomised is the best way to avoid this risk of bias. Twelve of the studies did not performed an intention-to treat analysis, and had moderate to high levels of attrition, so we therefore regarded them as at high risk of bias.

### Potential biases in the review process

Publication bias is a significant threat to the validity of any systematic review. Such bias appears either when negative studies have lower likelihood of being published or if outcome data are selectively neglected from published reports because of their negative outcome. We did not have enough studies to explore the former type of bias but to limit the effects of the latter type of bias we wrote to some authors of trials that met our inclusion criteria, asking them for missing data, and to provide such data if available. Four authors did not respond to our requests for more information. However, we were able to obtain unpublished data for one study from this process. The inability to identify all unpublished data and retrieve all missing data that met inclusion criteria might have biased our results.

### Agreements and disagreements with other studies or reviews

Some other reviews are in agreement with our review. For example, the Walters 2004 review reported studies that have used feedback as a greater part of an alcohol intervention for college students, suggesting that feedback appears to change normative perceptions of drinking and possibly is more effective among students who drink for social reasons, and that the addition of an individual counselling or group session does not seem to increase the short-term effect of the feedback. We are generally in agreement with this review as we cannot say if a web/computer intervention is more effective than an individual face-to-face intervention. Fager 2004 in his review evaluated the effectiveness of interventions intended at reducing alcohol use in college students, with conclusions that were consistent with the finding in this review: some empirical support for the use of brief motivational interventions to reduce alcohol use and misuse was found. The review by Carey 2007 also suggests that individual face-to-face intervention is associated with reductions in alcohol-related problems.

## AUTHORS' CONCLUSIONS

### Implications for practice

Overall, this systematic review suggests that individual and personalised normative interventions over the immediate and medium term appear to reduce alcohol use, misuse and related problems amongst university or college students. The use of social norms interventions should also be considered for use and study in other settings since they have the potential to be a very cost-effective intervention for reducing alcohol use and related harms. The use of new technologies, such as computer or web/computer delivered interventions, could be a successful and cost-effective method for providing normative feedback

- Practitioners and policy makers may wish to consider and adopt a social norms feedback approach for the prevention of alcohol misuse.

### Implications for research

- Small sample sizes in many studies are a limitation of the current results; future studies should have larger sample sizes.

- Further research studies should have longer term follow-ups to provide a more thorough assessment of the effectiveness of the social norm intervention over the medium- and long-term.

- We are not able to say whether web/computer delivery or individual-face-to-face feedback is the more effective intervention; more studies are needed to directly answer this question.

- In only a few small studies, mailed feedback, a social marketing campaign and group feedback didn't show any evidence of effectiveness and further research is needed to test definitively the effectiveness of these delivery modes.

- Further research studies should present ITT analyses or adequate accounting for missing data.

## ACKNOWLEDGEMENTS

We thank Scott T. Walters, Brian Borsari, Kypros Kypri, William DeJong, John Baer and Susan E. Collins for providing information about their studies or additional data.

# REFERENCES

## References to studies included in this review


**Baer 2001** *{published data only}*

* Baer JS, Kivlahan DR, Blume AW, McKnight P, Marlatt GA. Brief Intervention for Heavy-Drinking College Students: 4-Year Follow-Up and Natural History. *American Journal of Public Health* 2001;**91**(8):1310–6.

**Borsari 2000** *{published data only}*

* Borsari B, Carey, KB. Effects of a brief motivational intervention with college student drinkers. *Journal of Consulting and Clinical Psychology* 2000;**68**:728–33.

**Borsari 2005** *{published data only}*

* Borsari B, Carey KB. Two brief alcohol interventions for mandated college students. *Psychology of Addictive Behaviors* 2005;**19**:296–302.

**Carey 2006** *{published data only}*

* Carey KB, Carey MP, Maisto SA, Henson JM. Brief motivational interventions for heavy college drinkers: A randomized controlled trial. *Journal of Consulting and Clinical Psychology* 2006;**74**(5):943–54.

**Collins 2002** *{published data only}*

* Collins SE, Carey KB, Sliwinski MJ. Mailed personalized normative feedback as a brief intervention for at-risk college drinkers. *Journal Studies on Alcohol* 2002;**63**(5):559–67.

**Collins 2002, Female** *{published data only}*

Collins SE, Carey KB, Sliwinski MJ. Mailed personalized normative feedback as a brief intervention for at-risk college drinkers. *Journal Studies on Alcohol* 2002;**63**(5):559–67.

**Collins 2002, Male** *{published data only}*

Collins SE, Carey KB, Sliwinski MJ. Mailed personalized normative feedback as a brief intervention for at-risk college drinkers. *Journal Studies on Alcohol* 2002;**63**(5):559–67.

**DeJong 2006** *{published data only}*

* DeJong W, Schneider SK, Towvim LG, Murphy MJ, Doerr EE, Simonsen NR, et al.A multisite randomized trial of social norms marketing campaigns to reduce college student drinking. *Journal of Studies on Alcohol* 2006;**67**(6): 868–79.

**DeJong 2008** *{unpublished data only}*

* DeJong W, Scheider SK, Towvim LG, Murphy MJ, Doerr EE, Simonsen NR, et al.A multi-site randomized trial of Social Norms Marketing Campaigns to Reduce College Student Drinking: A replication Failure. under review.

**Juárez 2006** *{published data only}*

* Juarez P, Walters ST, Daugherty M, Radi C. A Randomized Trial of Motivational Interviewing and Feedback With Heavy Drinking College Students. *Journal of Drug Education* 2006;**36**(3):233–46.

**Kypri 2004** *{published data only}*

* Kypri K, Saunders J, Williams S, McGee RO, Langley JD, Cashell-Smith ML, Gallagher SJ. Web-based screening and brief intervention for hazardous drinking: a double-blind randomised controlled trial. *Addiction* 2004;**99**:1410–7.

**Kypri 2005** *{published data only}*

* Kypri K, McAnally HM. Randomized controlled trial of a web-based primary care intervention for multiple health risk behaviors. *Preventive Medicine* 2005;**41**(3-4):761–6.

**Kypri 2008** *{published and unpublished data}*

* Kypri K, Langley JD, Saunders JB, Cashell-Smith ML, Herbison P. Randomized Controlled Trial of Web-Based Alcohol Screening and Brief Intervention in Primary Care. *Archives of Internal Medicine* 2008;**168**(5):530–36.

**Lewis 2007a** *{published data only}*

* Lewis MA, Neighbors C. Optimizing Personalized Normative Feedback: The Use of Gender-Specific Referents. *Journal of Studies on Alcohol and Drugs* 2007;**68**:228–37.

**Lewis 2007a, Female** *{published data only}*

Lewis MA, Neighbors C. Optimizing Personalized Normative Feedback: The Use of Gender-Specific Referents. *Journal of Studies on Alcohol and Drugs* 2007;**68**:228–37.

**Lewis 2007a, Male** *{published data only}*

Lewis MA, Neighbors C. Optimizing Personalized Normative Feedback: The Use of Gender-Specific Referents. *Journal of Studies on Alcohol and Drugs* 2007;**68**:228–37.

**Lewis 2007b** *{published data only}*

* Lewis MA, Neighbors C, Oster-Aaland L, Kirkeby B, Larimer ME. Indicated prevention for incoming college freshmen: Personalized feedback and high risk drinking. *Addictive Behaviors* 2007;**32**(11):2495–2508.

**Marlatt 1998** *{published data only}*

* Marlatt GA, Baer JS, Kivlahan DR, Dimeff LA, Larimer ME, Quigley LA, et al.Screening and Brief Intervention for High-Risk College Student Drinkers Results From a 2-Year Follow-Up Assessment. *Journal of Consulting and Clinical Psychology* 1998;**66**(4):604–7.

**McNally 2003** *{published data only}*

* McNally AM, Palfai TP. Brief group alcohol interventions with college students: examining motivational components. *Journal of Drug Education* 2003;**33**(2):159–76.

**Michael 2006** *{published data only}*

* Michael KD, Curtin L, Kirkley DE, Jones DL Harris RJr. Group-Based Motivational Interviewing for Alcohol Use Among College Students: An Exploratory Study. *Professional Psychology: Research and Practice* 2006;**37**(6): 629–34.

**Murphy 2001** *{published data only}*

* Murphy JG, Duchnick JJ, Vuchinich RE, Davison JW, Karg R, Olson AM, et al.Relative efficacy of a brief motivational intervention for college student drinkers. *Psychology of Addictive Behaviors* 2001;**15**:373–9.

**Neal 2004** *{published data only}*

* Neal DJ, Carey KB. Developing discrepancy within self-regulation theory: Use of personalized normative feedback and personal strivings with heavy-drinking college students. *Addictive Behaviors* 2004;**29**(2):281–97.

**Neighbors 2006** *{published data only}*

* Neighbors C, Lewis MA, Bergstrom RL, Larimer ME. Being controlled by normative influences: Self-determination as a moderator of a normative feedback alcohol intervention. *Health Psychology* 2006;**25**:571–9.

**Walters 2000** *{published data only}*

* Walters ST, Bennett ME, Miller JE. Reducing alcohol use in college students: a controlled trial of two brief interventions. *Journal of Drug Education* 2000;**30**(3): 361–72.

**Walters 2007** *{published data only}*

* Walters ST, Vader AM, Harris TR. A Controlled Trial of Web-Based Feedback for Heavy Drinking College Students. *Prevention Science* 2007;**8**(1):83–8.

**Werch 2000** *{published data only}*

* Werch CE, Pappas DM, Carlson JM, DiClemente CC, Chally PS, Sinder JA. Results of a Social Norm Intervention To Prevent Binge Drinking among First-Year Residential College Students. *Journal of American College Health* 2000; **49**(2):85–92.

## References to studies excluded from this review

**Agostinelli 1995** *{published data only}*

Agostinelli G, Brown J, Miller WR. Effects of Normative Feedback on Consumption among Heavy DrinkingCollege Students. *Journal of Drug Education* 1995;**25**(1):31–40.

**Baer 1992** *{published data only}*

Baer JS, Marlatt GA, Kivlahan DR, Fromme K, Larimer ME, Williams E. An Experimental Test of Three Methods of Alcohol Risk Reduction with Young Adults. *Journal of Consulting and Clinical Psychology* 1992;**60**(6):974–9.

**Barnett 1996** *{published data only}*

Barnett LA, Far JM, Mauss AL, Miller JA. Changing Perceptions of Peer Norms as a Drinking Reduction Program for College Students. *Journal of Alcohol and Drug Education* 1996;**41**(2):39–62.

**Barnett 2007** *{published data only}*

Barnett NP, Murphy JG, Colby SM, Monti PM. Efficacy of counsellor vs. computer-delivered intervention with mandated college students. *Addictive Behaviors* 2007;**32** (11):2529–48.

**Bendtsen 2006** *{published data only}*

Bendtsen P, Johansson K, Akerlind I. Feasibility of an email-based electronic screening and brief intervention (e-SBI) to college students in Sweden. *Addictive Behaviors* 2006;**31**(5): 777–87.

**Collins 2005** *{published data only}*

Collins SE, Carey KB, Smyth J. Relationships of Linguistic and Motivation Variables with Drinking Outcomes Following Two Mailed Brief Interventions. *Journal of Studies on Alcohol* 2005;**66**(4):526–35.

**Curtin 2001** *{published data only}*

Curtin L, Stephens RS, Bonenberger JL. Goal Setting and Feedback in the Reduction of Heavy Drinking in Female College Students. *Journal of College Student Psychotherapy* 2001;**15**(3):17–37.

**Dimeff 2000** *{published data only}*

Dimeff LA, McNeely M. Computer-enhanced primary care practitioner advice for high-risk college drinkers in a student primary health-care setting. *Computer-enhanced primary care practitioner advice for high-risk college drinkers in a student primary health-care setting* 2000;**7**(1):82–100.

**Graham 2004** *{published data only}*

Graham JW, Tatterson JW, Roberts MM, Johnston SE. Preventing alcohol-related harm in college students: Alcohol-related Harm Prevention program effects on hypothesized mediating variables. *Health Education Research* 2004;**19**(1):71–84.

**Granfield 2002** *{published data only}*

Granfield R. Believe it or not: examining to the emergence of new drinking norms in college. *Journal of Alcohol & Drug Education* 2002;**47**(2):18–33.

**Granfield 2005** *{published data only}*

Granfield R. Alcohol use in college: Limitations on the transformation of social norms. *Addiction Research and Theory* 2005;**13**(3):281–92.

**Gregory 2001** *{published data only}*

Gregory BM. College alcohol & life skills study with students athletes (dissertation). Florida Atlantic University 2001.

**Hanewinkel 2005** *{published data only}*

Hanewinkel R, Wiborg G. Brief alcohol screening and intervention for college students (BASICS): A German pilot study. *SUCHT* 2005;**51**(5):285-90.

**Kypri 2003** *{published data only}*

Kypri K, Saunders JB, Gallagher SJ. Acceptability of various brief intervention approaches for hazardous drinking among university students. *Alcohol and Alcoholism* 2003;**38**(6): 626–8.

**Kypri 2007** *{published data only}*

Kypri K, Langley JD, Saunders JB, Cashell-Smith ML. Assessment may conceal therapeutic benefit: findings from a randomized controlled trial for hazardous drinking. *Addiction* 2007;**102**(1):71–80.

**LaBrie 2007** *{published data only}*

LaBrie JW, Pedersen ER, Lamb TF, Quinlan T. A campus-based motivational enhancement group intervention reduces problematic drinking in freshmen male college students. *Addictive Behaviors* 2007;**32**(5):889–901.

**Larimer 2007** *{published data only}*

Larimer ME, Lee CM, Kilmer JR, Fabiano PM, Stark CB, Geisner IM. Personalized Mailed Feedback for College Drinking Prevention: A Randomized Clinical Trial. *Journal of Consulting and Clinical Psychology* 2007;**75**(2):285–93.

**Lysaught 2004** *{published data only}*

Lysaught EM, Wodarski JS, Parris H. A Comparison of an Assessment/Information-Based Group versus an Assessment-Only Group: An Investigation of Drinking Reduction with Young Adults. *Journal of Human Behavior in the Social Environment* 2004;**8**(4):23–43.

**Maney 2002** *{published data only}*
Maney DW, Mortensen S, Powell MP, Lozinska-Lee M, Kennedy S, Moore B. Alcohol-Free Alternative Activities for University Students: Modeling Associated Drinking Behavior. *American Journal of Health Behavior* 2002;**33**(4): 225–33.

**Martens 2007** *{published data only}*
Matthew PM, Ciminib MD, Barrb AR, Riverob EM, Vellis PA, Desemonec GA, et al.Implementing a screening and brief intervention for high-risk drinking in university-based health and mental health care settings: Reductions in alcohol use and correlates of success. *Addictive Behaviors* 2007;**32**(11):2563–72.

**Murphy 2004** *{published data only}*
Murphy JG, Benson TA, Vuchinich RE, et al.A comparison of personalized feedback for college student drinkers delivered with and without a motivational interview. *Journal of Studies on Alcohol* 2004;**65**:200–3.

**Murphy 2005** *{published data only}*
Murphy JG, Colby SM, Correia CJ, Vuchinich RE. Using Behavioral Theories of Choice to Predict Drinking Outcomes Following a Brief Intervention. *Experimental and Clinical Psychopharmacology* 2005;**13**(2):93-101.

**Nye 1997** *{published data only}*
Nye EC, Agostinelli G, Smith JE. Enhancing Alcohol Problem Recognition: A Self-Regulation Model for the Effects of Self-Focusing and Normative Information. *Journal of studies on alcohol* 1997;**60**(5):685–93.

**Saitz 2007** *{published data only}*
Saitz R, Palfai TP, Freedner N, Winter MR, Macdonald A, LU J, et al.Screening and brief intervention online for college students: The iHealth Study. *Alcohol and Alcoholism* 2007;**42**:28–36.

**Schulenberg 2001** *{published data only}*
Schulenberg J, Maggs JL, Long SW, Sher KJ, Gotham HJ, Baer JS, et all. The Problem of College Drinking: Insights from a Developmental Perspective. *Alcoholism: Clinical and Experimental Research* 2001;**25**(3):473–7.

**Smith 2004** *{published data only}*
Smith BH. A randomized study of a peer-led, small group social norming intervention designed to reduce drinking among college students. *Journal of Alcohol & Drug Education* 2004;**47**(3):67–75.

**Stamper 2004** *{published data only}*
Stamper GA, Smith BH, Gant R, Bogle KE. Replicated Findings of an Evaluation of a Brief Intervention Designed to Prevent High-Risk Drinking among First-Year College Students: Implications for Social Norming Theory. *Journal of Alcohol and Drug Education* 2004;**48**(2):53.

**Steffian 1999** *{published data only}*
Steffian G. Correction of Normative Misperceptions: An Alcohol Abuse Prevention Program. *Journal of Drug Education Article Back To: Main Publication Issue JourJournal of Drug Education* 1999;**29**(2):115–38.

**Ståhlbrandt 2007** *{published data only}*
Ståhlbrandt H, Johnsson KO, Berglund M. Two-Year Outcome of Alcohol Interventions in Swedish University Halls of Residence: A Cluster Randomized Trial of a Brief Skills Training Program, Twelve-Step-Influenced Intervention, and Controls. *Alcoholism Clinical and Experimental Research* 2007;**31**(3):458–66.

**Tevyaw 2007** *{published data only}*
Tevyaw TO, Borsari B, Colby SM, Monti PM. Peer enhancement of a brief motivational intervention with mandated college students. *Psychol Addict Behav* 2007;**21** (1):114–9.

**Thombs 2002** *{published data only}*
Thombs DL, Hamilton MJ. Effects of a Social Norm Feedback Campaign on the Drinking Norms and Behavior of Division I Student-Athletes. *Journal of Drug Education* 2002;**32**(3):227–44.

**Trocker 2004** *{published and unpublished data}*
Trocker MT. Alcohol abuse prevention among fraternity men: Addressing individual perceptions andmoderating group culture determinants of High-risk drinking (dissertation). University of Illinois at Urbana-Champaigh 2004.

**Walker 2002** *{published data only}*
Walker K. Report on a social norm intervention at a south Australian university. *Health Promotion Journal of Australia* 2002;**13**(3):211–3.

**White 2006** *{published data only}*
White HR, Morgan TJ, Pugh LA, et al.Evaluating two brief substance-use interventions for mandated college students. *Journal of Studies on Alcohol* 2006;**67**(2):309–17.

**White 2007** *{published data only}*
White HR, Mun EY, Pugh L, Morgan TJ. Long-Term Effects of Brief Substance Use Interventions for Mandated College Students: Sleeper Effects of an In-Person Personal Feedback Intervention. *Alcoholism Clinical and Experimental Research* 2007;**31**(8):1380–91.

**Wild 2007** *{published data only}*
Wild TC, Cunningham JA, Roberts AB. Controlled study of brief personalized assessment-feedback for drinkers interested in self-help. *Addiction* 2007;**102**(2):241–50.

## References to studies awaiting assessment

**Larimer 2001** *{published data only}*
Larimer ME, Turner AP, Anderson BK, Foder JS, Kilmer JR, Palmer RS, et al.Evaluating a brief alcohol intervention with fraternities. *Journal of Studies on Alcohol* 2001;**62**:370–80.

**Neighbors 2004** *{published data only}*
Neighbors C, Larimer ME, Lewis MA. Targeting Misperceptions of Descriptive Drinking Norms: Efficacy of a Computer-Delivered Personalized Normative Feedback Intervention. *Journal of Consulting and Clinical Psychology* 2004;**72**(3):434–47.

