HHS Public Access

Author manuscript

Psychol Addict Behav. Author manuscript; available in PMC 2016 July 18.

Published in final edited form as:

Psychol Addict Behav. 2013 December ; 27(4): 909–920. doi:10.1037/a0031174.

Personalized Feedback Interventions for College Alcohol Misuse: An Update of Walters & Neighbors (2005)

Mary Beth Miller,
Department of Psychology, Oklahoma State University

Thad Leffingwell,
Department of Psychology, Oklahoma State University

Kasey Claborn,
Department of Psychology, Oklahoma State University

Ellen Meier,
Department of Psychology, Oklahoma State University

Scott Walters, and
School of Public Health, University of North Texas Health Science Center

Clayton Neighbors
Department of Psychology, University of Houston

Abstract

Personalized drinking feedback is an evidence-based and increasingly common way of intervening with high-risk college drinking. This article extends an earlier review by Walters and Neighbors (S. T. Walters & C. Neighbors, 2005, Feedback interventions for college alcohol misuse: What, why, and for whom? *Addictive Behaviors, 30*, 1168–1182) by reviewing the literature of published studies using personalized feedback as an intervention for heavy drinking among college students. This article updates and extends the original review with a more comprehensive and recent set of 41 studies, most of which were not included in the original article. This article also examines within-subject effect sizes for personalized feedback interventions (PFIs) for high-risk alcohol use and examines the content of PFIs more closely to provide insight on the most essential components that will guide the future development of feedback-based interventions. In general, PFIs appear to be reliably effective at reducing harmful alcohol misuse among college students. Some components are almost universally included (i.e., drinking profile and normative comparison), precluding inferences regarding their unique contribution. Significantly larger effect sizes were observed for interventions that included decisional balance, practical costs, and strategies to limit risks. The present research provides an important empirical foundation for determining the relative contribution of individual components and facets in the efficacy of PFIs.

Correspondence concerning this article should be addressed to Thad Leffingwell, Department of Psychology, Oklahoma State University, 116 North Murray, Stillwater, OK 74078. thad.leffingwell@okstate.edu.

Keywords

feedback; intervention; college students; alcohol

Alcohol misuse is widespread among college students and results in substantial negative consequences. Findings from national surveys suggest that rates of heavy drinking, driving under the influence, and alcohol-related deaths all increased between 1998 and 2005 (Hingson, Zha, & Weitzman, 2009). Almost half of college students (44.7%) report heavy episodic (i.e., "binge") drinking in the last month; one in three (28.9%) reports driving under the influence of alcohol, and in 2005 alone, approximately 1,825 students died due to unintentional, alcohol-related injuries (Hingson et al., 2009).

The epidemic of alcohol misuse among college students has produced a variety of prevention and intervention strategies that are specifically tailored to college drinkers. One of the most promising approaches to date has been personalized feedback interventions (PFIs). PFIs have been at least moderately effective in reducing alcohol use and associated consequences in this population, especially among heavier drinkers (Carey, Scott-Sheldon, Carey, & DeMartini, 2007; Larimer & Cronce, 2007; Walters & Neighbors, 2005). Stemming from motivational and social psychology, PFIs are intended to encourage thoughtful consideration of future alcohol use by increasing the salience of normative discrepancies; reframing use in terms of personal, social, financial, caloric, or other consequential costs; and/or comparing individual students' risk scores to standard risk measures (Walters & Neighbors, 2005).

Numerous investigations of PFIs have been reported in the literature. In a meta-analysis of alcohol intervention studies for college drinkers (Carey et al., 2007), 45 of the 62 studies reviewed integrated either personalized feedback or a normative comparison into the intervention. In an analysis of computer-based drinking interventions for the same population (Elliott, Carey, & Bolles, 2008), nearly every intervention incorporated personalized feedback, either as a stand-alone or as a part of a multifaceted intervention. Moreover, in a 1999 to 2006 review of the literature on individualized interventions for college student drinking (Larimer & Cronce, 2007), more than half of the 29 studies that reported significant reductions in alcohol consumption and/or problems at follow-up used feedback as at least part of the intervention.

Though PFIs have been associated with positive outcomes, the essential elements responsible for efficacy remain unclear. Systematic reviews (Carey et al., 2007; Walters & Neighbors, 2005) have identified the general content and applications of feedback interventions, but the question of which aspects of feedback are most effective remains uncertain. The current project extends an earlier review by Walters and Neighbors (2005) by (a) incorporating a number of new studies not included in the original review, (b) including a more fine-grained review of the content of PFIs, and (c) examining the within-group effect sizes of personalized feedback conditions in an attempt to determine the most essential aspects of feedback content and to guide the future development of PFIs.

Methods

Search Strategy and Selection

This article reviewed published studies that investigated PFIs as a college student drinking intervention. As in Walters and Neighbors (2005), "feedback" was defined as any information about one's personal use of alcohol and/or associated consequences (e.g., the recipient's consumption and/or consequences with or without normative comparisons). A search of PsycINFO and Web of Science databases was conducted using a Boolean search strategy with the keywords (feedback) AND (alcohol OR drinking) AND (college students) AND (intervention OR prevention OR treatment). The review included original studies that (a) used personalized feedback as a major component of the alcohol intervention, (b) sampled U.S. college students, and (c) measured drinking outcomes. Researchers also cross-checked reference lists from identified articles and other reviews of this literature.

After eliminating reanalyses and non-U.S. references, 56 studies were identified through 2011. Five studies were excluded due to insufficient breadth of feedback for cross-study comparisons (e.g., feedback targeting only one drinking day, such as a 21st birthday), and/or feedback on repeated occasions. From the resulting list, 51 authors were contacted and asked to supply a sample of the feedback profile provided to participants in their study, as well as any missing data necessary for effect size calculations. Of the 51 authors, 41 (80%) responded and supplied a feedback profile. Authors who did not respond to the original e-mail were recontacted, and authors who did provide a sample of feedback were contacted to double-check data for effect size calculations. Forty-one studies were included in the final review, 31 of which were not included in the original Walters and Neighbors (2005) review.[1] Studies comprised 64 separate feedback conditions (e.g., feedback provided in an in-person and/or computerized condition). Because two studies did not use identical feedback profiles across conditions, a total of 43 separate feedback profiles were examined. Table 1 provides sample size, participant characteristics, and intervention details and outcomes for feedback conditions within each study.