**Saunders 2004** *{published data only}*
Saunders JB, Kypri K, Walters ST, Laforge RG, Larimer ME. Approaches to brief intervention for hazardous drinking

in young people. *Alcoholism: Clinical and Experimental Research* 2004;**28**(2):322–9.

**Wood 2007** ***{published data only}***

Wood MD, Capone C, Laforge R, Erickson DJ, Brand NH. Brief motivational intervention and alcohol expectancy challenge with heavy drinking college students: A randomized factorial study. *Addictive Behaviors* 2007;**32** (11):2509–28.

## Additional references

**Altman 2001**

Altman DG, Schulz KF, Moher D, Egger M, Davidoff F, Elbourne D, et al.The revised CONSORT statement for reporting randomized trials: explanation and elaboration. *Ann Intern Med* 2001;**134**(8):663–94.

**Anderson 2006**

Anderson P, Baumberg B. Alcohol in Europe. *Institute of Alcohol Studies* 2006;**n/a**(n/a):n/a. [: http://ec.europa.eu/health–eu/news_alcoholineurope_en.htm]

**Berkowitz 1997**

Berkowitz AD. From Reactive to Proactive Prevention: Promoting an Ecology of Health on Campus. Chapter 6. In: P.C. Rivers, E. Shore editor(s). *A Handbook on Substance Abuse for College and University Personne*. Westport, CT: Greenwood Press, 1997.

**Berkowitz 2005**

Berkowitz AD. An overview of the social norms approach. In: Cresskill editor(s). *Changing the Culture of College Drinking: A Socially Situated Health Communication Campaign*. NJ: Hampton Press, 2005.

**Bewick 2008**

Bewick MB, Trusler B, Barkham M, Hill JA, Cahill J, Mulhern B. The effectiveness of web-based interventions designed to decrease alcohol consumption -- A systematic review. *Preventive Medicine* 2008;**47**(1):17–26.

**Carey 2004**

Carey KB, Neal DJ, Collins SE. A psychometric analysis of the self-regulation questionnaire. *Addictive Behaviors* 2004; **29**(2):253–260.

**Carey 2007**

Carey KB, Scott-Sheldon LA, Carey MP, DeMartini KS. Individual-level interventions to reduce college student drinking: A meta-analytic review. *Addictive Behaviors* 2007; **32**(11):2469–94.

**Cohen 1988**

Cohen J. *Statistical power analysis for the behavioral sciences*. 2nd Edition. New Jersey: Lawrence Erlbaum, 1988.

**Dawson 2004**

Dawson DA, Grant BF, Stinson FS, Chou PS. Another look at heavy episodic drinking and alcohol use among college and non college youth. *Journal Studies Alcohol* 2004;**65**: 477–89.

**Fager 2004**

Fager J, Mazurek MB. The Effectiveness of Intervention Studies to Decrease Alcohol Use in College Undergraduate Students: An Integrative Analysis. *Worldviews on Evidence-Based Nursing* 2004;**1**(2):102–19.

**Grossman 2004**

Grossman J. Special Campus Dole Poll. Available at Dole Nutrition Institute web site 2004.

**Gruenewald 2002**

Gruenewald PJ, Johnson FW, Treno AJ. Outlets, drinking and driving: A multilevel analysis of availability. *Journal of studies on alcohol* 2002;**63**(4):460–8.

**Higgins 2008**

Higgins JPT, Green S (editors). Cochrane Handbook for Systematic Reviews of Interventions Version 5.0.1 [updated September 2008]. The Cochrane Collaboration, 2008. Available from www.cochrane-handbook.org..

**Hingson 2005**

Hingson R, Heeren T, Winter M, Wechsler H. Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18-24: Changes from 1998 to 2001. *Annual Review of Public Health* 2005;**26**:259–79.

**Karam 2007**

Karam K, Kypri K, Salamoun M. Alcohol use among college students: an international perspective. *Current Opinion in Psychiatry* 2007;**20**:213–21.

**Kuo 2003**

Kuo M, Wechsler H, Greenberg P, Lee H. The marketing of alcohol to college students: the role of low prices and special promotions. *American Journal Preventive Medicine* 2003;**25** (3):204–11.

**Kypri 2002**

Kypri K, Langley JD, McGee R, Saunders JB, Williams S. High Prevalence, Persistent Hazardous Drinking Among New Zealand Tertiary Students. *Alcohol & Alcoholism* 2002; **37**(5):457–64.

**Kypri 2005**

Kypri K, Cronin M, Wright CS. Do University students drink more hazardously than their non-student peers?. *Addiction* 2005;**100**:713–4.

**Lewis 2006**

Lewis MA, Neighbors C. Who is the typical college student? Implications for personalized normative feedback interventions [Who is the typical college student? Implications for personalized normative feedback interventions]. *Addictive Behaviors* 2006;**31**(11):2120–6.

**Mcalaney 2007**

McAlaney J, McMahon J. Normative beliefs, misperceptions and heavy episodic drinking in a British student sample. *Journal of Studies on Alcohol and Drugs* 2007;**68**(3):385–92.

**O' Malley 2002**

O'Malley P, Johnston L. Epidemiology of alcohol and other drug use among American college students. *Journal of Studies on Alcohol* 2002;**Supplement 14**:23–39.

**Perkins 1996**

Perkins HW, Wechsler H. Variation in perceived college drinking norms and its impact on alcohol abuse: A nationwide study. *Journal of Drug Issues* 196;**26**(4):961–74.

**Perkins 2002**
Perkins HW. Social Norms and the Prevention of Alcohol Misuses in Collegiate Contexts. *Journal of Studies on Alcohol* 2002;**(Supplement No. 14)**:164–72.

**Perkins 2003**
Perkins HW (ED). *The Social Norms Approach to Preventing School and College Age Substance Abuse: A Handbook for Educators, Counselors, and Clinicians*. First Edition. San Francisco: Jossey-Bass, 2003.

**Perkins 2007**
Perkins W. Misperceptions of peer drinking norms in Canada: Another look at the "reign of error" and its consequences among college students. *Addictive Behaviors* 2007;**32**(11):2645–56.

**Rehm 2005**
Rehm, et al.The share of deaths attributable to alcohol in the EU citizens younger that age 70 years (year 2000). Global Burden of Disease data 2005.

**Scribner 2000**
Scribner RA, Cohen DA, Fisher W. Evidence of a structural effect for alcohol outlet density : A multilevel Analysis. *Alcoholism, clinical and experimental research* 2000;**24**(295): 188–1.

**Underwood 2000**
Underwood B, Fox K. A survey of alcohol and drug use among UK based dental undergraduates. *British Dental Journal* 2000;**18**:314–7.

**Walters 2004**
Walters ST, Neighbors C. Feedback interventions for college alcohol misuse: what, why and for whom?. *Addictive Behaviors* 2005;**30**(6):1168–82.

**Wechsler 1994**
Wechsler H, Davenport A, Dowdall G, Moeykens B, Castillo S. Health and behavioral consequences of binge drinking in college. *JAMA* 1994;**272**:1672–7.

**Wechsler 2002**
Wechsler H, Lee JE, Hall J, Wagenaar AC, Lee H. Secondhand Effects of Student Alcohol Use Reported by Neighbors of Colleges: The Role of Alcohol Outlets. *Social Science & Medicine* 2002;**55**(3):425–35.

**Weitzman 2003**
Weitzman ER, Folkman A, Lemieux Folkman K, Wechsler H. The relationship of alcohol outlet density to heavy and frequent drinking and drinking-related problems among college students at eight universities. *Health & Place* 2003; **9**:1-6.

**WHO 2008**
WHO. Management of substance abuse - Alcohol. in: http://www.who.int/substance_abuse/facts/alcohol/en/index.html.

* *Indicates the major publication for the study*

## CHARACTERISTICS OF STUDIES

### Characteristics of included studies *[ordered by study ID]*

**Baer 2001**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 1, 2, 3 and 4 years<br>Attrition: 16.1% |
| Participants | Age:< 19 at baseline<br>Sex: 55% female<br>Size: N=363 at 4 year follow-up<br>Setting: university<br>Country: USA |
| Interventions | Programme type: Motivational interview (MI)<br>Type: feedback sheet, interview<br>Theoretical base: MI<br>Key components: Motivational techniques and personalized summary feedback sheet given at the end.<br>Mailed feedback<br>Duration: no details<br>Primary staff: 2 doctoral-level clinical psychologists, 2 postdoctoral-level clinical psychologists and 4 advanced graduate students in clinical psychology for follow-up interview<br>Control group: No intervention given<br>Normative feedback: Consumption patterns, rates of drinking compared with norms for same-age peers, perceived risk and benefits of drinking, biphasic effects of alcohol, placebo and tolerance effects |
| Outcomes | Slight decline over time in frequency . Quantity and negative consequences of drinking increased only marginally |
| Notes | monetary incentives given<br>Large sample size.<br>Screening of students while in high school - other risk factors my be missed |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Adequate sequence generation? | Unclear | "..were randomised..." |
| Allocation concealment? | Unclear | not discussed in this study |
| Incomplete outcome data addressed? All outcomes | No | Moderate attrition and no ITT performed for 4 year follow-up |
| Free of selective reporting? | Yes | all data reported |

**Baer 2001** (*Continued*)

| | | |
|---|---|---|
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | No | self-reported |

**Borsari 2000**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up:6 weeks<br>Attrition:1% |
| Participants | Age:18.58<br>Sex:55% female<br>Size:N=60<br>Setting:University<br>Country:USA |
| Interventions | Programme type: Modeled on Brief Alcohol Screening and Intervention of College Students (BASICS)<br>Type: Group face-to-face session<br>Theoretical base: Motivation for change<br>Key components: MI with normative feedback , positive and negative consequences of drinking<br>Duration: 1 hour<br>Primary Staff: clinical graduate student supported by a clinical psychologist trained in MI<br>Control group: no intervention given<br>Normative feedback: Students alcohol use in the past month, compared with both campus and national norms, perceptions of close friends drinking and that of the typical student perceived norms on drinking, negative consequences of drinking. The influence of positive and negative expectancies on personal use, perceived risks and benefits of drinking, accurate information about alcohol and its effects |
| Outcomes | Reduction in number of drinks, number of times and frequency of binge drinking.<br>No significant reduction in drinking-related problems. |
| Notes | Binge drink students only |

***Risk of bias***

| **Item** | **Authors' judgement** | **Description** |
|---|---|---|
| Adequate sequence generation? | Yes | "...by flip of a coin.." |
| Allocation concealment? | Unclear | not discussed in this study |

**Borsari 2000** (*Continued*)

| | | |
|---|---|---|
| Incomplete outcome data addressed? All outcomes | Yes | low attrition, no need for ITT analysis |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | Unclear | not discussed in this study |
| Blinding outcome assessors? | Unclear | not discussed in this study |

**Borsari 2005**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 3 and 6 months |
| Participants | Age:19.1<br>Sex: 17% female<br>Size:N=64<br>Setting:University<br>Country:USA |
| Interventions | Programme type: BMI<br>Type:Individual face-to-face BMI<br>Theoretical base: not discussed<br>Key components: personalized normative feedback (PNF), normative quantity and frequency of drinking, blood alcohol content (BAC), alcohol related consequences and alcohol expectancies<br>Duration: BMI session:62 min, Alcohol education (AE) session: 46 min<br>Primary Staff: two undergraduate psychology majors<br>Control group: AE session<br>Normative feedback: normative quantity and frequency of drinking, BAC and tolerance, alcohol related problems, influence of setting and expectancies on drinking and alcohol expectancies |
| Outcomes | BMI an AE decreased their alcohol use<br>BMI students reduced alcohol-related problems to a greater extent than AE students |
| Notes | Mandated students<br>AE - Alcohol education intervention<br>BMI or alcohol intervention session |

***Risk of bias***

| **Item** | **Authors' judgement** | **Description** |
|---|---|---|
| Adequate sequence generation? | Yes | "coin toss..." |
| Allocation concealment? | Unclear | not discussed in this study |

**Borsari 2005** (*Continued*)

| | | |
|---|---|---|
| Incomplete outcome data addressed? All outcomes | No | medium attrition and no ITT analysis |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | Not discussed |

**Carey 2006**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up:1, 6 and 12 months<br>Attrition:3% at 1month<br>23% at 6 months<br>13% at 12 months |
| Participants | Age:19.2<br>Sex:65% female<br>Size:N=509<br>Setting:University<br>Country:USA |
| Interventions | Programme type: BMI<br>Type:Individual face-to-face BMI<br>Theoretical base: not discussed<br>Key components: personalized normative feedback, effects of alcohol, alcohol related consequences and alcohol expectancies<br>Duration: not discussed<br>Primary Staff: Interventionists supervised by 2 of the authors<br>Control group: No intervention given<br>Duration: not discuss<br>Primary Staff: Staff: Interventionists supervised by 2 of the authors<br>Normative feedback: drinking patterns, local and national gender-specific drinking norms, tolerance, typical and peak BAC, positive and negative alcohol expectancies, alcohol related negative consequences and risk behaviour (e.g. driving); discussion of harm reduction, individual goal setting and tips for safer drinking |
| Outcomes | Reduction in consumption and negative consequences |
| Notes | Randomisation within gender<br>Course credits<br>and money incentives given |
| ***Risk of bias*** | |

**Carey 2006** (*Continued*)

| Item | Authors' judgement | Description |
|---|---|---|
| Adequate sequence generation? | Unclear | "...assigned randomly within gender..." |
| Allocation concealment? | Unclear | not discussed in this study |
| Incomplete outcome data addressed? All outcomes | Unclear | Information on ITT analysis not given |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | No | self-reported |

**Collins 2002**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: six weeks, 6 months<br>Attrition: 35% |
| Participants | Age: 18.67<br>Sex: 50% male<br>Size: N=100 |
| Interventions | Programme type: BMI<br>Type: mailed feedback<br>Theoretical base: Social Norms theory<br>Key components: Mailed motivational feedback; personalized normative feedback<br>Duration: no details<br>Primary staff: N/A<br>Control group: Alcohol education leaflet mailed |
| Outcomes | Reduction of drinking per heaviest drinking week and fewer drinking episodes at week 6 but no evidence at 6 months follow-up.<br>No changes in related alcohol problems<br>Gender did not interact with group to alter effect of the intervention |
| Notes | Course credits and/or money incentives given |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Adequate sequence generation? | Unclear | "participants were randomly assigned by gender.." |

**Collins 2002** (*Continued*)

| | | |
|---|---|---|
| Allocation concealment? | Unclear | not discussed in this study |
| Incomplete outcome data addressed? All outcomes | No | moderate attrition at 6 months (35%) but no ITT analysis |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | not discussed in this study |

**Collins 2002, Female**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: six weeks, 6 months<br>Attrition: 35% |
| Participants | Age: 18.67<br>Sex: 50% female<br>Size: N=100 |
| Interventions | Programme type: BMI<br>Type: mailed feedback<br>Theoretical base: Social Norms theory<br>Key components: Mailed motivational feedback; personalized normative feedback<br>Duration: no details<br>Primary staff: N/A<br>Control group: Alcohol education leaflet mailed |
| Outcomes | Reduction of drinking per heaviest drinking week and fewer drinking episodes at week 6 but no<br>evidence at 6 months follow-up.<br>No changes in related alcohol problems<br>Gender did not interact with group to alter effect of the intervention |
| Notes | Course credits and/or money incentives given |

***Risk of bias***

| **Item** | **Authors' judgement** | **Description** |
|---|---|---|
| Adequate sequence generation? | Unclear | "participants were randomly assigned by gender.." |
| Allocation concealment? | Unclear | not discussed in this study |

**Collins 2002, Female** (*Continued*)

| | | |
|---|---|---|
| Incomplete outcome data addressed? All outcomes | No | moderate attrition at 6 months (35%) but no ITT analysis |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | not discussed in this study |

**Collins 2002, Male**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: six weeks, 6 months<br>Attrition: 35% |
| Participants | Age: 18.67<br>Sex: 50% male<br>Size: N=100 |
| Interventions | Programme type: BMI<br>Type: mailed feedback<br>Theoretical base: Social Norms theory<br>Key components: Mailed motivational feedback; personalised normative feedback<br>Duration: no details<br>Primary staff: N/A<br>Control group: Alcohol education leaflet mailed |
| Outcomes | Reduction of drinking per heaviest drinking week and fewer drinking episodes at week 6 but no evidence at 6 months follow-up.<br>No changes in related alcohol problems<br>Gender did not interact with group to alter effect of the intervention |
| Notes | Course credits and/or money incentives given |

***Risk of bias***

| **Item** | **Authors' judgement** | **Description** |
|---|---|---|
| Adequate sequence generation? | Unclear | "participants were randomly assigned by gender.." |
| Allocation concealment? | Unclear | not discussed in this study |
| Incomplete outcome data addressed? All outcomes | No | moderate attrition at 6 months (35%) but no ITT analysis |

**Collins 2002, Male** (*Continued*)

| | | |
|---|---|---|
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | not discussed in this study |

**DeJong 2006**

| | |
|---|---|
| Methods | Design:RCT by 18 matched universities<br>Follow-up: 3 years |
| Participants | Age: 46.3% < 21yrs<br>Sex: 60.8% female<br>Size: N=2936<br>Setting: University<br>Country: USA |
| Interventions | Programme type: Social marketing campaign<br>Type: Core messages posted on University campus<br>Theoretical base: Social Norms theory<br>Key components:<br>Core messages posted based on 2 questionnaires<br>Example: "67% of XYZ University students have 4 or fewer drinks when they party"<br>Duration: 3 years campaign<br>Primary staff: N/A<br>Control group:No intervention given<br>Normative feedback: Core message reported a normative behaviour for all students and correct an identified misperception. Core message based on two student survey questions: " What is he number of drinks you consume in a week?" and "When you party, how many drinks do you usually have?"<br>Example: " 67% of XYZ University students have 4 or fewer drinks when they party." |
| Outcomes | Relative small changes in drinking behaviour, lower risk of alcohol consumption |
| Notes | money incentives given |

***Risk of bias***

| **Item** | **Authors' judgement** | **Description** |
|---|---|---|
| Adequate sequence generation? | Unclear | " We randomly assigned..." |
| Allocation concealment? | Unclear | not discussed in this study |
| Incomplete outcome data addressed? All outcomes | Yes | data for all respondents reported |

**DeJong 2006** (*Continued*)

| | | |
|---|---|---|
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | No | self-reported |

**DeJong 2008**

| | |
|---|---|
| Methods | Design:RCT by 14 matched universities<br>Follow-up: 3 years<br>Attrition: 15.9% |
| Participants | Age: 88.5% < 24yrs<br>Sex: 55% female<br>Size: N=2439<br>Setting: University<br>Country: USA |
| Interventions | Programme type: Social marketing campaign<br>Type: Core messages posted on University campus<br>Theoretical base: Social Norms theory<br>Key components:<br>Core messages posted ion universities based on one of 2 questionnaires<br>Example: "67% of XYZ University students have 4 or fewer drinks when they party"<br>Duration: 3 years campaign<br>Primary staff: N/A<br>Control group: No intervention given<br>Normative feedback: Core message reported a normative behaviour for all students and correct an identified misperception. Core message based on two student survey questions: " What is he number of drinks you consume in a week?" and "When you party, how many drinks do you usually have?"<br>Example: " 67% of XYZ University students have 4 or fewer drinks when they party." |
| Outcomes | No changes in drinking behaviour, or risk of alcohol consumption |
| Notes | money incentives given |