Coding and Reliability

The content of each feedback profile ($N = 43$) was categorized into 11 content *components*, each of which was further differentiated by the number of specific details within each component. Table 2 depicts the primary content components and details included across studies. Three researchers independently coded the content components and details of each profile. Raters agreed on 91% of the categorical dimensions, and inconsistencies were resolved via group discussion (see Table 3).

A few changes were made in the way the previous review (Walters & Neighbors, 2005) coded information. For example, the previous review categorized any information regarding the consequences of one's drinking as "negative consequences." Because the large majority of profiles (86%) included this information in some form, the current review attempted to

[1]The original Walters and Neighbors (2005) article summarized the content of 13 studies. Three of these studies (Baer et al., 1992; Dimeff & McNeely, 2000; Neal & Carey, 2004) were not included in the present review due to challenges obtaining dated research materials, lack of access to feedback profiles and outcome data, and absence of drinking outcomes, respectively.

differentiate between studies that provided an actual list of alcohol-related consequences and those that either discussed or provided a rating of such consequences. Only those studies that provided a list of negative consequences experienced were coded as having included this component. Conversely, the previous review included as "moderation strategies" only those strategies that were intended to limit participants' drinking. In the current review, any strategies associated with limiting risk (e.g., calling a safe-ride number, using a designated driver), also commonly referred to as protective behavioral strategies (e.g., Martens, Pederson, LaBrie, Ferrier, & Cimini, 2007), were coded as such.

Effect Size Derivation

A within-group effect size for each feedback condition was calculated in order to differentiate between the effectiveness of conditions that included different feedback components (see Table 4). Cohen's *d* was calculated for each feedback condition ($N = 64$) based on means and standard deviations either reported in the published article or provided by the authors upon request. To examine the magnitude of effect across different components, the average effect size of written feedback conditions (i.e., mailed or computerized) that included each primary content component was compared with the average effect size of those that did not include that component using mean comparisons. Conditions were coded as including components only if the component was present in the written profile provided. However, if a component that is often provided separately from feedback (decisional balance, harm reduction advice sheet, or local referral) was not observed in the written profile but was described in the article as having been provided, it was coded in mean comparison analyses as having been included. To isolate the effects of the feedback itself as much as possible, conditions incorporating in-person interviews (either individually or in a group setting) were excluded to eliminate the confounding variable of therapist effects. Further, because the majority of studies reported follow-up within 6 months of baseline ($n = 37$; 90%), studies reporting outcomes after 6 months (Doumas, Workman, Smith, & Navarro, 2011; Larimer et al., 2007) were also excluded. One additional study (Walters, Vader, & Harris, 2007) was excluded due to insufficient data for effect size calculations. Thus, a total of 26 studies comprising 35 feedback conditions were included in effect size analyses. Means and ranges of effect size are depicted in Table 4.

Results

Sample and Modality Variability Across Studies

Sample variability—Though the majority of studies used an indicated prevention strategy to target high-risk college student drinkers, the studies varied widely in "high-risk drinking" eligibility criteria, comparison group, follow-up period, and feedback content. Most used self-report data from students who met a multifaceted definition of high-risk drinking, ranging from one binge episode (four or more drinks per drinking occasion for women and five or more drinks per occasion for men) in the past month, to 80 drinks in the past month, to some combination of frequency/quantity and alcohol-related problems. Ten studies used a selective prevention strategy to target typically high-risk drinking populations (college freshmen, athletes, fraternity members) without specifying particular drinking

criteria, and one study assumed a universal prevention approach, recruiting all college students regardless of drinking status.

Modality variability—Twenty-two studies examined personalized feedback as a supplement to an individual or group meeting, using an interviewer or group leader to facilitate discussion. Twenty-nine studies used only the feedback profile itself, seven were delivered via mail and 22 via computer; and nine attempted to differentiate between the effects of the separate formats (e.g., feedback alone vs. feedback provided with a face-to-face interview).

Variability in Content Components Included in PFIs

The content of individual feedback profiles varied from a one-page depiction of the student's drinking profile with normative comparisons to a comprehensive, multiple-page packet of information including several components. Table 2 lists the 11 content components most commonly included in personalized feedback interventions and the percentage of studies incorporating specific aspects of the personal drinking profile.

Drinking profile—All but one feedback profile included some kind of personal drinking summary that illustrated at least the typical quantity of alcohol that students self-reported drinking.[2] Over half of profiles (67%) also included a typical drinking frequency. Though less consistent, peak quantities and frequencies were also reported in some profiles (13% and 2%, respectively), and one profile (Marlatt et al., 1998) included a review of students' frequency and quantity of drinking during high school. Feedback regarding blood alcohol concentration (BAC) levels was given in 31 (72%) of the 43 profiles, all of which reported estimated BAC levels of the heaviest night of drinking. Twenty-nine (67%) reported BAC on a typical night of drinking, and one (Barnett, Murphy, Colby, & Monti, 2007) reported the student's BAC on a specific night (i.e., the night of the incident for which the student was referred for treatment/disciplinary action). Fifteen feedback profiles also included information regarding the amount of time required for the student's BAC to return to zero.

Normative comparisons—All profiles that provided a personal drinking summary also compared the student's personal drinking to some kind of descriptive norm. The majority (88%) described normative comparisons in terms of a percentile rank, and all but four of those explained the implications of that ranking (e.g., you drink more than 80% of other college students). Several studies also included normative comparisons regarding other aspects of college drinking, including frequency of binge drinking, frequency of moderate drinking (e.g., two drinks or less per week), number of alcohol-related consequences, prevalence of abstinence on campus, and frequency of other drug use. None of the studies used injunctive norms.

The profiles also varied widely in terms of the normative referent used. The most common reference group was other students on campus, with 29 of the 43 profiles (67%) comparing participants' drinking to other students at their school. Twenty-five profiles (58%) used a

[2]The one profile that did not include this information (Hendershot, Otto, Collins, Liang, & Wall, 2010) was considerably different from all other profiles and specifically targeted the genetic vulnerability of Asian American college students.

national normative referent, eight (19%) used age-specific referents (i.e., adults your age), and five (12%) referenced a social group comparison (e.g., other freshmen). Thirty-four of these profiles (79%) made the comparison sex-specific, such that personal drinking was compared with other men/women on campus, across the nation, his or her age, or within his or her group.

Consequences—Feedback profiles have frequently included a list of negative consequences that students report experiencing due to drinking. A list of alcohol-related negative consequences was included in 26 (60%) of the profiles reviewed. One profile (White, Mun, Pugh, & Morgan, 2007) also provided a list of consequences due to drugs other than alcohol, and 10 (23%) provided a score that estimated risk for future consequences.

Collectively, 23 profiles (53%) included some kind of practical cost. Twenty-two of these (51%) included the estimated amount of money (or percent of income) spent within a certain timeframe (usually a semester and/or a year), and six reframed this value into some kind of monetary equivalent (e.g., number of flat-screen TVs). Nineteen profiles (44%) reported calories consumed, and 16 provided the hours/minutes of exercise required to expend those calories. Thirteen of those also provided students with a graphic caloric equivalent (e.g., number of cheeseburgers consumed), and six included the projected pounds of body fat acquired in 1 year. Six profiles (14%) also contrasted the amount of time spent drinking with the amount of time spent on other important activities (e.g., exercising and studying).

Didactic information—Though 86% of profiles included some form of didactic information regarding alcohol, the amount and content of such information differed considerably. Some feedback profiles provided links to educational websites (e.g., Doumas, Haustveit, & Coll, 2010; Saitz et al., 2007), whereas others provided only a snapshot of the information likely covered within the session. Because many feedback profiles were discussed within the context of an individual session, it is difficult to determine how much educational information was actually provided. For the purposes of this study, the presence of educational information was coded only for studies in which the educational information was included in the written feedback profile provided or described explicitly in the corresponding article. Table 2 describes the content of didactic information included across studies.

Risk factors—Most feedback profiles (n = 33, 77%) included information about risk factors for future alcohol-related problems. Twenty-five profiles portrayed past consequences as an indicator of future alcohol-related problems (usually in the context of an Alcohol Use Disorders Identification Test score), 23 (53%) either reviewed students' tolerance symptoms and/or indicated a personal tolerance score, and 22 (51%) reviewed students' personal family history of alcohol problems. Fourteen profiles (33%) educated students on the increased risk associated with binge drinking and/or participation in drinking games. Eleven profiles (26%) evaluated participants' other drug use, four (9%) educated students on the relation between alcohol use and other symptomology (i.e., depression), and three reviewed the increased risk associated with age of first drink. Fourteen profiles (33%) provided contact information for local alcohol-related resources.

Behavioral strategies—A total of 28 interventions (65%) discussed strategies to moderate drinking either via feedback profile or in person. However, the number of strategies reviewed ranged from 1 to 28, and only two studies incorporated a practice component that would, theoretically, improve students' self-efficacy to use such strategies.

Alcohol expectancies—Only 13 (30%) of the 43 profiles included information about students' expectations of their alcohol use (e.g., increased sociability and reduced tension). Although only four feedback profiles explicitly challenged these expectations in written form, it is likely most if not all relevant profiles included an expectancy challenge component based on descriptions provided in articles. Related to these findings, only two profiles included a written decisional balance to clarify students' perceptions of their alcohol use, though 12 articles (28%) described the use of such methods within the intervention.

Effects of Content Components

Few studies have examined the additive effects of certain content components and/or assessment measures. In attempting to dismantle the effects of specific components, Saitz et al. (2007) failed to find evidence that feedback regarding personal BAC levels and effects, negative consequences, and practical costs increased the efficacy of an intervention comprised of normative comparisons, didactic information, and contact information for local resources. Similarly, a number of studies (Lewis, Neighbors, Oster-Aaland, Kirkby, & Larimer, 2007; Lewis & Neighbors, 2007; Neighbors et al., 2010; Neighbors, Larimer, & Lewis, 2004; Neighbors, Lewis, Bergstrom, & Larimer, 2006) have found significant results using only a drinking profile and normative comparison, suggesting the normative comparison included in all studies may be the one common and necessary component.

To generate hypotheses in this regard, effect sizes of all written profile conditions using a follow-up assessment within 6 months of baseline ($n = 35$) were contrasted using mean comparisons, such that the average effect size of all conditions including each content component was compared with the mean effect size of all conditions excluding that component. As described in Table 4, significant differences in effect sizes were found for three feedback components. Written profiles that included a decisional balance elicited greater change in drinks per week at shortest follow-up than did those that did not, $F(1, 34) = 4.68$, $p = .04$, $\eta^2 = .12$, as did interventions incorporating practical costs, $F(1, 34) = 4.02$, $p = .05$., $\eta^2 = .11$, and strategies to limit risk, $F(1, 34) = 9.74$, $p = .01$, $\eta^2 = .23$.

It is also unclear thus far if simply providing more information elicits greater change in drinking behavior. To provide insight on this uncertainty, a Pearson's correlation was conducted to assess the relationship between the number of components included in each treatment condition (ranging from 1 to 11) and the magnitude of intervention effect. Though a moderate relationship was found between the number of components included and intervention effect at shortest follow-up (≤6 months), this trend was not statistically significant, $r = .34$, $p = .06$.