***Risk of bias***

| **Item** | **Authors' judgement** | **Description** |
|---|---|---|
| Adequate sequence generation? | Unclear | " We randomly assigned..." |
| Allocation concealment? | Unclear | not discussed in this study |

**DeJong 2008** (*Continued*)

| | | |
|---|---|---|
| Incomplete outcome data addressed? All outcomes | Yes | medium attrition (15%) but ITT performed |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | No | self-reported |

**Juárez 2006**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 2 months<br>Attrition: 27% |
| Participants | Age:19.43<br>Sex: 52.5% female<br>Size: N=122<br>Setting: University<br>Country: USA |
| Interventions | I - Mailed feedback control<br>Programme type: Modeled on Check-Up to GO (CHUG)<br>Type: mailed feedback<br>Theoretical base: not discussed<br>Key components: personalized individual normative mailed feedback,<br>Duration: N/A<br>Primary Staff: N/A<br>Control group: No intervention given<br>II - Individual face-to-face feedback and MI or MI only<br>Programme type: Modeled on MET-MATCH<br>Type: MI<br>Theoretical base: not discussed<br>Key components: personalized individual normative face-to face feedback,<br>Duration: from 30 to 80 min<br>Primary Staff: 7 Master's level clinical psychology students<br>Control group: MI only<br>Normative Feedback: alcohol-related consequences, level of risk for alcohol problems, reasons for drinking, peak BAC, dependence symptoms and perceived and actual prevalence of (gender specific) college drinking norms |
| Outcomes | Reduction in drinks per day, Peak BAC and alcohol related problems<br>Reduction in drinks per day, Peak BAC and alcohol related problems. Those who received feedback show greater reduction that those who received only an MI session |

**Juárez 2006** (*Continued*)

| | |
|---|---|
| Notes | CHUG - Check-Up to GO<br>MI - Motivational Interviewing<br>Randomisation by gender<br>Course credits or money incentives given |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Adequate sequence generation? | Unclear | "participants were randomly assigned.." "Randomization was stratified by gender... " |
| Allocation concealment? | Unclear | not discussed in this study |
| Incomplete outcome data addressed? All outcomes | No | Moderate attrition (27%) but no ITT analysis |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | Blindness of outcome assessor not specified |

**Kypri 2004**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: six weeks, 6 months<br>Attrition: < 10% |
| Participants | Age: 20.15<br>Sex: not given<br>Size: N=112<br>Setting: student health service<br>Country: New Zeland |
| Interventions | Programme type: Brief interventions<br>Type: web feedback<br>Theoretical base: Social Norms theory<br>Key components: computerized assessment, feedback and advice<br>Duration: no details<br>Primary staff: not applicable<br>Control group: alcohol advice leaflet given<br>Normative feedback: Summary of their recent consumption, their risk status, comparison of their consumption with recommended upper limits, Peak BAC, comparison of their consumption with national and university norms, and correction of norm misperception |

**Kypri 2004** (*Continued*)

| | |
|---|---|
| Outcomes | At 6 weeks, the intervention resulted in reduction in total consumption, very heavy episodes and alcohol related problems<br>At 6 months, there was a reduction in alcohol related problems |
| Notes | Small attrition rate |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Adequate sequence generation? | Yes | "randomizations was effected by computer in blocks of 10" |
| Allocation concealment? | Yes | "assigned randomly by computer" |
| Incomplete outcome data addressed? All outcomes | Yes | no ITT but attrition low (<10%) |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | Yes | personnel blind to intervention group |
| Blinding outcome assessors? | Unclear | Blindness of outcome assessor not specified |

**Kypri 2005**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: six weeks<br>Attrition: 14% |
| Participants | Age: 17-24<br>Sex: 49% female<br>Size: N=218<br>Setting: student health service<br>Country: New Zeland |
| Interventions | Programme type: Brief interventions<br>Type: web feedback<br>Theoretical base: Social Norms theory<br>Key components: computerized assessment, feedback and advice<br>Duration: no details<br>Primary staff: N/A<br>Control group: No intervention given<br>Normative feedback: health authority recommendations, social norms and self-comparison with percentage of same age and gender adhering to these recommendations |

**Kypri 2005** (*Continued*)

| | | |
|---|---|---|
| Outcomes | No difference between groups in their compliance with recommended limits for episodic alcohol consumption | |
| Notes | Small attrition rate | |
| ***Risk of bias*** | | |
| **Item** | **Authors' judgement** | **Description** |
| Adequate sequence generation? | Yes | "computerized random number generator. ." |
| Allocation concealment? | Yes | not informing students that it was an intervention trial |
| Incomplete outcome data addressed? All outcomes | No | low attrition at 6 weeks (14%) but no ITT, though loss to follow-up analyses are discussed separately |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | Yes | personnel blind to intervention group |
| Blinding outcome assessors? | Yes | assessors blinded to intervention group |

**Kypri 2008**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: six and twelve months<br>Attrition: 16.1% |
| Participants | Age: 20.1<br>Sex: 74.3% female<br>Size: N=429<br>Setting: student health service<br>Country: New Zeland |
| Interventions | Programme type: Brief interventions<br>Type: web feedback<br>Theoretical base: Social Norms theory<br>Key components: computerized assessment, personalized feedback<br>Duration:n/a<br>Primary staff:<br>Control group: Alcohol education leaflet given<br>Normative feedback: Summary of their recent consumption, their risk status, comparison of their consumption with recommended upper limits, Peak BAC, comparison of their consumption with national and university norms, and correction of norm misperception |

**Kypri 2008** (*Continued*)

| | |
|---|---|
| Outcomes | Intervention group showed reduction alcohol consumption and fewer problems compared with control |
| Notes | Cash incentives given |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Adequate sequence generation? | Yes | "we selected a random sample" |
| Allocation concealment? | Yes | not informing students that it was an intervention trial |
| Incomplete outcome data addressed? All outcomes | Yes | low attrition (16%) at 12 months and ITT analysis |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | Yes | personnel blind to intervention group |
| Blinding outcome assessors? | Yes | outcome assessors blind to intervention group |

**Lewis 2007a**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 3 and 5 months<br>Attrition: 3 months - 6.1%<br>5 months - 11% |
| Participants | Age: 18.53<br>Sex: 52.24% female<br>Size: N=245 |
| Interventions | Programme type: Social Norm Intervention<br>Type: Computer delivered brief PNF<br>Theoretical base:<br>Social Norm Theory<br>Key components: web-based survey in a controlled laboratory setting ,personalized feedback, norms for typical student drinking behaviour<br>Duration: 1hour<br>Primary staff: N/A<br>Control group: No intervention given<br>Normative feedback: personal drinking, perceptions of typical student drinking, and actual typical student drinking. Percentile ranking comparing their drinking with other students drinking |

**Lewis 2007a** (*Continued*)

| | | |
|---|---|---|
| Outcomes | Reduced drinking among incoming high-risk and drinking behaviour | |
| Notes | Cash incentives given | |
| ***Risk of bias*** | | |
| **Item** | **Authors' judgement** | **Description** |
| Adequate sequence generation? | Unclear | not discussed in this study |
| Allocation concealment? | Unclear | not discussed in this study |
| Incomplete outcome data addressed? All outcomes | No | Low attrition at 5 months (11%) but no ITT analysis |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | Blindness of outcome assessor not specified |

**Lewis 2007a, Female**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 3 and 5 months<br>Attrition: 3 months - 6.1%<br>5 months - 11% |
| Participants | Age: 18.53<br>Sex: 52.24% female<br>Size: N=245 |
| Interventions | Programme type: Social Norm Intervention<br>Type: Computer delivered brief PNF<br>Theoretical base:<br>Social Norm Theory<br>Key components: web-based survey in a controlled laboratory setting ,personalized feedback, norms for typical student drinking behaviour<br>Duration: 1hour<br>Primary staff: N/A<br>Control group: No intervention given<br>Normative feedback: personal drinking, perceptions of typical student drinking, and actual typical student drinking. Percentile ranking comparing their drinking with other students drinking |
| Outcomes | Reducing drinking among incoming high-risk and drinking behaviour |

**Lewis 2007a, Female** (*Continued*)

| | | |
|---|---|---|
| Notes | Cash incentives given | |
| ***Risk of bias*** | | |
| **Item** | **Authors' judgement** | **Description** |
| Adequate sequence generation? | Unclear | not discussed in this study |
| Allocation concealment? | Unclear | not discussed in this study |
| Incomplete outcome data addressed? All outcomes | No | Low attrition at 5 months (11%) but no ITT analysis |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | Blindness of outcome assessor not specified |

**Lewis 2007a, Male**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 3 and 5 months<br>Attrition: 3 months - 6.1%<br>5 months - 11% |
| Participants | Age: 18.53<br>Sex: 47.76% male<br>Size: N=245 |
| Interventions | Programme type: Social Norm Intervention<br>Type: Computer delivered brief PNF<br>Theoretical base:<br>Social Norm Theory<br>Key components: web-based survey in a controlled laboratory setting ,personalized feedback, norms for typical student drinking behaviour<br>Duration: 1hour<br>Primary staff: N/A<br>Control group: No intervention given<br>Normative feedback: personal drinking, perceptions of typical student drinking, and actual typical student drinking. Percentile ranking comparing their drinking with other students drinking |
| Outcomes | Reduced drinking among incoming high-risk and drinking behaviour |
| Notes | Cash incentives given |

**Lewis 2007a, Male** (*Continued*)

| *Risk of bias* | | |
|---|---|---|
| **Item** | **Authors' judgement** | **Description** |
| Adequate sequence generation? | Unclear | not discussed in this study |
| Allocation concealment? | Unclear | not discussed in this study |
| Incomplete outcome data addressed? All outcomes | No | Low attrition at 5 months (11%) but no ITT analysis |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | Blindness of outcome assessor not specified |

**Lewis 2007b**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 3 and 12 months<br>Attrition: 15% |
| Participants | Age:18.53<br>Sex:53.8% female<br>Size: N= 316<br>Setting: University<br>Country: USA |
| Interventions | Programme type: PNF<br>Theoretical base:<br>Key components:<br>Duration:<br>Primary Staff:<br>Control group: No intervention given<br>Normative feedback: personal drinking behaviour, personal perceptions of typical student drinking behaviour, information regarding actual norms for typical student drinking behaviour, and their rank in comparison to other students |
| Outcomes | Reducing in drinking over 16 weeks compared with control<br>Correction of normative perceptions compared with control |
| Notes | PNF - Personalized Normative Feedback |
| *Risk of bias* | |

**Lewis 2007b** (*Continued*)

| Item | Authors' judgement | Description |
|---|---|---|
| Adequate sequence generation? | Unclear | "randomly assigned" |
| Allocation concealment? | Unclear | "simple random assignment" |
| Incomplete outcome data addressed? All outcomes | No | Moderate attrition at 5 months (15%) but no ITT analysis |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | Blindness of outcome assessor not specified |

**Marlatt 1998**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 1 and 2 years<br>Attrition: 14% |
| Participants | Age: not given<br>Sex: 54% female<br>Size: N=299<br>Setting: university<br>Country: USA |
| Interventions | Programme type: MI<br>Type: feedback<br>sheet, interview<br>Theoretical base: not discussed<br>Key components: Motivational techniques and personalized summary feedback sheet given at the end<br>Duration: no details<br>Primary staff: 2 doctoral-level clinical psychologists, 2 postdoctoral-level clinical psychologists and 4 advanced graduate students in clinical psychology for follow-up interview<br>Control group: No intervention given<br>Normative Feedback: Individualised feedback about their drinking patterns, risks and beliefs about alcohol effects. Students self-report drinking rates were compared with college averages and perceived risks for current and future problems were identified. Beliefs about alcohol effects on social behaviour were discussed |
| Outcomes | High-risk college show significant reductions in both drinking rates and harmful consequences |

**Marlatt 1998** (*Continued*)

| | |
|---|---|
| Notes | Large sample size<br>Screening of students whilst in high school - other risk factors my be missed |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Adequate sequence generation? | Yes | "computer generated...." |
| Allocation concealment? | Unclear | not discussed in this study |
| Incomplete outcome data addressed? All outcomes | No | medium attrition (14%) and no ITT performed |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | Blindness of outcome assessor not specified |

**McNally 2003**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 1month<br>Attrition: not discuss |
| Participants | Age: 18.99<br>Sex: 65% female<br>Size: N=76 subsample of 117 students<br>Setting: University<br>Country: USA |
| Interventions | Programme type: MI<br>Type: interview<br>Theoretical base: Social norm theory<br>Key components: group focused intervention through the provision and discussion of normative and other alcohol information<br>Duration: 30 min assessment followed by 40 min group intervention; 20 to 30 min follow up session<br>Primary staff: Doctoral graduate student in clinical psychology for group intervention; data collection and follow-up sessions conducted by research assistant<br>Control group: No intervention given<br>Normative feedback: Biphasic effect curve of alcohol, legal alcohol levels, definitions and statistical norms for episodic, heavy drinking, norms for general alcohol use among college students, tolerance, types of incidents of alcohol related problems. Students were repeatedly asked to recall their own response to the questionnaire items as they considered |

**McNally 2003** (*Continued*)

| | |
|---|---|
| | the information presented |
| Outcomes | Significant reduction in heavy drinking episode frequency in social norm group<br>No difference between group in drinking-related problems. |
| Notes | Relative small sample<br>Convenience sample of undergraduate students.<br><br>Cut-off may have created a sample bias towards non-problematic drinkers.<br>Course credits. |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Adequate sequence generation? | Yes | "...randomization table" |
| Allocation concealment? | Unclear | not discussed |
| Incomplete outcome data addressed? All outcomes | Unclear | subgroup analyses after randomisation |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | Unclear | not discussed |
| Blinding outcome assessors? | Unclear | Blindness of outcome assessor not specified |

**Michael 2006**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 30 to 45 days |
| Participants | Age: 18.35<br>Sex: 62.5% female<br>Size: N=91<br>Setting: University<br>Country: USA |
| Interventions | Programme type: MI counselling style<br>Type: brief group intervention<br>Theoretical base: not discussed<br>Key components:<br>Decisional balance activity, discussion of perceived college student drinking in relation to normative data<br>Duration: 60 min -pretreatment assessment session<br>50 min - MI session<br>Primary Staff: 2 master's level counsellors, one doctoral-level psychologist |

**Michael 2006** (*Continued*)

| | |
|---|---|
| | Control group: No intervention given<br>Normative feedback: Perceptions of alcohol use, misperceptions of college and nationalwide misperceptions drinking, biological risk factors (e.g. tolerance) |
| Outcomes | Some effectiveness in reduction self-report drinking quantity and episodes of intoxication |
| Notes | Randomised by classes<br>Cash incentives given |

***Risk of bias***

| **Item** | **Authors' judgement** | **Description** |
|---|---|---|
| Adequate sequence generation? | Unclear | .."randomly assigned..." |
| Allocation concealment? | Unclear | not discussed in this study |
| Incomplete outcome data addressed? All outcomes | Yes | Medium attrition and ITT analysis |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | Blindness of outcome assessor not specified |

**Murphy 2001**

| | |
|---|---|
| Methods | Design: RCT<br>Follow-up: 3 and 9 months<br>Attrition:<br>15% |
| Participants | Age: 19.60<br>Sex: 54% female<br>Size: N=99<br>Setting: University<br>Country: USA |
| Interventions | Programme type: based on BASICS<br>Type: Individual BMI<br>Theoretical base: Not discussed<br>Key components: individual MI, PNF<br>Duration: 50 min<br>Primary staff: graduate students in clinical psychology<br>Control group: AE session<br>Normative feedback: Studdents drinking patterns relative to normative college students |

**Murphy 2001** (*Continued*)

| | |
|---|---|
| | drinking, BAC's, alcohol related problems and risk factors (e.g. family history of alcoholism) |
| Outcomes | Significant reduction in drinks per week and frequency of binge drinking for the heavier drinkers |
| Notes | Heavy drink students only<br>Course credits given. |

***Risk of bias***

| **Item** | **Authors' judgement** | **Description** |
|---|---|---|
| Adequate sequence generation? | Unclear | "randomly assigned..." |
| Allocation concealment? | Unclear | not discussed in this study |
| Incomplete outcome data addressed? All outcomes | Yes | Medium attrition, but ITT performed |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | Blindness of outcome assessor not specified |

**Neal 2004**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 1 week |
| Participants | Age: not given<br>Sex: 51% female<br>Size: N=92<br>Setting: University<br>Country: USA |
| Interventions | Programme type: Social norm intervention<br>Type: PNF<br>Theoretical base:<br>discrepancy-induction<br>Key components: individual feedback, normative comparison data, nature and frequency of alcohol-related problems<br>Duration: 45 min - session I<br>40 mim - session II<br>Primary staff:<br>Control group: Personal striving assessment |

**Neal 2004** (*Continued*)

| | |
|---|---|
| Outcomes | Significant increase in intention to reducer alcohol use |
| Notes | Randomly assigned by gender<br>At risk students only<br>Course credits given |

***Risk of bias***

| **Item** | **Authors' judgement** | **Description** |
|---|---|---|
| Adequate sequence generation? | Unclear | "...randomly assigned by gender..." |
| Allocation concealment? | Unclear | not discussed in this study |
| Incomplete outcome data addressed? All outcomes | Yes | Medium attrition and ITT analysis performed |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | not discussed in this study |

**Neighbors 2006**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 2 month<br>Attrition: 14% |
| Participants | Age: 19.67<br>Sex: 119 women<br>Size: N=214<br>Setting: laboratory, University<br>Country: USA |
| Interventions | Programme type: Modeled on BASICS<br>Type: web feedback intervention<br>Theoretical base: Social Norms Theory; Self-determination theory<br>Key components: Baseline assessment followed by personalized normative feedback delivered by computer<br>Duration: no details<br>Primary staff: no interpersonal interaction involved<br>Control group: No intervention group |
| Outcomes | Reduction in drinking fewer drinks in feedback group mediated by changes in perceived norms |

**Neighbors 2006** (*Continued*)

| | | |
|---|---|---|
| Notes | Good sample size.<br>Course credits | |
| ***Risk of bias*** | | |
| **Item** | **Authors' judgement** | **Description** |
| Adequate sequence generation? | Unclear | "randomly assigned to the intervention" |
| Allocation concealment? | Unclear | not discussed in this study |
| Incomplete outcome data addressed? All outcomes | No | low attrition at 6 months (14%) but no ITT analysis |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | Blindness of outcome assessor not specified |

**Walters 2000**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 6 weeks<br>Attrition: 14% |
| Participants | Age: 19.7<br>Sex: 40% female<br>Size: N=37<br>Setting: laboratory, University<br>Country: USA |
| Interventions | Programme type: based on Drinker's Check-Up<br>Type: mailed feedback intervention<br>Theoretical base: Social Norms Theory<br>Motivational approach<br>Key components:<br>Baseline assessment followed by personalized normative feedback delivered by mail, peer norms , severity of drinking problems<br>Duration: N/A<br>Primary staff: Not discussed<br>Control group: No intervention given |
| Outcomes | Feedback only group reduced their drinking at 6 weeks follow-up<br>Reduction in drinking levels compared with control |

**Walters 2000** (*Continued*)

| | | |
|---|---|---|
| Notes | Course credits | |
| ***Risk of bias*** | | |
| **Item** | **Authors' judgement** | **Description** |
| Adequate sequence generation? | Unclear | "were randomly assigned to one of three groups.." |
| Allocation concealment? | Unclear | not discussed in this study |
| Incomplete outcome data addressed? All outcomes | No | low attrition (13%) but no ITT analysis |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | Blindness of outcome assessor not specified |