Discussion

Overall, these conclusions reiterate the tentative inferences made by Walters and Neighbors seven years ago: PFIs seem to be effective across a range of modalities at reducing alcohol consumption in the short-term. However, duration of effect is difficult to determine, and existing research does not allow us to draw strong conclusions. However, several new findings are noteworthy. First, there is a lack of research investigating the most effective aspects of PFI content for college alcohol misuse. One reason for this dearth of knowledge lies in the qualitative differences among these interventions, differences that render them exceedingly difficult to replicate and compare.

Second, it seems that interventions that include more feedback components may be more effective. Though the considerable difference in sample sizes prevents us from drawing strong conclusions, it seems that incorporating a personally relevant evaluation of the consequences of drinking, reframing alcohol consumption in terms of practical costs, and providing strategies to limit alcohol-related risk may enhance the short-term effectiveness of PFIs. Conversely, providing a list of consequences experienced seems to slightly diminish the intervention effect. One explanation for this finding is that a list of consequences may increase defensive bias. Consistent with Cognitive Dissonance Theory (Festinger, 1957) and previous findings of defensively biased responding to health risk information (Leffingwell, Neumann, Leedy, & Babitzke, 2007), it is possible that students who realize they have experienced this number of consequences are driven to defend their behavior by convincing themselves that these consequences were worthwhile. This may seem to contraindicate the use of decisional balance; however, each of the studies utilizing decisional balances did so in the spirit of motivational interviewing, which may have minimized participants' perceptions of condemnation or judgment and increased their motivation to change.

Despite the finding that the majority of content components may be helpful in crafting the most effective PFI possible, very few studies have examined the additive effects of incorporating various feedback components. In fact, five studies found significant results utilizing only a descriptive normative comparison, without additional elements. Though the effect sizes of these interventions tended to be slightly below average, the benefit of incorporating other components may or may not reach clinical significance when tested empirically. For example, the practical (monetary/physical) costs of drinking are included in 53% of studies. Yet no study has empirically tested the efficacy of this addition or the benefit of adding the visual equivalent (e.g., the weight you have gained in pounds of butter).

In examining the effectiveness of normative comparisons, it also seems we have only begun to document the importance of the relevance of the referent to the individual. Previous reviews (Walters & Neighbors, 2005) have discussed the importance of balancing the proximity of the referent (you drink more than 40% of *male* college *fraternity members*) with the potential discrepancy it creates (you drink more than 70% of college students in the United States). In groups with lower drinking norms (e.g., women), a closer referent (other women) may create a greater discrepancy, and theoretically, produce greater change. In groups with higher drinking norms (e.g., fraternity members), a more distal norm (U.S. college students) may create greater discrepancy. However, a more distal norm may also

elicit defensive bias in responding ("I may drink more than 70% of college students, but I drink about as much as the guys in my fraternity"). This issue has yet to be addressed adequately within the literature. Specifically, only three studies have examined the effect of using a sex-specific referent (Lewis & Neighbors, 2007; Lewis et al., 2007; Neighbors et al., 2010), and only three have used comparisons to members of a more intimate group (i.e., the individual's intervention group or academic class) (Fromme & Corbin, 2004; Lewis et al., 2007; Saitz et al., 2007). Likewise, no published studies have used normative comparisons to members of one's ethnicity, which has been identified as a potentially valuable source of comparison for those who strongly identify with a particular culture (Lewis & Neighbors, 2007).

Considering the prevalence and severity of drinking among college students, further investigation of the specific variables associated with behavior change is warranted. The data in this article may be helpful to future investigators in making informed selections of PFI content. Greater consistency among feedback interventions will allow for more specific identification of the methods that lead college drinkers to commit to change. Accounting for the differences in study outcomes in this way may aid in the development of more effective, time- and cost-efficient interventions.

Acknowledgments

The authors acknowledge the assistance of many investigators who generously shared their studies' feedback profiles and other information in support of this project.

References

Agostinelli G, Brown JM, Miller WR. Effects of normative feedback on consumption among heavy drinking college students. Journal of Drug Education. 1995; 25:31–40. DOI: 10.2190/XD56-D6WR-7195-EAL3 [PubMed: 7776148]

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; 60:974–979. DOI: 10.1037/0022-006X.60.6.974 [PubMed: 1460160]

Barnett NP, Murphy JG, Colby SM, Monti PM. Efficacy of counselor vs. computer-delivered intervention with mandated college students. Addictive Behaviors. 2007; 32:2529–2548. DOI: 10.1016/j.addbeh.2007.06.017 [PubMed: 17707594]

Borsari B, Carey KB. Effects of a brief motivational intervention with college student drinkers. Journal of Consulting and Clinical Psychology. 2000; 68:728–733. DOI: 10.1037/0022-006X.68.4.728 [PubMed: 10965648]

Borsari B, Carey KB. Two brief alcohol interventions for mandated college students. Psychology of Addictive Behaviors. 2005; 19:296–302. DOI: 10.1037/0893-164x.19.3.296 [PubMed: 16187809]

Butler LH, Correia CJ. Brief alcohol intervention with college student drinkers: Face-to-face versus computerized feedback. Psychology of Addictive Behaviors. 2009; 23:163–167. DOI: 10.1037/a0014892 [PubMed: 19290702]

Carey KB, Carey MP, Henson JM, Maisto SA, DeMartini KS. Brief alcohol interventions for mandated college students: Comparison of face-to-face counseling and computer-delivered interventions. Addiction. 2011; 106:528–537. DOI: 10.1111/j.1360-0443.2010.03193.x [PubMed: 21059184]

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; 74:943–954. DOI: 10.1037/0022-006X.74.5.943 [PubMed: 17032098]

Carey KB, Henson JM, Carey MP, Maisto SA. Computer versus in-person intervention for students violating campus alcohol policy. Journal of Consulting and Clinical Psychology. 2009; 77:74–87. DOI: 10.1037/a0014281 [PubMed: 19170455]

Carey KB, Scott-Sheldon LA, Carey MP, DeMartini KS. Individual-level interventions to reduce college student drinking: A meta-analytic review. Addictive Behaviors. 2007; 32:2469–2494. DOI: 10.1016/j.addbeh.2007.05.004 [PubMed: 17590277]

Collins SE, Carey KB, Sliwinski MJ. Mailed personalized normative feedback as a brief intervention for at-risk college drinkers. Journal of Studies on Alcohol. 2002; 63:559–567. [PubMed: 12380852]

Dimeff LA, McNeely M. Computer-enhanced primary care practitioner advice for high-risk college drinkers in a student primary health-care setting. Cognitive and Behavioral Practice. 2000; 7:82–100. DOI: 10.1016/S1077-7229(00)80010-3

Doumas DM, Haustveit T. Reducing heavy drinking in intercollegiate athletes: Evaluation of a web-based personalized feedback program. The Sport Psychologist. 2008; 22:212–228.