**Walters 2007**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 8 and 16 weeks<br>Attrition: 28.3% at 8 weeks and 22.6% at 16 weeks |
| Participants | Age: not given<br>Sex: 48.1% female<br>Size: N=106<br>Setting: University<br>Country: USA |
| Interventions | Programme type: based on Drinker's Check-Up<br>Type: Web feedback intervention<br>Theoretical base: Social Norms BMI<br>Key components:<br>Baseline assessment followed by personalized normative feedback , peer norms , severity of drinking problems<br>Duration: N/A<br>Primary staff: Not discussed<br>Control group: No intervention given |
| Outcomes | Feedback group reduced their drink at follow-up |
| Notes | Prize draw |

**Walters 2007** (*Continued*)

| *Risk of bias* | | |
|---|---|---|
| **Item** | **Authors' judgement** | **Description** |
| Adequate sequence generation? | Unclear | "participants were assigned to receive personalized feedback" |
| Allocation concealment? | Unclear | not discussed in the study |
| Incomplete outcome data addressed? All outcomes | No | moderate attrition at 16 weeks (23%) but no ITT analysis |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | Blindness of outcome assessor not specified |

**Werch 2000**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 1 month<br>Attrition: 18% |
| Participants | Age: not given<br>Sex: 64% female<br>Size: N= 634<br>Setting:University<br>Country: USA |
| Interventions | Programme type: Social norm campaign<br>Type: brief card marketing campaign<br>Theoretical base: Social Norm theory<br>Key components:<br>Duration: 20 min<br>Primary Staff: trained student staff in phone surveys<br>Control group: AE session |
| Outcomes | No effectiveness in overall alcohol reduction or alcohol-use risk factors |
| Notes | 1st year university students only<br>Heavy drinks only |

| *Risk of bias* | | |
|---|---|---|
| **Item** | **Authors' judgement** | **Description** |

**Werch 2000** (*Continued*)

| | | |
|---|---|---|
| Adequate sequence generation? | Unclear | "students randomly assigned" |
| Allocation concealment? | Unclear | The study did not address this outcome |
| Incomplete outcome data addressed? All outcomes | No | Low attrition (18%) ut no ITT analysis |
| Free of selective reporting? | Yes | all data reported |
| Blinding of personnel? | No | blindness of participants and personnel not possible for the kind of intervention |
| Blinding outcome assessors? | Unclear | Blindness of outcome assessor not specified |

## Characteristics of excluded studies *[ordered by study ID]*

| Study | Reason for exclusion |
|---|---|
| Agostinelli 1995 | Clear differences at baseline between intervention and control groups for number of variables, indicating failed randomization |
| Baer 1992 | No social norms intervention |
| Barnett 1996 | Process of randomizations failed |
| Barnett 2007 | Both groups received a social norm intervention |
| Bendtsen 2006 | Not a RCT |
| Collins 2005 | No alcohol outcomes |
| Curtin 2001 | Feedback group without a social norm intervention |
| Dimeff 2000 | Not a true randomizations. Students were asked if they wanted the intervention |
| Graham 2004 | Not a RCT |
| Granfield 2002 | Not a RCT |
| Granfield 2005 | Not a RCT |
| Gregory 2001 | All 3 groups received a social norm intervention included in the skills workbook |
| Hanewinkel 2005 | Not a RCT |

(*Continued*)

| | |
|---|---|
| Kypri 2003 | No social norms outcomes |
| Kypri 2007 | No normative feedback group |
| LaBrie 2007 | Not a RCT |
| Larimer 2007 | Social norms media campaign on campus at same time as the RCT, indicates contamination of the control group |
| Lysaught 2004 | No between group analysis results reported, no alcohol outcomes measures available |
| Maney 2002 | Not a RCT |
| Martens 2007 | Not a RCT |
| Murphy 2004 | Both groups received a social norm intervention |
| Murphy 2005 | Both groups received a social norm intervention |
| Nye 1997 | No alcohol or social norms outcomes reported |
| Saitz 2007 | Both groups received a social norm intervention |
| Schulenberg 2001 | No PNF data reported |
| Smith 2004 | Social norms media campaign on campus at same time as the RCT, indicates contamination of the control group |
| Stamper 2004 | Social norms media campaign on campus at same time as the RCT, indicates contamination of the control group |
| Steffian 1999 | Not a RCT |
| Ståhlbrandt 2007 | No social norms intervention |
| Tevyaw 2007 | Both groups received a social norm intervention |
| Thombs 2002 | Not a RCT |
| Trocker 2004 | Process of randomization failed |
| Walker 2002 | Not a RCT |
| White 2006 | Not a true control group |
| White 2007 | Both groups received a social norm intervention |
| Wild 2007 | Not university or college students |

## Characteristics of studies awaiting assessment *[ordered by study ID]*

**Larimer 2001**

| | |
|---|---|
| Methods | Design:RCT of 12 fraternities<br>Follow-up: 12 months<br>Attrition: 25% |
| Participants | Age: 18.8<br>Sex: 59% female<br>Size: N= 159<br>Setting:University<br>Country: USA |
| Interventions | Programme type: BASICS and MI<br>Type: individual feedback session<br>Theoretical base: Social Norms<br>Key components:<br>Baseline assessment followed by individually feedback session<br>Duration: 1 hour<br>Primary staff: undergraduate staff or a clinical psychologist (undergraduate, master's level or incensed)<br>Control group: 1 hour didactic presentation |
| Outcomes | reduce of students overall drinking consumption<br>Greater decrease in total weekly consumption and typical peak BAC |
| Notes | incentives given |

**Neighbors 2004**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 3 and 6 month<br>Attrition: 18% at 6 months |
| Participants | Age: not given<br>Sex: 59% female<br>Size: N= 252<br>Setting:University<br>Country: USA |
| Interventions | Programme type: Brief interventions<br>Type: web feedback<br>Theoretical base: Social Norms theory<br>Key components: computerized assessment, personalized feedback<br>Duration:n/a<br>Primary staff: n/a<br>Control group: no intervention given |
| Outcomes | Effective in changing perceived norms and alcohol consumption at 3 and 6 months |

**Neighbors 2004** (*Continued*)

| | |
|---|---|
| Notes | heavy-drinkers only |

**Saunders 2004**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 3, 6 and 12 months<br>Attrition: 23% at 12 months |
| Participants | Age: not given<br>Sex: not discussed<br>Size: N= 1067<br>Setting:University<br>Country: USA |
| Interventions | Programme type: Harm reduction<br>Type: mail feedback report<br>Theoretical base:<br>Key components: 3 individually risk and motivationally matched feedback report<br>Duration:n/a<br>Primary staff: n/a<br>Control group: no intervention given<br>Normative feedback: awaiting response from author |
| Outcomes | reduction in alcohol risk taking and problems |
| Notes | |

**Wood 2007**

| | |
|---|---|
| Methods | Design:RCT<br>Follow-up: 1, 3 and 6 month<br>Attrition: not discussed |
| Participants | Age: 20-24<br>Sex: 52.5% female<br>Size: N= 335<br>Setting:University<br>Country: USA |
| Interventions | Programme type: BMI<br>Type: individual face-to-face<br>Theoretical base: Social Norms theory<br>Key components: Duration: 45 to 60 minunts<br>Primary staff: clinical psycology graduate students<br>Control group: no intervention given |
| Outcomes | Significant reduction in Q-F, heavy drinking and problems |

**Wood 2007** (*Continued*)

| | |
|---|---|
| Notes | Incentives given |

## DATA AND ANALYSES

### Comparison 1. Social norms feedback vs control

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|---|---|---|---|---|
| 1 Alcohol related problems - Up to 3 months | 12 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 1.1 Mailed feedback | 4 | 681 | Std. Mean Difference (IV, Random, 95% CI) | 0.13 [-0.02, 0.28] |
| 1.2 Web feedback | 3 | 278 | Std. Mean Difference (IV, Random, 95% CI) | -0.31 [-0.59, -0.02] |
| 1.3 Individual Face-to -face | 3 | 278 | Std. Mean Difference (IV, Random, 95% CI) | -0.24 [-0.49, 0.01] |
| 1.4 Group Face-to-face | 2 | 144 | Std. Mean Difference (IV, Random, 95% CI) | -0.09 [-0.49, 0.32] |
| 2 Peak BAC - Up to 3 months | 5 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 2.1 Mailed feedback | 1 | 94 | Std. Mean Difference (IV, Random, 95% CI) | -0.20 [-0.60, 0.21] |
| 2.2 Web feedback | 2 | 198 | Std. Mean Difference (IV, Random, 95% CI) | -0.77 [-1.25, -0.28] |
| 2.3 Individual Face-to-face | 2 | 224 | Std. Mean Difference (IV, Random, 95% CI) | -0.13 [-0.41, 0.15] |
| 3 Frequency - Up to 3 months | 8 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 3.1 Mailed feedback | 1 | 521 | Std. Mean Difference (IV, Random, 95% CI) | 0.12 [-0.05, 0.29] |
| 3.2 Web feedback | 2 | 243 | Std. Mean Difference (IV, Random, 95% CI) | -0.38 [-0.63, -0.13] |
| 3.3 Individual Face-to-face | 2 | 217 | Std. Mean Difference (IV, Random, 95% CI) | -0.39 [-0.66, -0.12] |
| 3.4 Group Face-to-face | 3 | 211 | Std. Mean Difference (IV, Random, 95% CI) | -0.26 [-0.69, 0.16] |
| 4 Quantity of drinking - Up to 3 months | 14 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 4.1 Mailed feedback | 3 | 656 | Std. Mean Difference (IV, Random, 95% CI) | -0.10 [-0.47, 0.26] |
| 4.2 Web feedback | 5 | 556 | Std. Mean Difference (IV, Random, 95% CI) | -0.29 [-0.50, -0.09] |
| 4.3 Individual Face-to-face | 3 | 278 | Std. Mean Difference (IV, Random, 95% CI) | -0.20 [-0.44, 0.03] |
| 4.4 Group Face-to-face | 3 | 173 | Std. Mean Difference (IV, Random, 95% CI) | -0.32 [-0.63, -0.02] |
| 5 Binge drinking - Up to 3 months | 10 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 5.1 Mailed feedback | 2 | 615 | Std. Mean Difference (IV, Random, 95% CI) | -0.07 [-0.50, 0.36] |
| 5.2 Web feedback | 1 | 80 | Std. Mean Difference (IV, Random, 95% CI) | -0.47 [-0.92, -0.03] |
| 5.3 Individual Face-to-face | 3 | 278 | Std. Mean Difference (IV, Random, 95% CI) | -0.25 [-0.49, -0.02] |
| 5.4 Group Face-to-face | 4 | 264 | Std. Mean Difference (IV, Random, 95% CI) | -0.38 [-0.62, -0.14] |
| 6 BAC - Up to 3 months | 3 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 6.1 Mailed feedback | 2 | 66 | Std. Mean Difference (IV, Random, 95% CI) | -0.08 [-0.57, 0.40] |
| 6.2 Individual Face-to-face feedback | 1 | 61 | Std. Mean Difference (IV, Random, 95% CI) | 0.16 [-0.34, 0.67] |
| 7 Drinking Norms - Up to 3 months | 5 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 7.1 Mailed feedback (up to 3 months) | 1 | 521 | Std. Mean Difference (IV, Random, 95% CI) | -0.05 [-0.22, 0.12] |
| 7.2 Web feedback (up to 3 months) | 3 | 312 | Std. Mean Difference (IV, Random, 95% CI) | -0.75 [-0.98, -0.52] |
| 7.3 Group Face-to-face (up to 3 months) | 1 | 59 | Std. Mean Difference (IV, Random, 95% CI) | -0.70 [-1.22, -0.17] |
| 8 Alcohol related problems - 4 to 16 months | 8 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 8.1 Mailed Feedback | 1 | 64 | Std. Mean Difference (IV, Random, 95% CI) | -0.34 [-0.83, 0.16] |
| 8.2 Web Feedback | 3 | 415 | Std. Mean Difference (IV, Random, 95% CI) | -0.26 [-0.45, -0.07] |
| 8.3 Individual Face-to-face | 4 | 533 | Std. Mean Difference (IV, Random, 95% CI) | -0.24 [-0.42, -0.07] |

| | | | | |
|---|---|---|---|---|
| 9 Peak BAC - 4 to 16 months | 3 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 9.1 Web feedback | 1 | 82 | Std. Mean Difference (IV, Random, 95% CI) | -0.09 [-0.53, 0.34] |
| 9.2 Individual Face-to-face | 2 | 180 | Std. Mean Difference (IV, Random, 95% CI) | -0.08 [-0.37, 0.22] |
| 10 Frequency - 4 to 16 months | 6 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 10.1 Web feedback | 3 | 478 | Std. Mean Difference (IV, Random, 95% CI) | -0.31 [-0.49, -0.13] |
| 10.2 Individual Face-to-face | 3 | 476 | Std. Mean Difference (IV, Random, 95% CI) | -0.26 [-0.44, -0.08] |
| 11 Quantity of drinking - 4 to 16 months | 9 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 11.1 Mailed feedback | 1 | 65 | Std. Mean Difference (IV, Random, 95% CI) | -0.32 [-0.80, 0.17] |
| 11.2 Web feedback | 4 | 560 | Std. Mean Difference (IV, Random, 95% CI) | -0.16 [-0.33, 0.00] |
| 11.3 Individual Face-to-face | 4 | 533 | Std. Mean Difference (IV, Random, 95% CI) | -0.14 [-0.31, 0.03] |
| 12 Binge drinking - 4 to 16 months | 6 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 12.1 Mailed feedback | 1 | 65 | Std. Mean Difference (IV, Random, 95% CI) | -0.17 [-0.65, 0.32] |
| 12.2 Web feedback | 2 | 329 | Std. Mean Difference (IV, Random, 95% CI) | Not estimable |
| 12.3 Individual Face-to-face | 3 | 234 | Std. Mean Difference (IV, Random, 95% CI) | -0.03 [-0.29, 0.22] |
| 13 BAC - 4 to 16 months | 1 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 13.1 Individual Face-to-face | 1 | 57 | Std. Mean Difference (IV, Random, 95% CI) | Not estimable |
| 14 Drinking Norms - 4 to 16 months | 2 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 14.1 Web feedback | 2 | 199 | Std. Mean Difference (IV, Random, 95% CI) | -0.59 [-1.02, -0.17] |
| 15 Alcohol Related Problems - + 17 months | 3 | | SMD (Random, 95% CI) | Subtotals only |
| 15.1 Individual Face-to-Face | 1 | | SMD (Random, 95% CI) | 0.31 [0.06, 0.56] |
| 15.2 Marketing Campaign | 2 | | SMD (Random, 95% CI) | -0.03 [-0.17, 0.11] |
| 16 Frequency - +17 months | 1 | | SDM (Random, 95% CI) | Subtotals only |
| 16.1 Individual Face-to-Face | 1 | | SDM (Random, 95% CI) | 0.06 [-0.18, 0.30] |
| 17 Quantity of Drinking - + 17 months | 3 | | SDM (Random, 95% CI) | Subtotals only |
| 17.1 Individual Face-to-Face | 1 | | SDM (Random, 95% CI) | 0.1 [-0.08, 0.28] |
| 17.2 Marketing Campaign | 2 | | SDM (Random, 95% CI) | -0.06 [-0.12, -0.01] |
| 18 BAC - + 17 months | 1 | | SDM (Random, 95% CI) | Subtotals only |
| 18.1 Marketing Campaign | 1 | | SDM (Random, 95% CI) | Not estimable |
| 19 Drinking Norms - +17 months | 2 | | SDM (Random, 95% CI) | Subtotals only |
| 19.1 Marketing Campaign | 2 | | SDM (Random, 95% CI) | -0.06 [-0.23, 0.11] |
| 20 Alcohol related problems - gender specific | 2 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 20.1 mailed feedback | 2 | 94 | Std. Mean Difference (IV, Random, 95% CI) | -0.01 [-0.41, 0.39] |
| 21 Quantity of drinking - gender specific | 4 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 21.1 Mailed Feedback | 2 | 94 | Std. Mean Difference (IV, Random, 95% CI) | -0.51 [-0.92, -0.09] |
| 21.2 Web/computer feedback | 2 | 122 | Std. Mean Difference (IV, Random, 95% CI) | -0.45 [-0.86, -0.05] |
| 22 Binge drinking - gender specific | 2 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 22.1 Mailed Feedback | 2 | 94 | Std. Mean Difference (IV, Random, 95% CI) | -0.33 [-0.74, 0.08] |
| 23 Peak BAC - gender specific | 2 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 23.1 Mailed Feedback | 2 | 94 | Std. Mean Difference (IV, Random, 95% CI) | -0.23 [-0.64, 0.17] |
| 24 Drinking Norms - gender specific | 2 | | Std. Mean Difference (IV, Random, 95% CI) | Subtotals only |
| 24.1 Web/computer feedback | 2 | 122 | Std. Mean Difference (IV, Random, 95% CI) | -0.95 [-1.33, -0.57] |

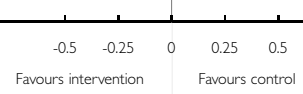
## Analysis 1.1. Comparison 1 Social norms feedback vs control, Outcome 1 Alcohol related problems - Up to 3 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 1 Alcohol related problems - Up to 3 months

| Study or subgroup | Intervention N | Mean(SD) | Control N | Mean(SD) | Std. Mean Difference IV,Random,95% CI | Weight | Std. Mean Difference IV,Random,95% CI |
|---|---|---|---|---|---|---|---|
| 1 Mailed feedback | | | | | | | |
| Collins 2002 | 47 | 7.83 (6.67) | 47 | 7.91 (5.69) | | 13.9 % | -0.01 [ -0.42, 0.39 ] |
| Jurez 2006 | 20 | 5.6 (5.08) | 21 | 4.28 (4.21) | | 6.0 % | 0.28 [ -0.34, 0.89 ] |
| Walters 2000 | 11 | 6 (3.19) | 14 | 4.86 (3.48) | | 3.6 % | 0.33 [ -0.47, 1.12 ] |
| Werch 2000 | 266 | 2.7 (4) | 255 | 2.2 (3.1) | | 76.6 % | 0.14 [ -0.03, 0.31 ] |
| **Subtotal (95% CI)** | **344** | | **337** | | | **100.0 %** | **0.13 [ -0.02, 0.28 ]** |
| Heterogeneity: Tau² = 0.0; Chi² = 0.95, df = 3 (P = 0.81); I² =0.0% | | | | | | | |
| Test for overall effect: Z = 1.73 (P = 0.083) | | | | | | | |
| 2 Web feedback | | | | | | | |
| Kypri 2004 | 42 | 2.36 (1.82) | 41 | 3.54 (2.2) | | 30.5 % | -0.58 [ -1.02, -0.14 ] |
| Neighbors 2006 | 58 | 5.69 (6.43) | 61 | 6.4 (8.05) | | 40.4 % | -0.10 [ -0.46, 0.26 ] |
| Walters 2007 | 37 | 1.73 (2.7) | 39 | 2.75 (3.77) | | 29.2 % | -0.31 [ -0.76, 0.15 ] |
| **Subtotal (95% CI)** | **137** | | **141** | | | **100.0 %** | **-0.31 [ -0.59, -0.02 ]** |
| Heterogeneity: Tau² = 0.02; Chi² = 2.78, df = 2 (P = 0.25); I² =28% | | | | | | | |
| Test for overall effect: Z = 2.12 (P = 0.034) | | | | | | | |
| 3 Individual Face-to -face | | | | | | | |
| Borsari 2005 | 31 | 5.9 (5.56) | 30 | 5.73 (4.84) | | 23.4 % | 0.03 [ -0.47, 0.53 ] |
| Carey 2006 | 84 | 5.9 (6.6) | 79 | 8.5 (6.7) | | 56.0 % | -0.39 [ -0.70, -0.08 ] |
| Murphy 2001 | 30 | 7.23 (3.81) | 24 | 7.78 (4.19) | | 20.6 % | -0.14 [ -0.67, 0.40 ] |
| **Subtotal (95% CI)** | **145** | | **133** | | | **100.0 %** | **-0.24 [ -0.49, 0.01 ]** |
| Heterogeneity: Tau² = 0.00; Chi² = 2.16, df = 2 (P = 0.34); I² =7% | | | | | | | |
| Test for overall effect: Z = 1.87 (P = 0.062) | | | | | | | |
| 4 Group Face-to-face | | | | | | | |
| McNally 2003 | 24 | 4.25 (4.27) | 29 | 5.89 (5.16) | | 40.7 % | -0.34 [ -0.88, 0.21 ] |
| Michael 2006 | 47 | 5.1 (5.7) | 44 | 4.6 (5.9) | | 59.3 % | 0.09 [ -0.33, 0.50 ] |
| **Subtotal (95% CI)** | **71** | | **73** | | | **100.0 %** | **-0.09 [ -0.49, 0.32 ]** |
| Heterogeneity: Tau² = 0.03; Chi² = 1.48, df = 1 (P = 0.22); I² =32% | | | | | | | |
| Test for overall effect: Z = 0.42 (P = 0.68) | | | | | | | |

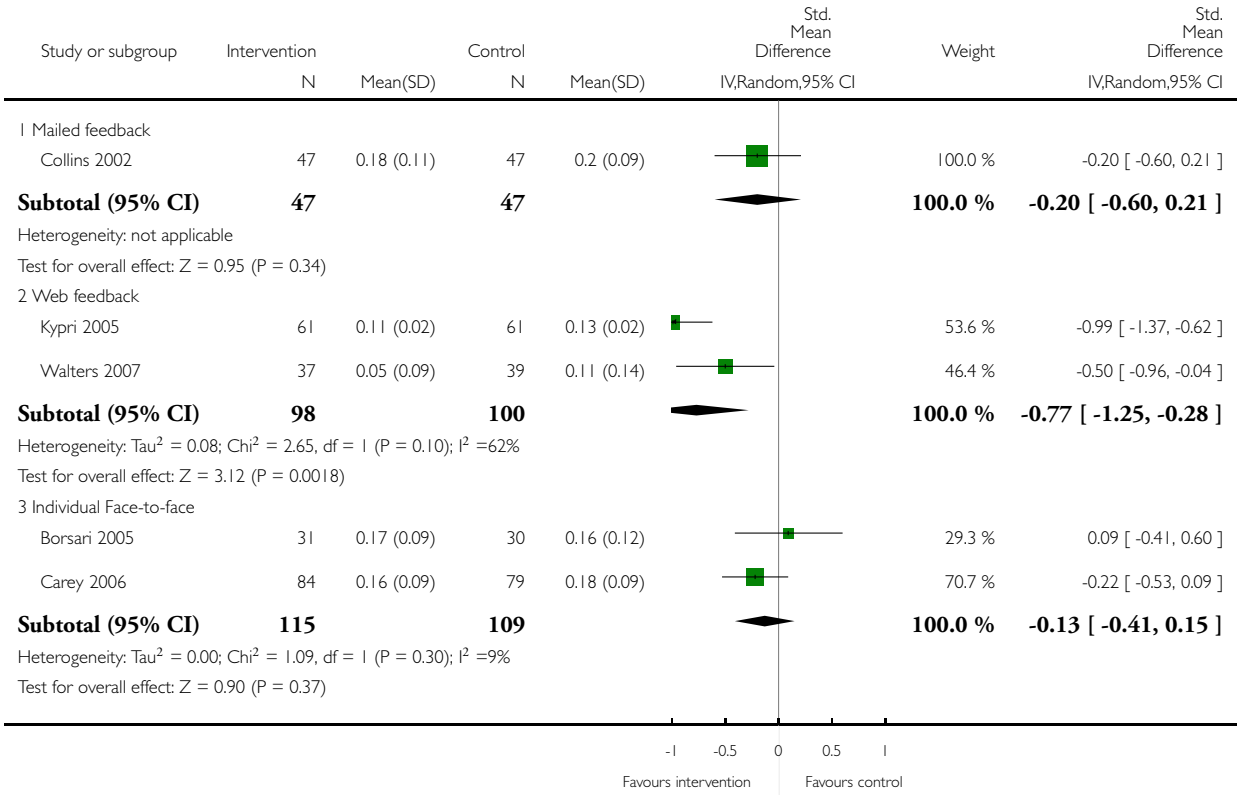


### Analysis 1.2. Comparison 1 Social norms feedback vs control, Outcome 2 Peak BAC - Up to 3 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 2 Peak BAC - Up to 3 months

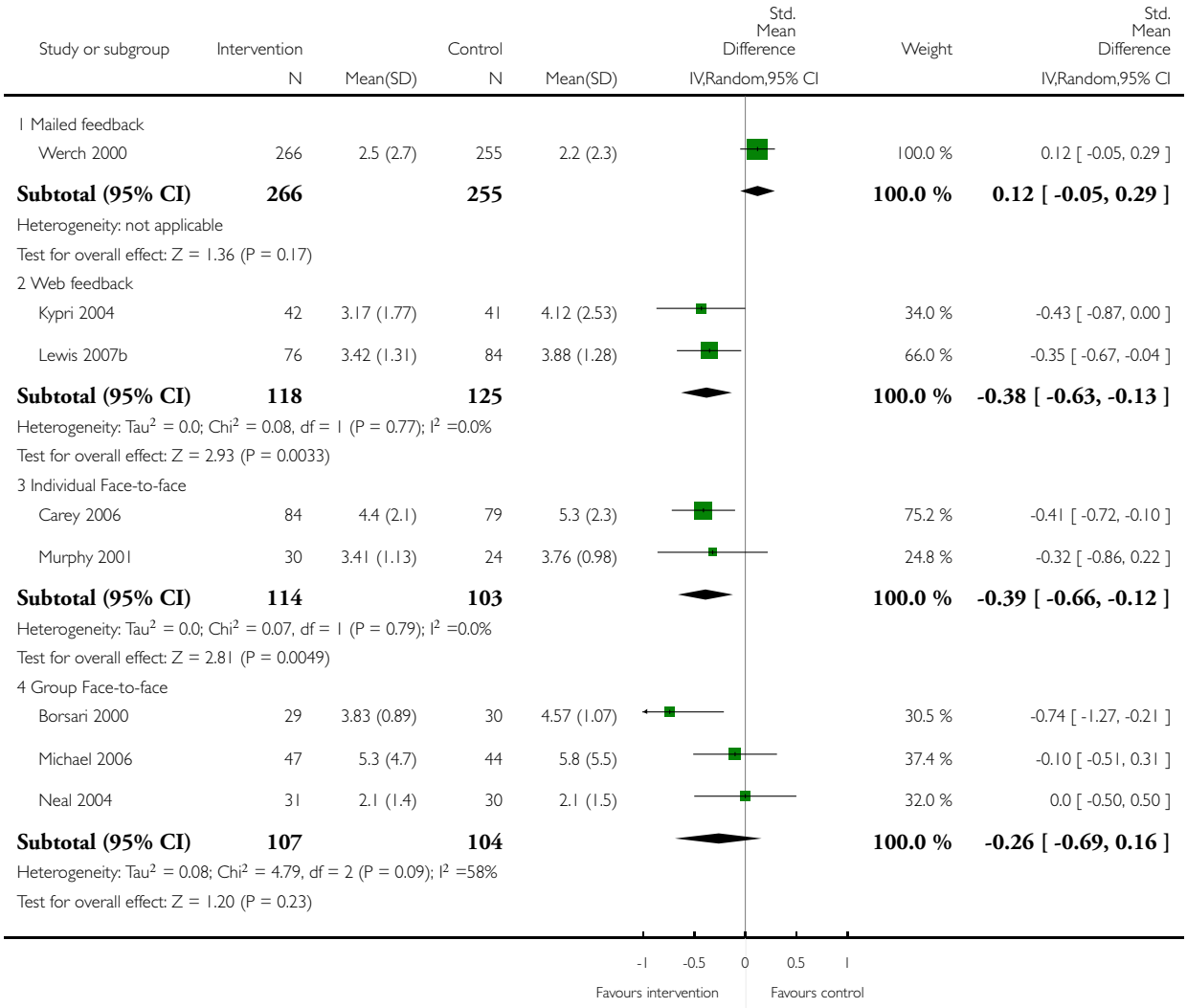


### Analysis 1.3. Comparison 1 Social norms feedback vs control, Outcome 3 Frequency - Up to 3 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 3 Frequency - Up to 3 months

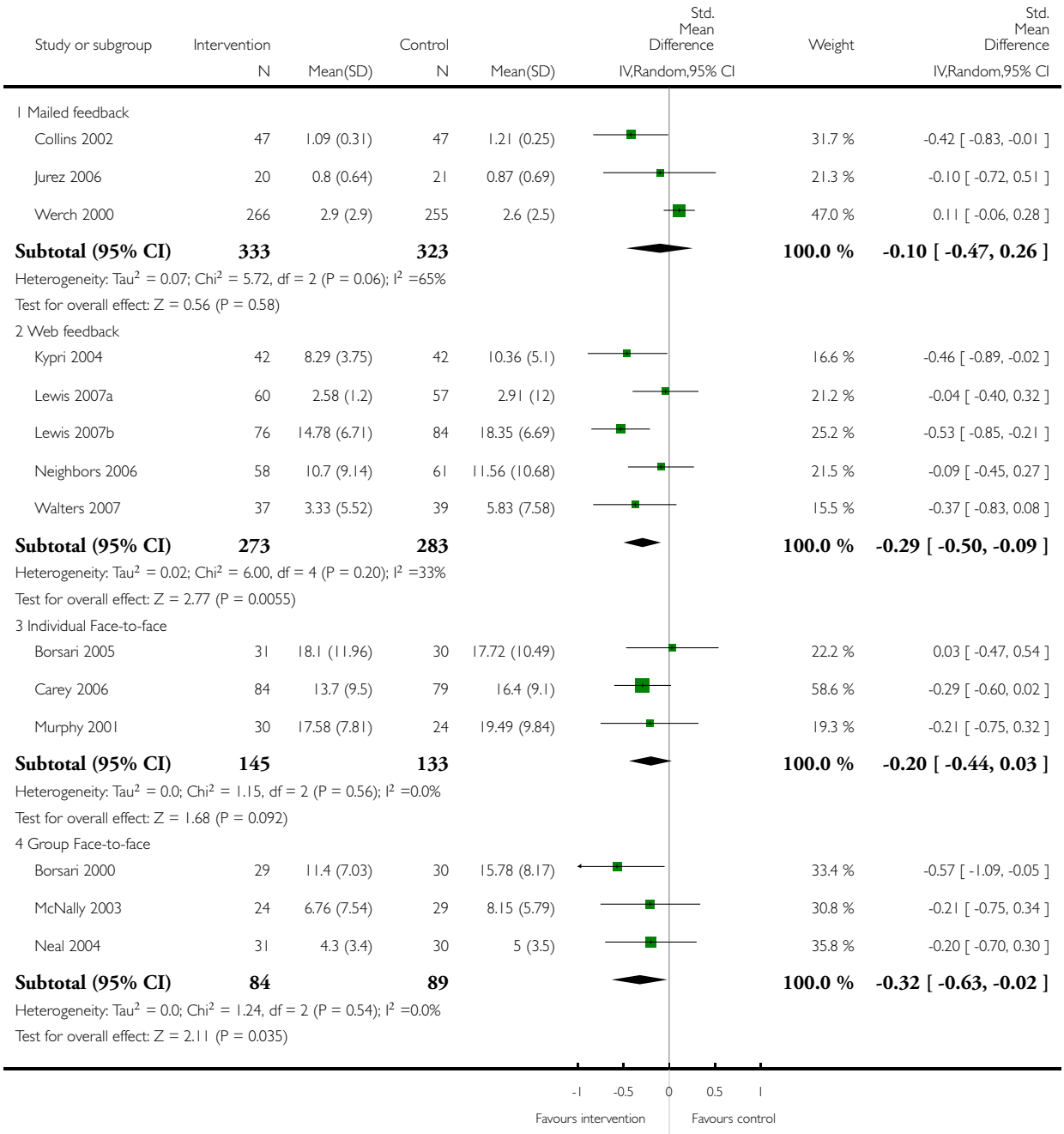


## Analysis 1.4. Comparison 1 Social norms feedback vs control, Outcome 4 Quantity of drinking - Up to 3 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 4 Quantity of drinking - Up to 3 months

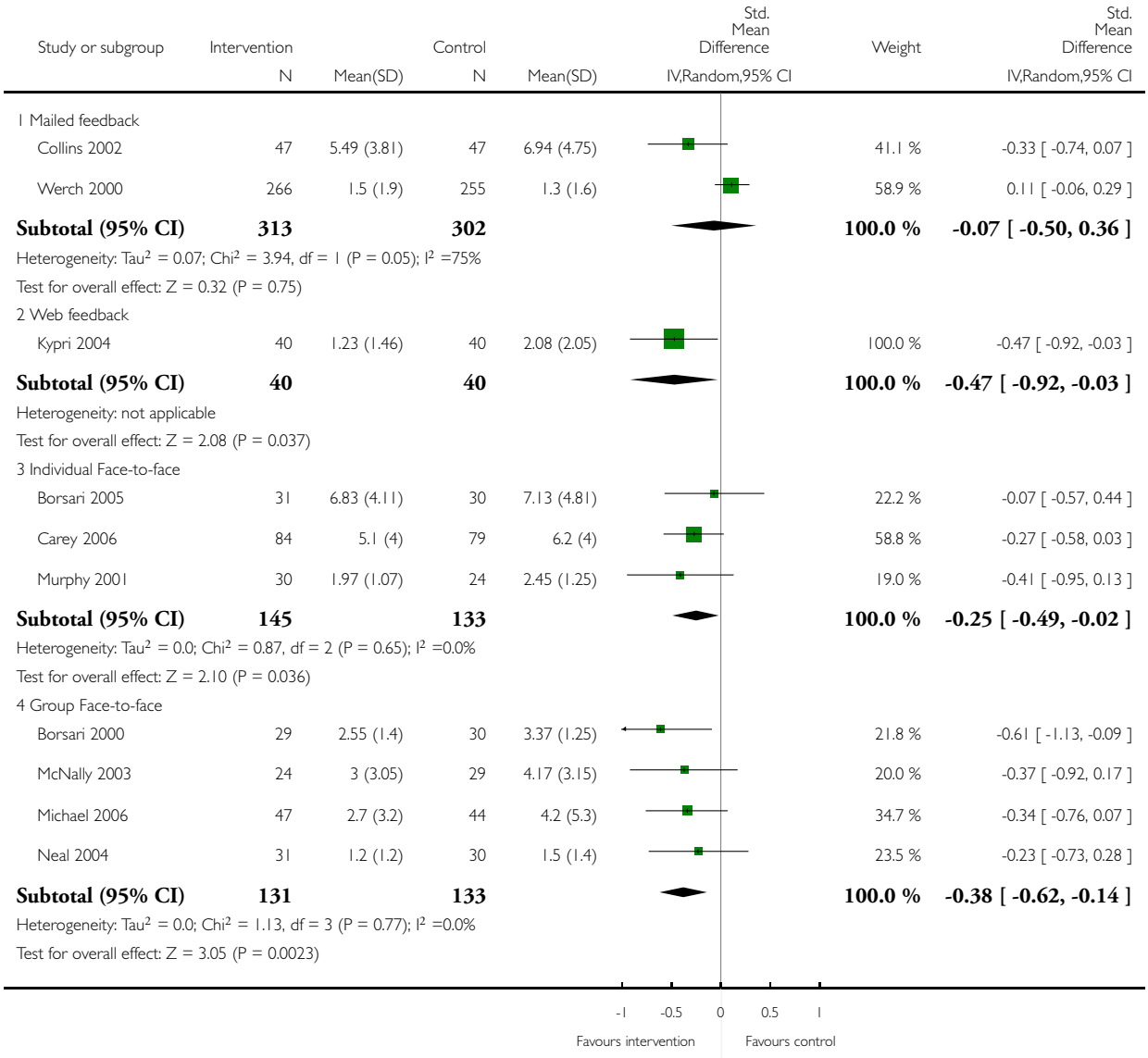


## Analysis 1.5. Comparison 1 Social norms feedback vs control, Outcome 5 Binge drinking - Up to 3 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 5 Binge drinking - Up to 3 months

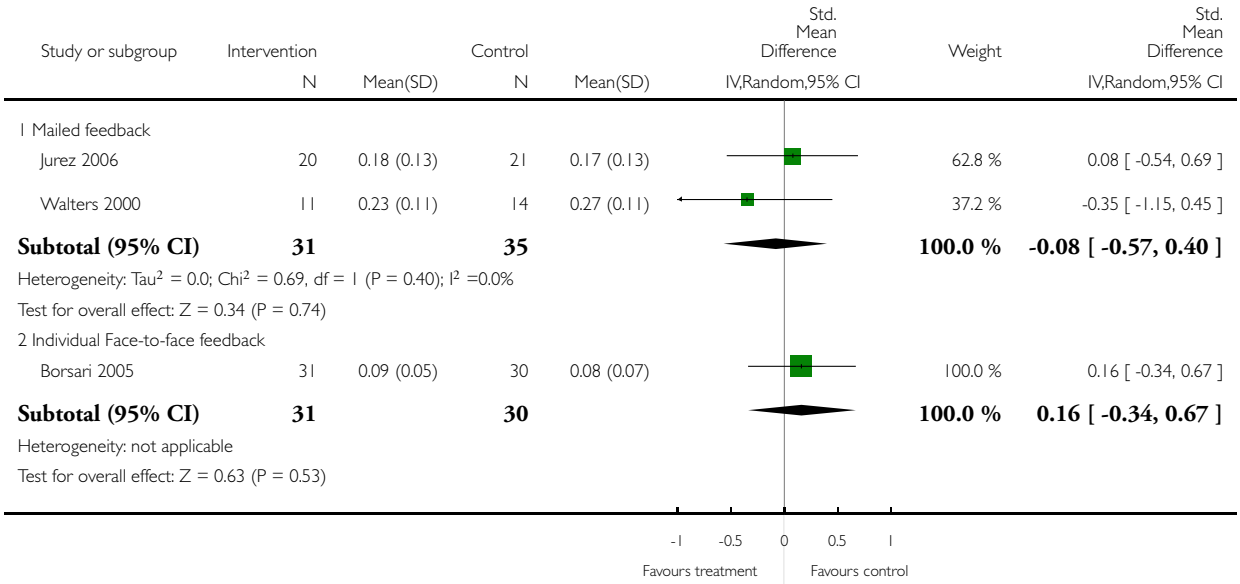


### Analysis 1.6. Comparison 1 Social norms feedback vs control, Outcome 6 BAC - Up to 3 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 6 BAC - Up to 3 months