Doumas DM, Haustveit T, Coll KM. Reducing heavy drinking among first year intercollegiate athletes: A randomized controlled trial of web-based normative feedback. Journal of Applied Sport Psychology. 2010; 22:247–261. DOI: 10.1080/10413201003666454

Doumas DM, McKinley LL, Book P. Evaluation of two web-based alcohol interventions for mandated college students. Journal of Substance Abuse Treatment. 2009; 36:65–74. DOI: 10.1016/j.jsat.2008.05.009 [PubMed: 18657941]

Doumas DM, Workman C, Smith D, Navarro A. Reducing high-risk drinking in mandated college students: Evaluation of two personalized normative feedback interventions. Journal of Substance Abuse Treatment. 2011; 40:376–385. DOI: 10.1016/j.jsat.2010.12.006 [PubMed: 21295938]

Elliott JC, Carey KB, Bolles JR. Computer-based interventions for college drinking: A qualitative review. Addictive Behaviors. 2008; 33:994–1005. DOI: 10.1016/j.addbeh.2008.03.006 [PubMed: 18538484]

Festinger, L. A theory of cognitive dissonance. Evanston, IL: Row, Peterson & Company; 1957.

Fromme K, Corbin W. Prevention of heavy drinking and associated negative consequences among mandated and voluntary college students. Journal of Consulting and Clinical Psychology. 2004; 72:1038–1049. DOI: 10.1037/0022-006X.72.6.1038 [PubMed: 15612850]

Geisner IM, Neighbors C, Lee CM, Larimer ME. Evaluating personal alcohol feedback as a selective prevention for college students with depressed mood. Addictive Behaviors. 2007; 32:2776–2787. DOI: 10.1016/j.addbeh.2007.04.014 [PubMed: 17499445]

Hendershot CS, Otto JM, Collins SE, Liang T, Wall TL. Evaluation of a brief web-based genetic feedback intervention for reducing alcohol-related health risks associated with ALDH2. Annals of Behavioral Medicine. 2010; 40:77–88. DOI: 10.1007/s12160-010-9207-3 [PubMed: 20652463]

Hingson RW. Magnitude and prevention of college drinking and related problems. Alcohol Research & Health. 2010; 33:45–54. [PubMed: 23579935]

Hingson RW, Zha W, Weitzman ER. Magnitude of and trends in alcohol-related mortality and morbidity among U.S. college students ages 18–24, 1998–2005. Journal of Studies on Alcohol and Drugs. 2009; 16:12–20. [PubMed: 19538908]

Hustad JTP, Barnett NP, Borsari B, Jackson KM. Web-based alcohol prevention for incoming college students: A randomized controlled trial. Addictive Behaviors. 2009; 35:183–189. DOI: 10.1016/j.addbeh.2009.10.012 [PubMed: 19900763]

Jouriles EN, Brown AS, Rosenfield D, McDonald R, Croft K, Leahy MM, Walters ST. Improving the effectiveness of computer-delivered personalized drinking feedback interventions for college students. Psychology of Addictive Behaviors. 2010; 24:592–599. DOI: 10.1037/a0020830 [PubMed: 21198222]

Juárez 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; 36:233–246. DOI: 10.2190/753N-8242-727T-G63L [PubMed: 17345916]

Larimer ME, Cronce JM. Identification, prevention, and treatment revisited: Individual-focused college drinking prevention strategies 1999–2006. Addictive Behaviors. 2007; 32:2439–2468. DOI: 10.1016/j.addbeh.2007.05.006 [PubMed: 17604915]

Larimer ME, Lee CM, Kilmer JR, Fabiano PM, Stark CB, Geisner IM, Neighbors C. Personalized mailed feedback for college drinking prevention: A randomized clinical trial. Journal of Consulting and Clinical Psychology. 2007; 75:285–293. DOI: 10.1037/0022-006X.75.2.285 [PubMed: 17469886]

Larimer ME, Turner AP, Anderson BK, Fader JS, Kilmer JR, Palmer RS, Cronce JM. Evaluating a brief alcohol intervention with fraternities. Journal of Studies on Alcohol. 2001; 62:370–380. [PubMed: 11414347]

Leffingwell TR, Neumann C, Leedy MJ, Babitzke AC. Defensively biased responding to risk information among alcohol-using college students. Addictive Behaviors. 2007; 32:158–165. DOI: 10.1016/j.addbeh.2006.03.009 [PubMed: 16626881]

Lewis MA, Neighbors C. Optimizing personalized normative feedback: The use of gender-specific referents. Journal of Studies on Alcohol and Drugs. 2007; 68:228–237. [PubMed: 17286341]

Lewis MA, Neighbors C, Oster-Aaland L, Kirkeby BS, Larimer ME. Indicated prevention for incoming freshmen: Personalized normative feedback and high-risk drinking. Addictive Behaviors. 2007; 32:2495–2508. DOI: 10.1016/j.addbeh.2007.06.019 [PubMed: 17658695]

Marlatt GA, Baer JS, Kivlahan DR, Dimeff LA, Larimer ME, Quigley LA, Williams E. 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; 66:604–615. DOI: 10.1037/0022-006X.66.4.604 [PubMed: 9735576]