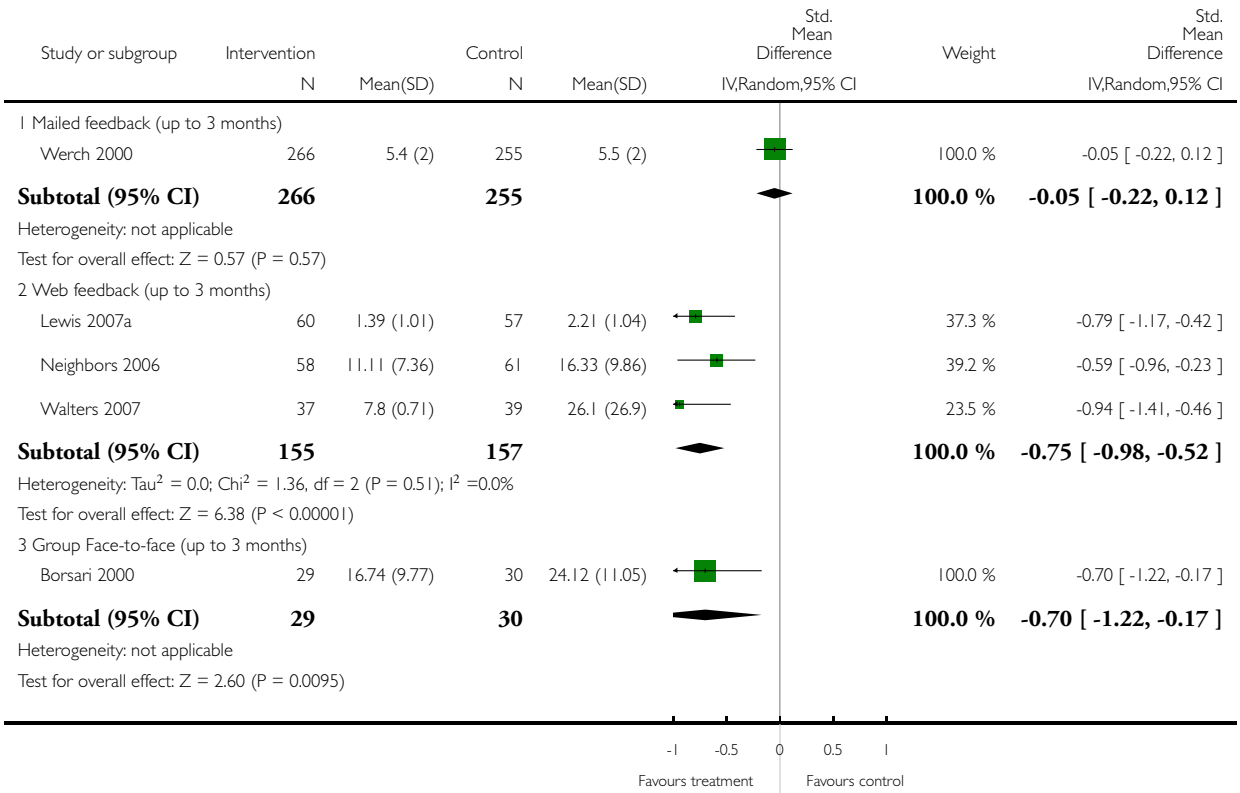


### Analysis 1.7. Comparison 1 Social norms feedback vs control, Outcome 7 Drinking Norms - Up to 3 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 7 Drinking Norms - Up to 3 months

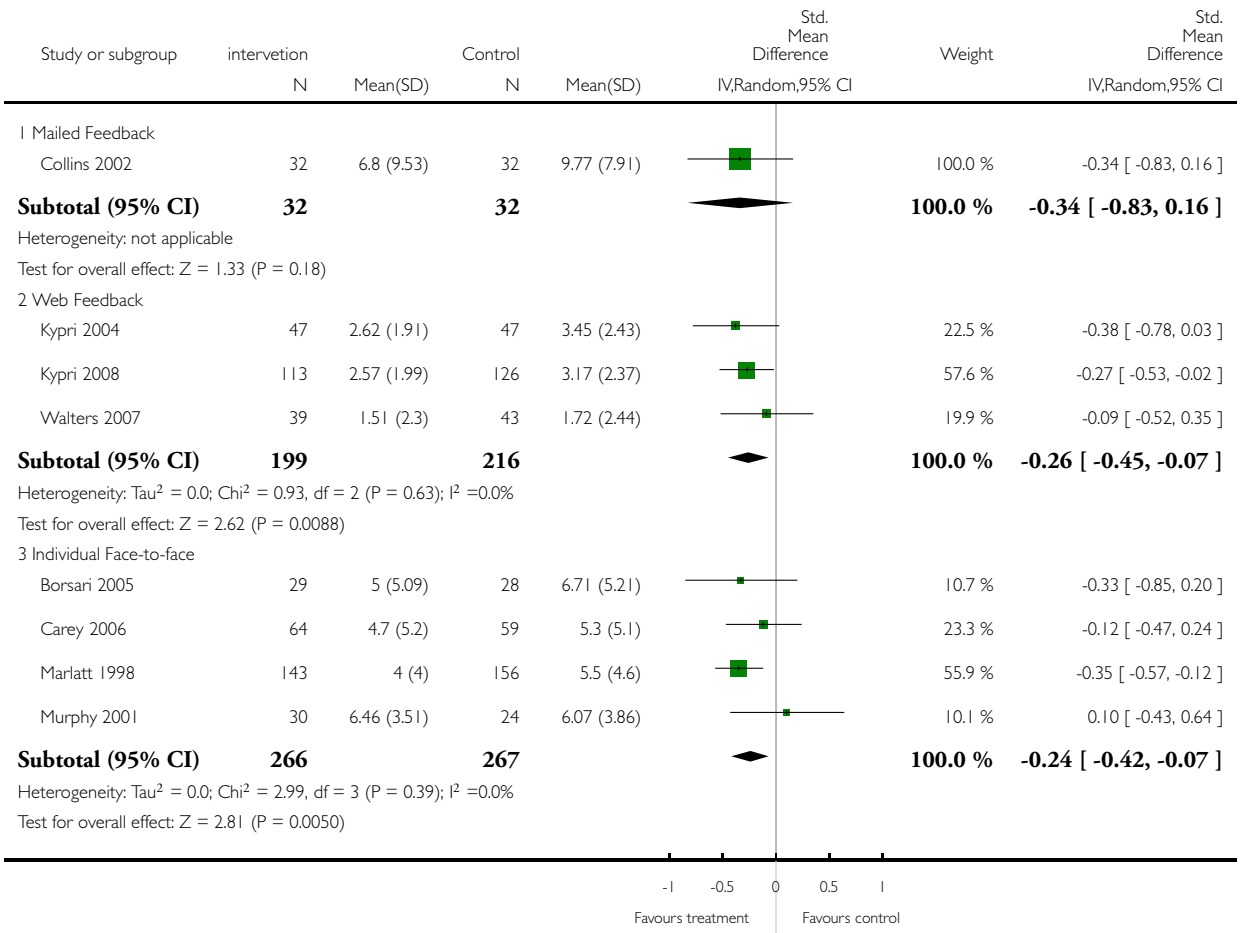


## Analysis 1.8. Comparison 1 Social norms feedback vs control, Outcome 8 Alcohol related problems - 4 to 16 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 8 Alcohol related problems - 4 to 16 months



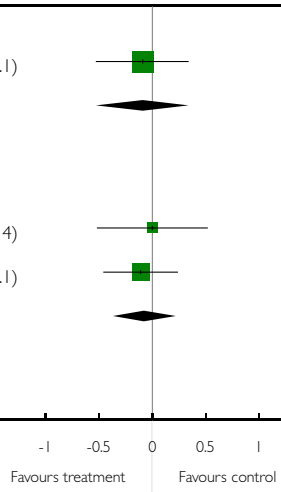
### Analysis 1.9. Comparison 1 Social norms feedback vs control, Outcome 9 Peak BAC - 4 to 16 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 9 Peak BAC - 4 to 16 months

| Study or subgroup | Intervention N | Mean(SD) | Control N | Mean(SD) | Std. Mean Difference IV,Random,95% CI | Weight | Std. Mean Difference IV,Random,95% CI |
|---|---|---|---|---|---|---|---|
| 1 Web feedback | | | | | | | |
| Walters 2007 | 39 | 0.05 (0.11) | 43 | 0.06 (0.1) | | 100.0 % | -0.09 [ -0.53, 0.34 ] |
| **Subtotal (95% CI)** | **39** | | **43** | | | **100.0 %** | **-0.09 [ -0.53, 0.34 ]** |
| Heterogeneity: not applicable | | | | | | | |
| Test for overall effect: Z = 0.43 (P = 0.67) | | | | | | | |
| 2 Individual Face-to-face | | | | | | | |
| Borsari 2005 | 29 | 0.17 (0.12) | 28 | 0.17 (0.14) | | 31.7 % | 0.0 [ -0.52, 0.52 ] |
| Carey 2006 | 64 | 0.16 (0.08) | 59 | 0.17 (0.1) | | 68.3 % | -0.11 [ -0.46, 0.24 ] |
| **Subtotal (95% CI)** | **93** | | **87** | | | **100.0 %** | **-0.08 [ -0.37, 0.22 ]** |
| Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.12$, df = 1 (P = 0.73); $I^2 = 0.0\%$ | | | | | | | |
| Test for overall effect: Z = 0.50 (P = 0.61) | | | | | | | |



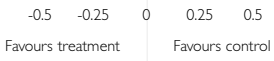
### Analysis 1.10. Comparison 1 Social norms feedback vs control, Outcome 10 Frequency - 4 to 16 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 10 Frequency - 4 to 16 months

| Study or subgroup | Intervention N | Mean(SD) | Control N | Mean(SD) | Std. Mean Difference IV,Random,95% CI | Weight | Std. Mean Difference IV,Random,95% CI |
|---|---|---|---|---|---|---|---|
| 1 Web feedback | | | | | | | |
| Kypri 2004 | 47 | 3.17 (1.63) | 47 | 3.83 (2.65) | | 19.8 % | -0.30 [ -0.70, 0.11 ] |
| Kypri 2008 | 113 | 3.87 (2.72) | 126 | 4.45 (2.78) | | 50.4 % | -0.21 [ -0.46, 0.04 ] |
| Lewis 2007b | 67 | 1.86 (1.15) | 78 | 2.43 (1.15) | | 29.8 % | -0.49 [ -0.82, -0.16 ] |
| **Subtotal (95% CI)** | **227** | | **251** | | | **100.0 %** | **-0.31 [ -0.49, -0.13 ]** |
| Heterogeneity: $Tau^2$ = 0.0; $Chi^2$ = 1.77, df = 2 (P = 0.41); $I^2$ =0.0% | | | | | | | |
| Test for overall effect: Z = 3.38 (P = 0.00073) | | | | | | | |
| 2 Individual Face-to-face | | | | | | | |
| Carey 2006 | 64 | 4.1 (2.5) | 59 | 4.6 (2.5) | | 26.0 % | -0.20 [ -0.55, 0.16 ] |
| Marlatt 1998 | 143 | 2.3 (1) | 156 | 2.6 (1) | | 62.7 % | -0.30 [ -0.53, -0.07 ] |
| Murphy 2001 | 30 | 3.17 (1.21) | 24 | 3.37 (1.14) | | 11.3 % | -0.17 [ -0.70, 0.37 ] |
| **Subtotal (95% CI)** | **237** | | **239** | | | **100.0 %** | **-0.26 [ -0.44, -0.08 ]** |
| Heterogeneity: $Tau^2$ = 0.0; $Chi^2$ = 0.34, df = 2 (P = 0.84); $I^2$ =0.0% | | | | | | | |
| Test for overall effect: Z = 2.80 (P = 0.0051) | | | | | | | |



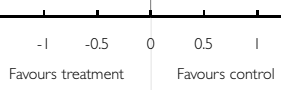
## Analysis 1.11. Comparison 1 Social norms feedback vs control, Outcome 11 Quantity of drinking - 4 to 16 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 11 Quantity of drinking - 4 to 16 months

| Study or subgroup | Intervention N | Mean(SD) | Control N | Mean(SD) | Std. Mean Difference IV,Random,95% CI | Weight | Std. Mean Difference IV,Random,95% CI |
|---|---|---|---|---|---|---|---|
| 1 Mailed feedback | | | | | | | |
| Collins 2002 | 33 | 1.33 (0.31) | 32 | 1.42 (0.25) | | 100.0 % | -0.32 [ -0.80, 0.17 ] |
| **Subtotal (95% CI)** | **33** | | **32** | | | **100.0 %** | **-0.32 [ -0.80, 0.17 ]** |
| Heterogeneity: not applicable | | | | | | | |
| Test for overall effect: Z = 1.26 (P = 0.21) | | | | | | | |
| 2 Web feedback | | | | | | | |
| Kypri 2004 | 47 | 8.04 (4.75) | 47 | 8.23 (5.87) | | 16.9 % | -0.04 [ -0.44, 0.37 ] |
| Kypri 2008 | 113 | 8.28 (5.06) | 126 | 9.02 (5.05) | | 42.8 % | -0.15 [ -0.40, 0.11 ] |
| Lewis 2007b | 67 | 8.41 (6.71) | 78 | 11.02 (6.71) | | 25.5 % | -0.39 [ -0.72, -0.06 ] |
| Walters 2007 | 39 | 3.17 (6.11) | 43 | 2.98 (4.95) | | 14.7 % | 0.03 [ -0.40, 0.47 ] |
| **Subtotal (95% CI)** | **266** | | **294** | | | **100.0 %** | **-0.16 [ -0.33, 0.00 ]** |
| Heterogeneity: $Tau^2$ = 0.0; $Chi^2$ = 2.97, df = 3 (P = 0.40); $I^2$ =0.0% | | | | | | | |
| Test for overall effect: Z = 1.91 (P = 0.056) | | | | | | | |
| 3 Individual Face-to-face | | | | | | | |
| Borsari 2005 | 29 | 18.69 (9.75) | 28 | 21.04 (14.22) | | 10.7 % | -0.19 [ -0.71, 0.33 ] |
| Carey 2006 | 64 | 12.8 (9.9) | 59 | 15 (10.5) | | 23.0 % | -0.21 [ -0.57, 0.14 ] |
| Marlatt 1998 | 143 | 2.4 (1.5) | 156 | 2.6 (1.4) | | 56.2 % | -0.14 [ -0.36, 0.09 ] |
| Murphy 2001 | 30 | 16.63 (9.29) | 24 | 15.72 (7.75) | | 10.1 % | 0.10 [ -0.43, 0.64 ] |
| **Subtotal (95% CI)** | **266** | | **267** | | | **100.0 %** | **-0.14 [ -0.31, 0.03 ]** |
| Heterogeneity: $Tau^2$ = 0.0; $Chi^2$ = 1.00, df = 3 (P = 0.80); $I^2$ =0.0% | | | | | | | |
| Test for overall effect: Z = 1.57 (P = 0.12) | | | | | | | |

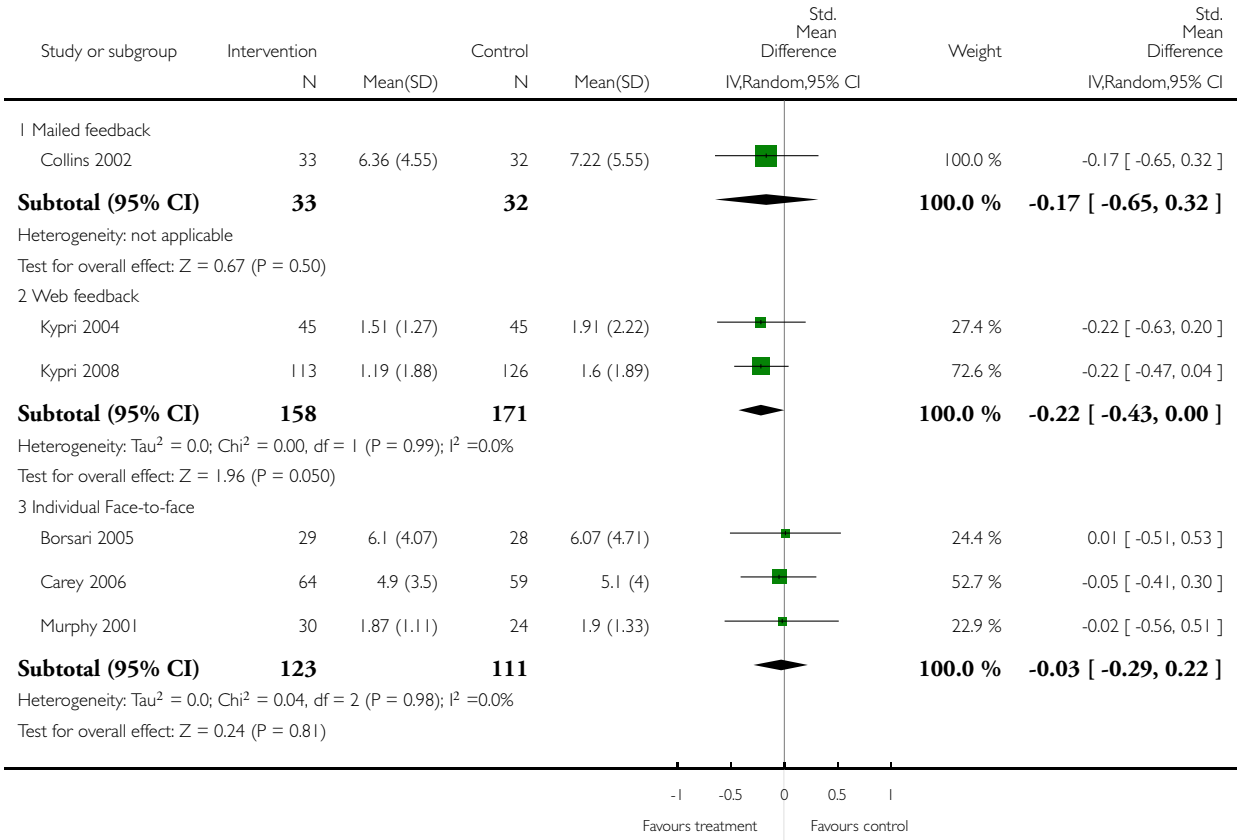


## Analysis 1.12. Comparison 1 Social norms feedback vs control, Outcome 12 Binge drinking - 4 to 16 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 12 Binge drinking - 4 to 16 months

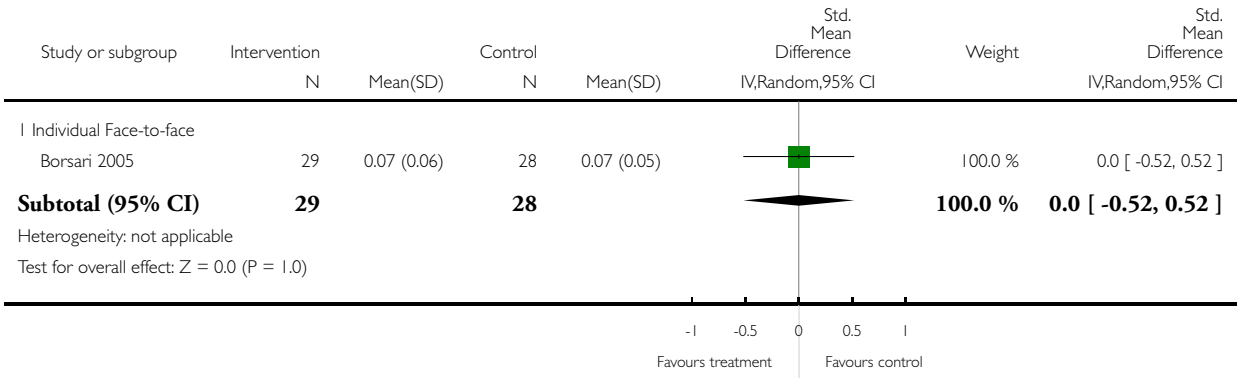


### Analysis 1.13. Comparison 1 Social norms feedback vs control, Outcome 13 BAC - 4 to 16 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 13 BAC - 4 to 16 months