Martens MP, Pederson ER, LaBrie JW, Ferrier AG, Cimini MD. Measuring alcohol-related protective behavioral strategies among college students: Further examination of the Protective Behavioral Strategies Scale. Psychology of Addictive Behaviors. 2007; 21:307–315. DOI: 10.1037/0893-164X.21.3.307 [PubMed: 17874881]

Murphy JG, Benson TA, Vuchinich RE, Deskins MM, Eakin D, Flood AM, Torrealday O. A comparison of personalized feedback for college student drinkers delivered with and without a motivational interview. Journal of Studies on Alcohol. 2004; 65:200–203. [PubMed: 15151350]

Murphy JG, Dennhardt AA, Skidmore JR, Martens MP, McDevitt-Murphy ME. Computerized versus motivational interviewing alcohol interventions: Impact on discrepancy, motivation, and drinking. Psychology of Addictive Behaviors. 2010; 24:628–639. DOI: 10.1037/a0021347 [PubMed: 21198224]

Murphy JG, Duchnick JJ, Vuchinich RE, Davison JW, Karg RS, Olson AM, Coffey TT. Relative efficacy of a brief motivational intervention for college student drinkers. Psychology of Addictive Behaviors. 2001; 15:373–379. DOI: 10.1037/0893-164X.15.4.373 [PubMed: 11767271]

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; 29:281–297. DOI: 10.1016/j.addbeh.2003.08.004 [PubMed: 14732417]

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; 72:434–447. DOI: 10.1037/0022-006X.72.3.434 [PubMed: 15279527]

Neighbors C, Lewis MA, Atkins DC, Jensen MM, Walter T, Fossos N, Larimer ME. Efficacy of web-based personalized normative feedback: A two-year randomized clinical trial. Journal of Consulting and Clinical Psychology. 2010; 78:898–911. DOI: 10.1037/a0020766 [PubMed: 20873892]

Neighbors C, Lewis MA, Bergstrom RL, Larimer ME. Being controlled by normative influences: Self-determination as a moderator of normative feedback alcohol intervention. Health Psychology. 2006; 25:571–579. DOI: 10.1037/0278-6133.25.5.571 [PubMed: 17014274]

Palfai TP, Zisserson R, Saitz R. Using personalized feedback to reduce alcohol use among hazardous drinking college students: The moderating effect of alcohol-related negative consequences. Addictive Behaviors. 2011; 36:539–542. DOI: 10.1016/j.addbeh.2011.01.005 [PubMed: 21295919]

Saitz R, Palfai TP, Freedner N, Winter MR, MacDonald A, Lu J, Dejong W. Screening and brief intervention online for college students: The iHealth study. Alcohol and Alcoholism. 2007; 42:28–36. DOI: 10.1093/alcalc/agl092 [PubMed: 17130139]

Tevyaw TO, Borsari B, Colby SM, Monti PM. Peer enhancement of a brief motivational intervention with mandated college students. Psychology of Addictive Behaviors. 2007; 21:114–119. DOI: 10.1037/0893-164X.21.1.114 [PubMed: 17385961]

Wagener TL, Leffingwell TR, Mignogna J, Mignogna MR, Weaver CC, Cooney NJ, Claborn KR. Randomized trial comparing computer-delivered and face-to-face personalized feedback interventions for high-risk drinking among college students. Journal of Substance Abuse Treatment. 2012; 43:260–267. [PubMed: 22197301]

Walters ST. In praise of feedback: An effective intervention for college students who are heavy drinkers. Journal of American College Health. 2000; 48:235–238. DOI: 10.1080/07448480009599310 [PubMed: 10778024]

Walters ST, Bennett ME, Miller JH. Reducing alcohol use in college students: A controlled trial of two brief interventions. Journal of Drug Education. 2000; 30:361–372. DOI: 10.2190/JHML-0JPD-YE7L-14CT [PubMed: 11092154]

Walters ST, Neighbors C. Feedback interventions for college alcohol misuse: What, why, and for whom? Addictive Behaviors. 2005; 30:1168–1182. DOI: 10.1016/j.addbeh.2004.12.005 [PubMed: 15925126]

Walters ST, Vader AM, Harris TR. A controlled trial of Web-based feedback for heavy drinking college students. Prevention Science. 2007; 8:83–88. DOI: 10.1007/s11121-006-0059-9 [PubMed: 17136461]

Walters ST, Vader AM, Harris TR, Field CA, Jouriles EN. Dismantling motivational interviewing and feedback for college drinkers: A randomized clinical trial. Journal of Consulting and Clinical Psychology. 2009; 77:64–73. DOI: 10.1037/a0014472 [PubMed: 19170454]

White HR, Mun EY, Morgan TJ. Do brief personalized feedback interventions work for mandated students or is it just getting caught that works? Psychology of Addictive Behaviors. 2008; 22:107–116. DOI: 10.1037/0893-164X.22.1.107 [PubMed: 18298236]

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. Alcohol: Clinical and Experimental Research. 2007; 31:1380–1391. DOI: 10.1111/j.1530-0277.2007.00435.x

Table 1

Descriptive Information for PFI Studies and Changes in Drinking Quantity Across Personalized Feedback Conditions

Study	*N* at shortest follow-up	Participant eligibility criteria	Mean age (years)	% Male	Group(s)	Baseline drinks *M*(*SD*)	Quantity d_{wi} (follow-up)
Agostinelli, Brown, & Miller (1995)	23	Over 80 drinks past month	NR	52.0	Mailed PFI	16.40 (10.40)/wk	.88 (*6 wk*)
Barnett et al. (2007)	215	High-risk referrals[a]	18.80	48.9	In-person PFI-BMI	4.92 (2.53)/occasion	.06 (3 mo) .11 (1 yr)
Borsari & Carey (2000)	59	2 binges past month	18.58	43.0	In-person PFI-BMI	17.57 (8.20)/wk	.81 (6 wk)
Borsari & Carey (2005)	60	High-risk drinkers with referrals	19.10	77.5	In-person PFI-BMI	19.22 (9.65)/wk	.10 (3 mo) .06 (6 mo)
Butler & Correia (2009)	84	High-risk drinkers	20.23	34.6	In-person PFI-BMI Computerized PFI	14.61 (7.60)/wk 15.47 (8.54)/wk	.18 (1 mo) *.55 (1 mo)*
Carey, Carey, Maisto, & Henson (2006)	496	High-risk drinkers	19.20	35.0	In-person PFI-BMI	20.70 (16.00)/wk	.53 (1 mo) .49 (6 mo) .59 (1 yr)
					In-person PFI-BMI + decisional balance	19.20 (13.00)/wk	.46 (1 mo) .12 (6 mo) .30 (1 yr)
					TLFB/In-person PFI-BMI	19.60 (12.40)/wk	.56 (1 mo) .51 (6 mo) .32 (1 yr)
					TLFB/In-person PFI-BMI + decisional balance	18.70 (13.20)/wk	.49 (1 mo) .33 (6 mo) .17 (1 yr)
Carey, Henson, Carey, & Maisto (2009)	192	Mandated college students	19.71	54.0	In-person PFI-BMI	14.79 (10.94)/wk	.31 (1 mo) NR (6 mo) NR (1 yr)
Carey, Carey, Henson, Maisto, & DeMartini (2011)	650	Mandated college students	19.00	64.0	In-person PFI-BMI	14.35 (10.36)/wk	.36 (1 mo) NR (6 mo) NR (1 yr)
Collins, Carey, & Sliwinski (2002)	100	2 binges past month	18.67	50.0	Mailed PFI	14.8 (1.58)/wk[b]	*.31 (6 wk)* *−0.61 (6 mo)*
Doumas & Haustveit (2008)	28	High-risk drinking freshmen athletes	18.10	58.0	Computerized PFI	13.25 (7.80)/wk	*.58 (6 wk)* *1.24 (3 mo)*
Doumas et al. (2009)	76	Mandated college students	19.24	72.4	Computerized PFI	8.16 (6.59)/wk	*.61 (1 mo)*
Doumas et al. (2010)	113	1st-year athletes	18.08	43.0	Computerized PFI	6.50 (6.09)/wk	*.57 (3 mo)*

Study	*N* at shortest follow-up	Participant eligibility criteria	Mean age (years)	% Male	Group(s)	Baseline drinks *M*(*SD*)	Quantity d_{wi} (follow-up)
Doumas et al. (2011)	67	Mandated college students	19.07	70.0	In-person PFI Computerized PFI	11.81 (9.67)/wk 8.94 (8.17)/wk	.19 (8 mo) −.31 (8 mo)
Fromme & Corbin (2004)	113	Disciplinary referrals	19.26	62.3	Pro-led PFI-BMI group Peer-led PFI-BMI group	18.63 (13.55)/wk 18.60 (15.25)/wk	.14 (6 wk) N/A (6 mo) .10 (6 wk) N/A (6 mo)
Geisner, Neighbors, Lee, & Larimer (2007)	168	Drinkers with elevated BDI scores	19.28	30.0	Mailed PFI	6.22 (7.89)/wk	*.11 (1 mo)*
Hendershot et al. (2010)	67	Asian American college students	20.2	46.5	Computerized PFI	1.53 (1.80)/wknd	*.26 (1 mo)*
Hustad, Barrett, Borsari, & Jackson (2009)	80	Incoming (nontransfer) freshmen	18.10	49.0	Computerized PFI	8.86 (10.21)/wk	*.16 (1 mo)*
Jouriles et al. (2010)	98	1 binge past 2 wk	20.0	20.4	Computerized PFI, typical condition	14.3 (10.7)/wk[c]	*.31 (2 wk)*
					Computerized PFI, reading condition	11.2 (7.2)/wk[c]	*.77 (2 wk)*
					Computerized PFI, recall condition	12.3 (9.2)/wk[c]	*.37 (2 wk)*
Juárez et al. (2006)	89	1 binge past 2 wk	19.43	47.5	In-person MI-PFI	2.12 (1.36)/occasion	.63 (2 mo)
					In-person MI + mailed PFI	1.42 (0.80)/occasion	1.27 (2 mo)
					Mailed PFI only	1.77 (1.08)/occasion	*1.09 (2 mo)*
Larimer et al. (2001)	120	1st-year fraternity members	18.80	100.0	Grp + individual PFI-BMI	15.42 (12.05)/wk	.28 (1 yr)
Larimer et al. (2007)	1488	College students	20.60	29.6	Mailed PFI + postcards	4.61 (7.45)/wk	−.03 (1 yr)
Lewis & Neighbors (2007)	182	1 binge past month	20.10	54.8	Computerized PFI, gender Specific Computerized PFI, gender Neutral	13.52 (10.32)/wk 11.43 (9.46)/wk	*.51 (1 mo)* *.51 (1 mo)*
Lewis et al. (2007)	209	Freshmen reporting 1 binge past month	18.53	46.2	Computerized PFI, Gender Specific Computerized PFI, gender Neutral	10.53 (8.88)/wk 11.66 (8.28)/wk	*.28 (5 mo)* *.41 (5 mo)*
Marlatt et al. (1998)	299	High-risk freshmen	NR	45.5	In-person PFI-BMI	4.70 (2.30)/occasion	N/A (6 mo) .29 (1 yr) .46 (2 yr)
Murphy et al. (2001)	84	High-risk drinkers	19.60	46.0	In-person PFI-BMI	22.38 (12.04)/wk	.47 (3 mo) .53 (9 mo)
Murphy et al. (2004)	51	High-risk drinkers:	19.94	31.0	Computerized PFI + in-person BMI	31.81 (6.26)/wk 31.69 (6.17)/wk	.93 (6 mo) *.43 (6 mo)*