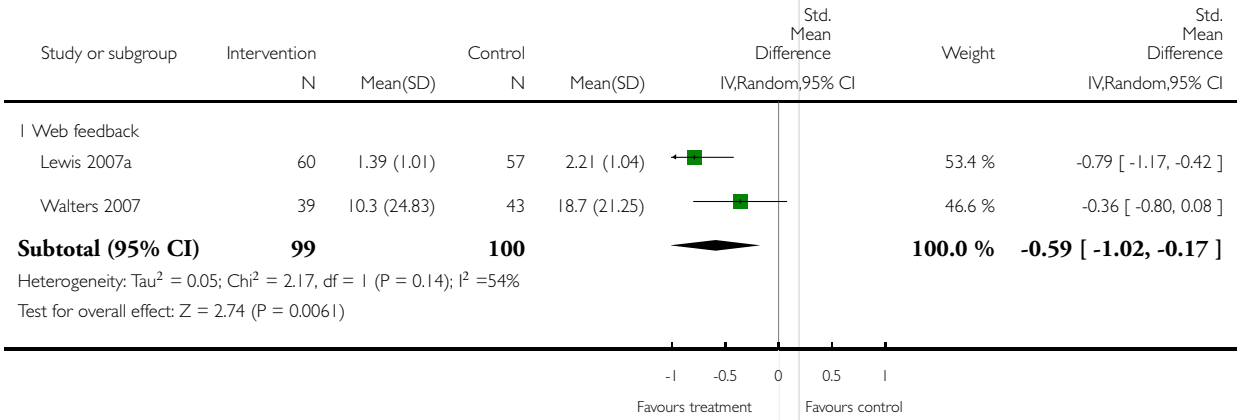



### Analysis 1.14. Comparison 1 Social norms feedback vs control, Outcome 14 Drinking Norms - 4 to 16 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 14 Drinking Norms - 4 to 16 months

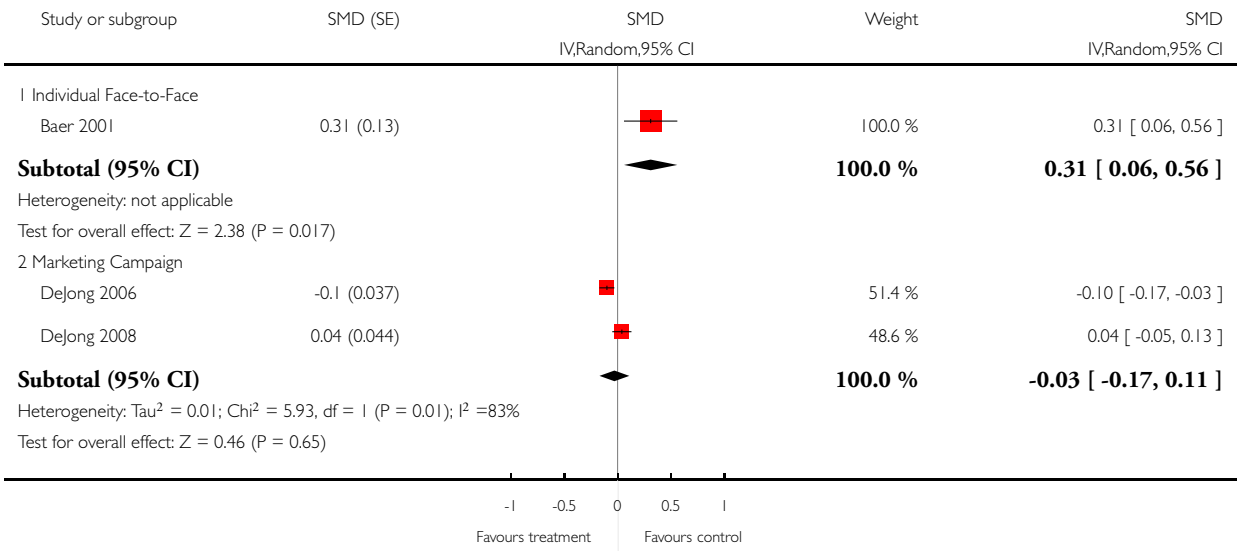


### Analysis 1.15. Comparison 1 Social norms feedback vs control, Outcome 15 Alcohol Related Problems - + 17 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 15 Alcohol Related Problems - + 17 months

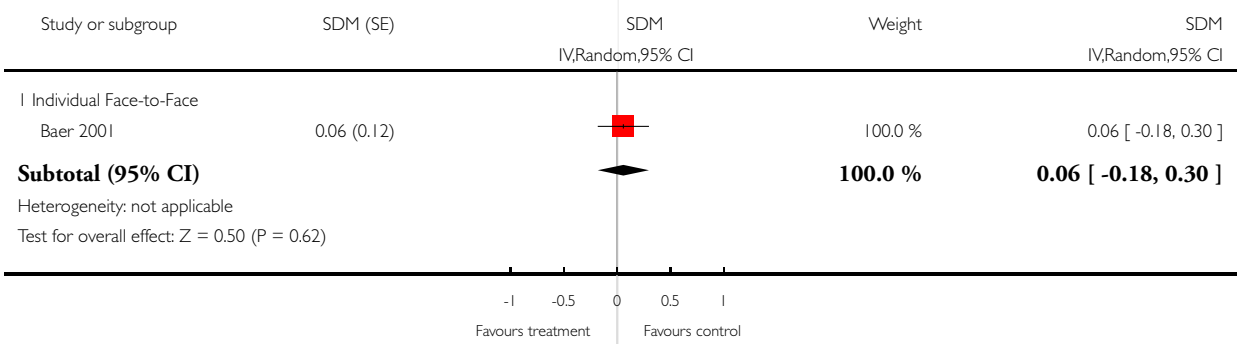



### Analysis 1.16. Comparison 1 Social norms feedback vs control, Outcome 16 Frequency - +17 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 16 Frequency - +17 months

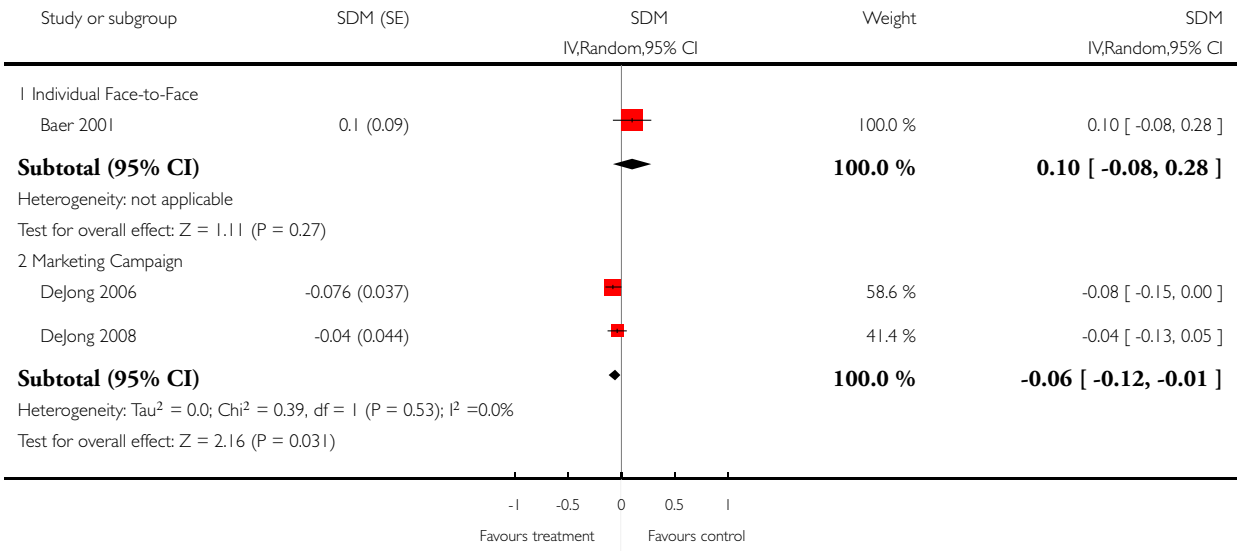


### Analysis 1.17. Comparison 1 Social norms feedback vs control, Outcome 17 Quantity of Drinking - + 17 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 17 Quantity of Drinking - + 17 months

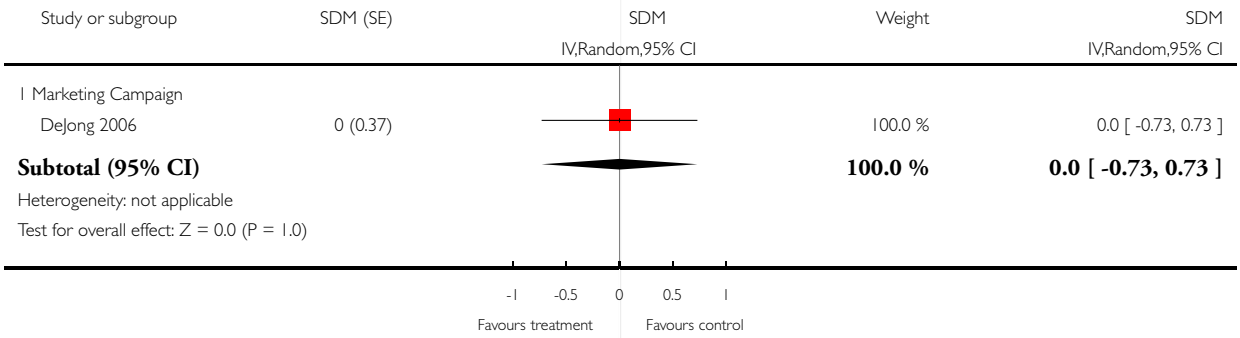



### Analysis 1.18. Comparison 1 Social norms feedback vs control, Outcome 18 BAC - + 17 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 18 BAC - + 17 months

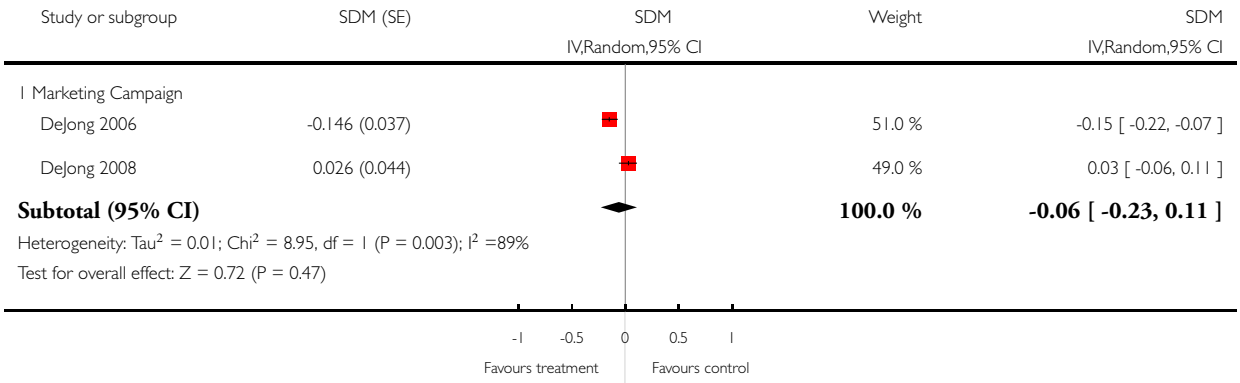


### Analysis 1.19. Comparison 1 Social norms feedback vs control, Outcome 19 Drinking Norms - +17 months.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 19 Drinking Norms - +17 months

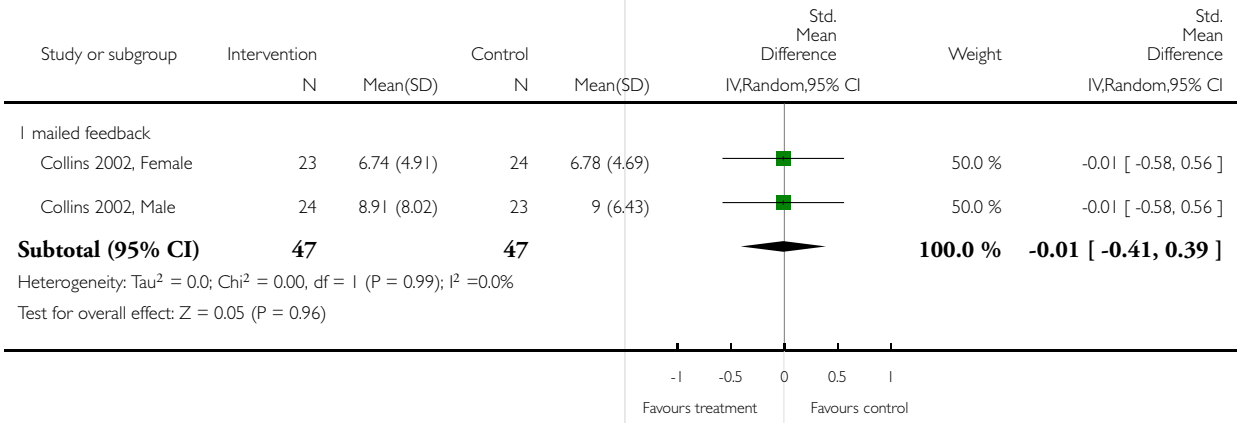



### Analysis 1.20. Comparison 1 Social norms feedback vs control, Outcome 20 Alcohol related problems - gender specific.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 20 Alcohol related problems - gender specific

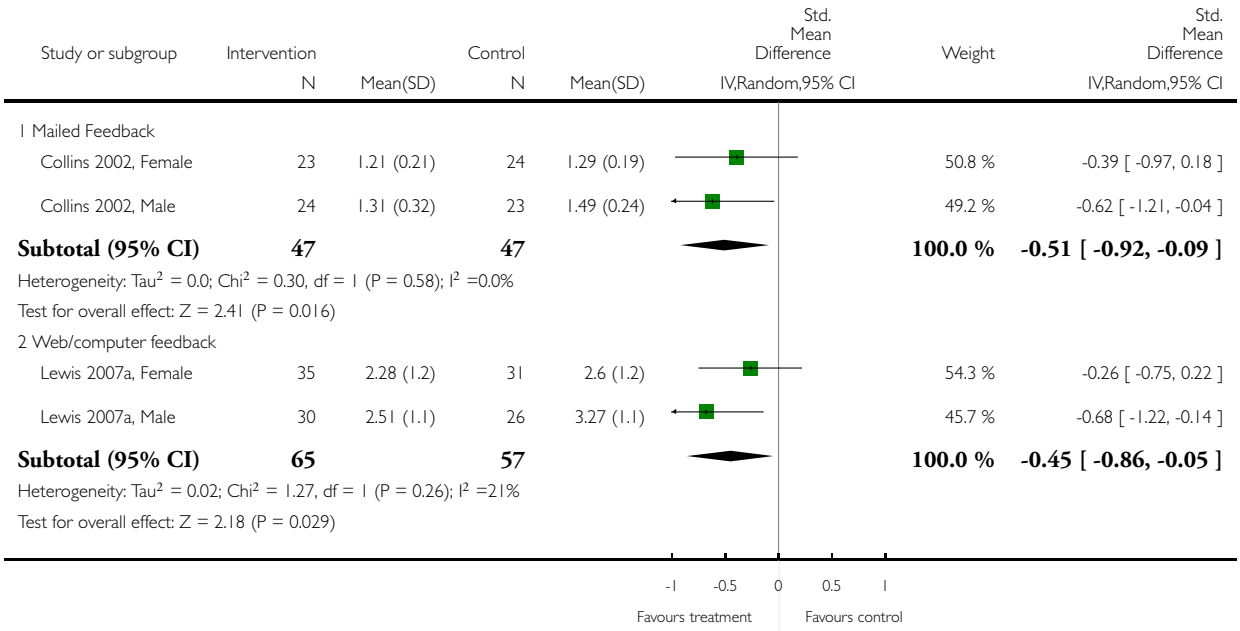


## Analysis 1.21. Comparison 1 Social norms feedback vs control, Outcome 21 Quantity of drinking - gender specific.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 21 Quantity of drinking - gender specific



### Analysis 1.22. Comparison 1 Social norms feedback vs control, Outcome 22 Binge drinking - gender specific.

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 22 Binge drinking - gender specific

| Study or subgroup | Intervention N | Mean(SD) | Control N | Mean(SD) | Std. Mean Difference IV,Random,95% CI | Weight | Std. Mean Difference IV,Random,95% CI |
|---|---|---|---|---|---|---|---|
| 1 Mailed Feedback | | | | | | | |
| Collins 2002, Female | 23 | 4.79 (3.58) | 24 | 6.61 (4.55) | | 49.5 % | -0.44 [ -1.02, 0.14 ] |
| Collins 2002, Male | 24 | 6.22 (3.99) | 23 | 7.25 (5.01) | | 50.5 % | -0.22 [ -0.80, 0.35 ] |
| **Subtotal (95% CI)** | **47** | | **47** | | | **100.0 %** | **-0.33 [ -0.74, 0.08 ]** |

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.26$, df = 1 (P = 0.61); $I^2 = 0.0\%$

Test for overall effect: Z = 1.58 (P = 0.11)


### Analysis 1.23. Comparison 1 Social norms feedback vs control, Outcome 23 Peak BAC - gender specific.

Review: Social norms interventions to reduce alcohol misuse in University or College students

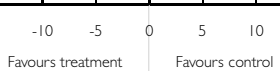
Comparison: 1 Social norms feedback vs control

Outcome: 23 Peak BAC - gender specific

| Study or subgroup | Intervention N | Mean(SD) | Control N | Mean(SD) | Std. Mean Difference IV,Random,95% CI | Weight | Std. Mean Difference IV,Random,95% CI |
|---|---|---|---|---|---|---|---|
| 1 Mailed Feedback | | | | | | | |
| Collins 2002, Female | 23 | 0.2 (0.11) | 24 | 0.21 (0.09) | | 50.4 % | -0.10 [ -0.67, 0.47 ] |
| Collins 2002, Male | 24 | 0.16 (0.12) | 23 | 0.2 (0.09) | | 49.6 % | -0.37 [ -0.95, 0.21 ] |
| **Subtotal (95% CI)** | **47** | | **47** | | | **100.0 %** | **-0.23 [ -0.64, 0.17 ]** |

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.43$, df = 1 (P = 0.51); $I^2 = 0.0\%$

Test for overall effect: Z = 1.12 (P = 0.26)

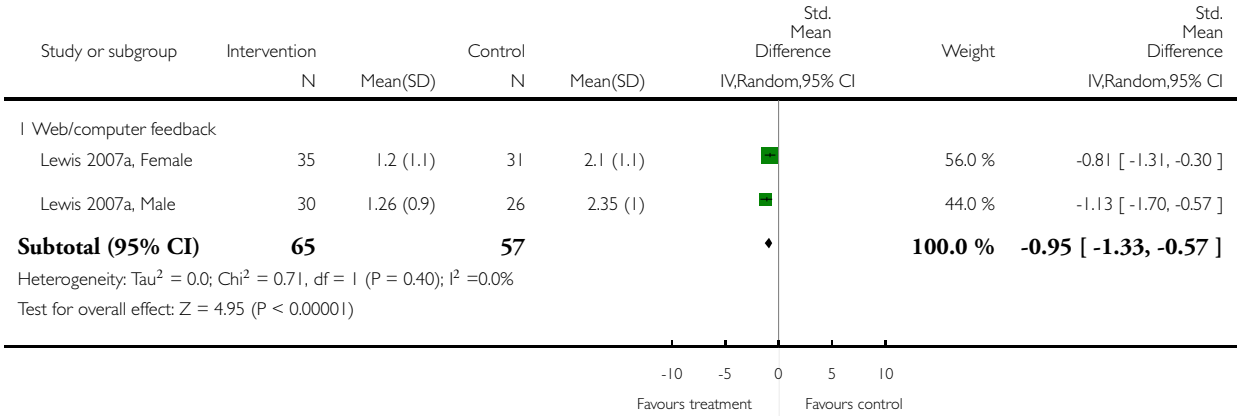


**Analysis 1.24. Comparison 1 Social norms feedback vs control, Outcome 24 Drinking Norms - gender specific.**

Review: Social norms interventions to reduce alcohol misuse in University or College students

Comparison: 1 Social norms feedback vs control

Outcome: 24 Drinking Norms - gender specific




## ADDITIONAL TABLES

**Table 1. Type of Interventions**

| | |
|---|---|
| The interventions in these studies included the following elements: | All of these studies used a randomised design with university or college students, with exception of two (Larimer, 2001; Michael, 2006) that used fraternities or classrooms as the unit of randomisation. Overall, there was more females than males participation, white and from the USA |
| Walters 2007 | Feedback as part of an electronic-Check-Up to GO (e-CHUG; http://www.echug.com)<br>After completing an online assessment , students were presented with a personalized feedback report<br>Normative feedback: Quantity-frequency drinking summary (number of drinks consumed, peak BAC, calories), comparison to national and college drinking norms, estimated level of risk (e.g tolerance), amount spent per year on alcohol |
| Borsari 2005 | Students screened after committed a violation of school alcohol violation<br>AUDIT >10<br>One-to-one format brief motivational intervention (BMI) using information collected at baseline to structure personalized feed- |

**Table 1. Type of Interventions** (*Continued*)

| | |
|---|---|
| | back.<br>Individualized introduction to topics such as normative quantity and frequency of drinking<br>Educational information related to their personal experiences<br>Harm reduction model used to minimize risky behaviour<br>Duration: 62 min |
| Walters 2000 | Students drinking more that 40 standard drinks completed baseline assessment<br>Individual feedback mailed sent to students based on Drinker's Check-Up<br>Normative feedback:Quantity-frequency of their consumption, peak weekly and monthly BAC levels, other personal risk factors. Percentile of national and campus gender adjusted norms. AUDIT Score, genetic risk of alcohol. Total amount spent on alcohol |
| Kypri 2005 | Patients attending a student health service completed a computer survey. After completing survey, students in one of the groups were presented with a personalized feedback report |
| Lewis 2007a | Students who reported at least one episode of heavy drinking<br>Baseline assessment via computer<br>Personalized feedback presented on computer screen for 1 to 2 min as it was printed<br>Printout given to students |
| Borsari 2000 | Students with five or more drinks (4 for women) on one occasion two or more times in the past month<br>Students were telephoned and asked to participate<br>Intervention adapted from Brief Alcohol Screening and Intervention for College Students (BASICS), customized to reflect the student's baseline information<br>Review of personal alcohol use in the past month compared with both campus and national norms<br>Personal negative consequences of drinking reviewed<br>Misconceptions about alcohol challenged<br>Options provided to facilitate a decrease in drinking<br>Harm reduction approach endorsed |
| McNally 2003 | Group feedback intervention<br>40 min part discussion, part didactic session that provided normative data about drinking, and information about alcohol<br>Focused on raising awareness of an effective sense of discrepancy regarding the divergence of drinking behaviours of the self from drinking behaviours of a typical college student<br>While no explicit personalized feedback was given, students were repeatedly asked to recall their own responses to the questionnaire as they considered the information presented |

**Table 1. Type of Interventions** (*Continued*)

| | |
|---|---|
| Michael 2006 | Brief group intervention based on the Motivational Interview (MI) counselling style<br>Examine pros and cons of alcohol use<br>Perceptions of alcohol use among college students with college and national drinking norms<br>Duration: 50 to 75 min |
| Lewis 2007b | Participants recruited via email and phone<br>Web-based survey in a controlled laboratory setting on campus<br>Student received on-screen personalized feedback to read. Printout of feedback given |
| Werch 2000 | Study announced in dormitories, posters and flyers<br>Intervention vs a standard prevention program<br>Standard prevention program consisted of a range of educational events offered, including presentations, printed materials and posters, and alcohol-awareness events<br>Two-phase program:<br>1.Intervention participants received a series of three greeting cards providing messages based on social norms and definition of binge drinking<br>2.brief peer follow-up telephone survey to reinforce prevention messages on the greeting card and to encourage the participants to continue to model health (5 min)<br>Normative feedback: messages including binge drinking, perceived peer binge drinking, stages of initiation of binge drinking |
| Neal 2004 | High risk students<br>Two session group feedback<br>Session one:<br>1- Assessment for baseline information<br>2 - Duration: 45 min<br>Session two<br>1 - Small groups of 6 people<br>2 - 5 people received session individually<br>3 - Duration: 40 min<br>4 - Students received individualized feedback on their assessment results from session one<br>5 - Additional estimates of national norms discussed<br>Normative feedback: Typical and peak alcohol consumption along with normative comparison data. Estimates of the average number of drinks per week compared with national college students.<br>Nature of frequency of alcohol related problems |
| Collins 2002 | Students reporting at least two heavy drinking episodes<br>Eligible students phoned to participate after screening session<br>Mailed PNF with college and national drinking norms<br>Control group received a standard psycho educational brochure about alcohol |

**Table 1. Type of Interventions** (*Continued*)

| | |
|---|---|
| | Post-test and follow up assessment took place in small groups on campus |
| Juarez 2006 | Four groups MI vs MI with feedback and mailed feedback vs control<br>Feedback based on "Check-up to Go" (E-CHUG), a brief confidential self-assessment tool, designed to give students personalized feedback about their alcohol use.<br>Students in the mailed intervention received normative feedback approximately 1-2 weeks after assessment<br>MI based on MET-MATCH manual (Miller, Zweben, DiClemente, & Rychtarik, 1995)<br>MI only - Duration: 40-60 min<br>MI group received normative feedback during session (Duration: 60-80 min) |
| Murphy 2001 | Single session individual normative feedback<br>Feedback based on BASICS<br>Duration: 50 min<br>Motivational-interviewing style<br>Control group watched "Eddie talk", a 30 min video that consisted of a male college student discussing the negative interpersonal and academic consequences resulting from his alcohol abuse |
| Neighbors 2006 | Students reporting heavy drinking<br>Assessment completed in private, on computer in a laboratory setting<br>Personalized normative feedback delivered via computer immediately after assessment<br>Feedback based on BASICS<br>Normative feedback: summary of students perceived drinking norm for quantity and frequency of alcohol consumption compare with actual norms of the student reported consumption. Percentile ranking of students drinking with other college students drinking |
| Marlatt 1998, Baer 2001 | Mailed questionnaire to freshman students<br>Individual brief intervention based on motivational interviewing<br>Alcohol consumption monitoring cards provided to students - asked to track their drinking on a daily basis for 2 weeks prior to their scheduled interview<br>Monitoring cards reviewed during motivational session and compared with college averages<br>1 year after BMI intervention group received a mailed graphic personalized feedback pertaining to their reports of drinking<br>At 1 year follow-up high-risk category received a phone call to offer assistance and encourage reducing alcohol use. If student was interested an additional follow-up interview was scheduled<br>Report in Baer, 2001: Winter term of their second year, partic- |

**Table 1. Type of Interventions** (*Continued*)

| | |
|---|---|
| | ipants were mailed feedback results. After the mailing, they also phoned prevention group in the highest -risk group to express concerns about risk and offer additional feedback. 34 MI were conducted in the second year, most over the phone |
| Carey 2006 | Four groups: BMI vs Control and TLFB+BMI vs TLFB (Timeline follow-back interview)"BMI for at risk college students based on motivational interview, combined normative feedback and alcohol education<br>TLFB interview was administrated in a private room, and involved sequential assessment of alcohol use, drug use and sexual behaviour. Daily consumption documented for the previous 90 days |
| Larimer 2001 | Fraternity students<br>1hr individual tailored normative feedback session, based on information provided from the baseline assessment based on motivational interviewing<br>Intervention group received 1 hr feedback program, identical to individual feedback, but focused on identifying house drinking norms. Programs were conducted on site at individual fraternities<br>Control fraternities received one didactic presentation regarding alcohol use<br>Normative feedback: typical drinking patterns, BAC estimating training, typical patterns of alcohol use and perceived norms to actual college wide norms, biphasic effects of alcohol, alcohol related expectancies, personalised review of alcohol related problems, strategies to moderate drinking |
| Wood 2007 | Heavy drinking college students recruited by posters and flyers<br>One-to-one session BMI utilizing the via role-play session<br>Participants monitored their drinking from two weeks prior to the session<br>Personalized feedback report based on their baseline responses was presented in order to guide the discussion, which also focused on normative information<br>Normative feedback: typical and peak BAC, effects of alcohol according to BAC levels, normative information, alcohol-related consequences and risk factors ( family history of alcoholism). Average weekly calories consumed and money spent on alcohol per semester |
| Neighbors 2004 | Heavy drinking students<br>Normative feedback based on BASICS<br>Baseline assessment via computer<br>Immediately after baseline assessment, intervention group received the PNF delivered by computer<br>Feedback seen on screen for 1 min before being printed<br>Printout given to students |

**Table 1. Type of Interventions** (*Continued*)

| | |
|---|---|
| | Normative feedback: perceived drinking norms compared with average college drinking behaviour. Percentile ranking, comparing their drinking with other college students drinking behaviour |
| DeJong 2006 | 18 matched institutions participates in the study<br>Treatment institutions ran campaigns for 3 academic years( Fall 2000-Spring 2003)<br>Core message reported normative behaviour for all undergraduate students and correct and identified misperceptions<br>All social norm marketing (SNM) included a core message, the campaign logo ("Just facts"), a brief description of the student survey, and the survey definition of a "drink" |
| Kypri 2004 | Students attending a student health service completed a computer survey<br>Students with AUDIT> 8 or consuming 4/6 (female/male) standard drinks on one or more occasion in the preceding 4 weeks<br>After completing survey, students in one of the groups were presented with a personalized feedback report |
| Kypri 2008 | Students attending a student health service completed a computer survey<br>Students with AUDIT> 8 were randomly assigned by computer to control or intervention<br>After completing survey, students in intervention group were presented with a personalized feedback report<br>Assessment and personalized feedback repeated at 6 months for intervention group |
| DeJong 2008 | 14 matched institutions participates in the study<br>Treatment institutions ran campaigns for 3 academic years( Fall 2001-Spring 2004)<br>Core message reported normative behaviour for all undergraduate students and correct and identified misperceptions<br>All social norm marketing (SNM) included a core message, the campaign logo ("Just facts"), a brief description of the student survey, and the survey definition of a "drink" |

**Table 2. Social norms outcomes**

| | **Mailed** | **Web/ Computer** | **Individual** | **Group** | **Marketing campaign** |
|---|---|---|---|---|---|
| **Short Term** | | | | | |
| Alcohol related problems | No effect (4 studies) | Effective (3 studies) | No effect (3 studies) | No effect (2 studies) | No studies |

**Table 2. Social norms outcomes** (*Continued*)

| | | | | | |
|---|---|---|---|---|---|
| Peak BAC | No effect (1 study) | Effective (2 studies) | No effect (2 studies) | No studies | No studies |
| Frequency | No effect (1 study) | Effective (2 studies) | Effective (2 studies) | No effect (3 studies) | No studies |
| Quantity | No effect (3 studies) | Effective (5 studies) | No effect (3 studies) | Effective (3 studies) | No studies |
| Binge drinking | No effect (2 studies) | No effect (1 study) | No effect (3 studies) | No effect (4 studies) | No studies |
| BAC | No effect (2 studies) | No studies | No effect (1 study) | No studies | No studies |
| Drinking norms | No effect (1 study) | Effective (3 studies) | No studies | Effective (1 study) | No studies |
| **Medium Term** | | | | | |
| Alcohol related problems | No effect (1 study) | Effective (3 studies) | Effective (4 studies) | No studies | No studies |
| Peak BAC | No effect (1 study) | No effect (1 study) | No effect (2 studies) | No studies | No studies |
| Frequency | No studies | Effective (3 studies) | Effective (3 studies) | No studies | No studies |
| Quantity | No effect (1 study) | Effective (4 studies) | No effect (4 studies) | No studies | No studies |
| Binge drinking | No effect (1 study) | Effective (2 studies) | No effect (3 studies) | No studies | No studies |
| BAC | No studies | No effect (1 study) | No studies | No studies | No studies |
| Drinking norms | No studies | No effect (1 study) | No studies | No studies | No studies |
| **Long term** | | | | | |
| Alcohol related problems | No studies | No studies | In favour of control (1 study) | No studies | No effect (2 studies) |
| Frequency | No studies | No studies | No effect (1 study) | No studies | No effect (2 studies) |
| Quantity | No studies | No studies | No effect ( 1study) | No studies | Effective (1 study) |
| BAC | No studies | No studies | No studies | No studies | No effect (1 study) |
| Drinking norms | No studies | No studies | No studies | No studies | No effect (2 studies) |
| **Gender Specific** | | | | | |
| Alcohol related problems | No effect (1 study) | No studies | No studies | No studies | No studies |

**Table 2. Social norms outcomes** (*Continued*)

| | | | | | |
|---|---|---|---|---|---|
| Peak BAC | No effect (1 study) | No studies | No studies | No studies | No studies |
| Quantity | Effective(1 study ) | Effective(1 study ) | No studies | No studies | No studies |
| Binge drinking | No effect (1 study) | No studies | No studies | No studies | No studies |
| Drinking norms | No studies | Effective(1 study ) | No studies | No studies | No studies |

# APPENDICES

## Appendix 1. Medline search strategy

**phase 1:**
1. RANDOMIZED CONTROLLED TRIAL.pt.
2. CONTROLLED CLINICAL TRIAL.pt.
3. RANDOMIZED CONTROLLED TRIALS.sh.
4. RANDOM ALLOCATION. sh.
5. DOUBLE BLIND METHOD. sh.
6. SINGLE BLIND METHOD. sh.
7. or/1 6
8. ANIMALS. sh. not HUMAN. sh.
9. 7 not 8

**phase 2:**
10. CLINICAL TRIAL.pt.
11. exp CLINICAL TRIALS/
12. (clin$ adj25 trial$).ti,ab.
13. ((singl$ or doubl$ or trebl$ or tripl$) adj25 (blind$ or mask$)).ti,ab.
14. PLACEBOS.sh.
15. placebo$.ti,ab.
16. random$.ti,ab.
17. RESEARCH DESIGN. sh.
18. or /10- 17
19. 18 not 8
20. 19 not 9
21. 9 or 20

**alcohol, social norms and student terms:**
22. Brief intervention$.mp. [mp=title, subject heading word, abstract, instrumentation]
23. Social norms intervention$.mp. [mp=title, subject heading word, abstract, instrumentation]
24. (Social$ adj1 norms$).ti,ab.
25. (norm$ adj1 feedback$).ti,ab.
26. (person$ adj1 feedback$).ti,ab.
27. (individual$ adj1 feedback$).ti,ab.
28. (computer$ adj1 feedback$).ti,ab.
29. (market$ adj1 campaign$).ti,ab.

30. normative$.ti,ab.
31. or/ 22 - 30
32. Alcohol$.mp. [mp=title, subject heading word, abstract, instrumentation]
33. Alcohol intervention$.mp. [mp=title, subject heading word, abstract, instrumentation]
34. (alcohol$ adj1use$).ti,ab.
35. (alcohol$ adj1 abuse$).ti,ab.
36. (alcohol$ adj1 misuse$).ti,ab.
37. (binge$ adj1 drink$).ti,ab.
38. binge drink$.mp. [mp=title, subject heading word, abstract, instrumentation]
39. alcohol use$.mp. [mp=title, subject heading word, abstract, instrumentation]
40. alcohol abuse$.mp. [mp=title, subject heading word, abstract, instrumentation]
41. alcohol misuse$.mp. [mp=title, subject heading word, abstract, instrumentation]
42. (alcohol$ adj1 problems$).ti,ab.
43. or/ 32-42
44. Student$.mp[mp=title, subject heading word, abstract, instrumentation]
45. (university$ adj1 student$).ti,ab.
46. (college$ adj1 student$).ti,ab.
47. education$.mp[mp=title, subject heading word, abstract, instrumentation]
48. or/ 44-47
44. 21 and 31 and 43 and 48

## Appendix 2. Embase , CINAHL , PsyInfo search strategy

1. Brief intervention$.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]
2. Social norms intervention$.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]
3. (Social$ adj1 norm$).ti,ab.
4. (norm$ adj1 feedback$).ti,ab.
5. (person$ adj1 feedback$).ti,ab.
6. (individual$ adj1 feedback$).ti,ab.
7. (computer$ adj1 feedback$).ti,ab.
8. (market$ adj1 campaign$).ti,ab.
9. normative$.ti,ab.
10. or/1-9
11. Alcohol$.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]
12. alcohol intervention$.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]
13. (alcohol$ adj1 use$).ti,ab.
14. (alcohol$ adj1 abuse$).ti,ab.
15. (alcohol$ adj1 misuse$).ti,ab.
16. (binge$ adj1 drink$).ti,ab.
17. binge drink$.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]
18. alcohol use$.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]
19. alcohol abuse$.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]
20. alcohol misuse$.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]
21. (alcohol$ adj1 problem$).ti,ab.

22. or/11-21
23. 10 and 22
24. student$.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]
25. (university$ adj1 student$).ti,ab.
26. (college$ adj1 student$).ti,ab.
27. education$.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]
28. or/24-27
29. 23 and 28

## WHAT'S NEW

Last assessed as up-to-date: 2 May 2007.

| Date | Event | Description |
|---|---|---|
| 5 November 2009 | Amended | correction of minimal errors |

## HISTORY

Protocol first published: Issue 4, 2007

Review first published: Issue 3, 2009

| Date | Event | Description |
|---|---|---|
| 21 August 2008 | New search has been performed | Converted to new review format. |
| 3 May 2007 | New search has been performed | Substantive amendment |

## CONTRIBUTIONS OF AUTHORS

Moreira and Foxcroft wrote the protocol. Moreira and Foxcroft conducted the searches. Moreira managed the reference databases. Moreira and Foxcroft sifted the references. Moreira and Foxcroft abstracted data. Moreira, Foxcroft and Smith performed statistical analysis. Moreira, Foxcroft and Smith wrote the review.

## DECLARATIONS OF INTEREST

Professor Foxcroft's department has received funding from the alcohol industry for unrelated prevention research.

## SOURCES OF SUPPORT


### Internal sources

- Oxford Brookes University-School of Health and Social Care, UK.

### External sources

- FCT- Fundação ciência e tecnologia, Portugal.
- AERC - Alcohol Education and Research Council, UK.
- ERAB -European Research Advisory Board, Belgium.


## DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We changed the criteria to assess methodological quality of included studies to conform to the recommended methods outlined in the last Handbook and to the requirements of RevMan5 (Cochrane, 2008).

## INDEX TERMS

### Medical Subject Headings (MeSH)

*Students; *Universities; Alcohol Drinking [*prevention & control]; Ethanol [*poisoning]; Feedback, Psychological; Peer Group; Randomized Controlled Trials as Topic; Social Behavior; Social Control, Informal [*methods]

### MeSH check words

Humans