Study	*N* at shortest follow-up	Participant eligibility criteria	Mean age (years)	% Male	Group(s)	Baseline drinks *M*(*SD*)	Quantity d_{wi} (follow-up)
					Computerized PFI		
Murphy, Dennhardt, Skidmore, Martens, & McDevitt-Murphy (2010): Study 1	69	1 binge past month (if minority); 2 binge past month (if Caucasian)	21.20	41.0	In-person PFI-BMI	15.20 (9.58)/wk	.39 (1 mo)
Murphy et al. (2010): Study 2	138	1 binge past month (if minority); 2 binge past month (if Caucasian)	18.60	50.0	In-person PFI-BMI[d] Computerized PFI[d]	14.61 (14.62)/wk 16.57 (16.30)/wk	.39 (1 mo) *.33 (1 mo)*
Neighbors et al. (2004)	252	1 binge past month	18.50	41.0	Computerized PFI	12.14 (13.02)/wk	*.28 (3 mo)* N/A (6 mo)
Neighbors et al. (2006)	185	1 binge past month	19.67	44.4	Computerized PFI	14.30 (11.75)/wk	*.34 (2 mo)*
Neighbors et al. (2010)	818	College freshmen	18.16	42.20	Computerized PFI, Gender Specific Computerized PFI, Gender Neutral	11.85 (10.26)/wk 12.06 (12.08)/wk	*.13 (6 mo)* N/A (1 yr) N/A (18 mo) N/A (2 yr) *.13 (6 mo)* N/A (1 yr) N/A (18 mo) N/A (2 yr)
Palfai, Zisserson, & Saitz (2011)	119	High-risk drinkers	18.6	30.0	Computerized PFI	12.64 (7.30)/wk	*.32 (1 mo)*
Saitz et al. (2007)	235	AUDIT score ≥ 8	18.14	44.9	Computerized, minimal PFI-BMI Computerized, extended PFI-BMI	13.50 (9.59)/wk 14.75 (20.56)/wk	*.13 (1 mo)* *.08 (1 mo)*
Tevyaw, Borsai, Colby, & Monti (2007)	36 dyads	Mandated referrals	19.17	66.0	In-person PFI-BMI In-person PFI-BMI with peer	5.82 (2.73)/occasion 6.23 (4.07)/occasion	.25 (1 mo) .41 (1 mo)
Wagener et al. (2012)	142	High-risk drinkers	20.90	54.6	In-person PFI Computerized PFI	23.3 (13.0)/wk 24.0 (15.7)/wk	.36 (10 wk) *.14 (10 wk)*
Walters (2000)	34	Over 40 drinks past month	NR	61.8	AE Grp + mailed PFI Mailed PFI only	21.01 (24.73)/wk[c] 21.23 (11.27)/wk[c]	.03 (6 wk) *.68 (6 wk)*
Walters, Bennett, & Miller (2000)	37	Over 40 drinks past month	NR	40.5	AE Grp + mailed PFI Mailed PFI only	29.42 (11.47)/wk[c] 27.96 (14.69)/wk[c]	.59 (6 wk) *1.27 (6 wk)*
Walters et al. (2007)	76	College freshmen	NR	51.9	Computerized PFI	8.92 (NR)/wk	N/A (8 wk) N/A (16 wk)
Walters, Vader, Harris, Feld, & Jouriles (2009)	250	1 binge past 2 wk	19.80	35.8	Computerized PFI In-person MI-PFI	14.27 (11.59)/wk 17.81 (14.38)/wk	*.06 (3 mo)* *.18 (6 mo)* .45 (3 mo) .64 (6 mo)
White et al. (2007)	319	Mandated referrals	18.64	60.1	In-person PFI-BMI	7.57 (6.87)/wk	.38 (4 mo)

Study	*N* at shortest follow-up	Participant eligibility criteria	Mean age (years)	% Male	Group(s)	Baseline drinks *M*(*SD*)	Quantity d_{wi} (follow-up)
					Computerized PFI	7.05 (5.95)/wk	.10 (15 mo) *.27 (4 mo)* −0.14 (15 mo)
White, Mun, & Morgan et al. (2008)	199	Mandated referrals	18.59	71.3	Immediate computerized PFI Delayed Computerized PFI	4.74 (4.88)/wk 4.60 (4.93)/wk	*.24 (2 mo)* N/A (7 mo) .33 (2 mo) N/A (7 mo)

Note. Italicized values indicate data utilized in mean effect size comparisons. AE = alcohol education; BMI = brief motivational intervention; DB = decisional balance; FB = feedback; Grp = Group intervention; N/A = Calculations could not be made based on data provided; NR = not reported; PFI = personalized FB intervention; Wknd = weekend.

[a] Participants were classified broadly as high-risk if multiple high-risk drinking eligibility criteria were used.

[b] Reported as log values in the original paper.

[c] Values reported in original manuscript were converted to drinks consumed per week.

[d] Feedback content varied across conditions.

Table 2

Content Component Definitions, Facets, and Number of Feedback Profiles (N = 43) That Included Each

Component/definition	*n* (%)	Facet	*n* (%)
Drinking profile: Patterns of quantity and frequency of alcohol consumption	42 (98%)	Typical quantity	42 (98%)
		Typical frequency	29 (67%)
		Frequency of binge drinking	15 (35%)
		Peak quantity	13 (30%)
		Frequency of drinking game participation	5 (12%)
		Peak frequency	2 (5%)
Normative comparison: Comparison of personal data (either behavior or perceptions) to a reference group	42 (98%)	Descriptive norms	42 (98%)
		Percentile comparison	38 (88%)
		Explanation of percentile	34 (79%)
		Indicated source of normative data	25 (58%)
		Reference group	
		Sex specific	34 (79%)
		Campus specific	29 (67%)
		Nation specific	25 (58%)
		Age specific	8 (19%)
		Social group specific (e.g., academic class)	5 (12%)
		Normative data provided for comparison	
		Drinking quantity	41 (95%)
		Drinking frequency	19 (44%)
		Abstinence	14 (33%)
		Other (e.g., use of other drugs)	15 (35%)
		Binge drinking	11 (26%)
		Moderate drinking	8 (19%)
		Alcohol consequences	4 (9%)
		Injunctive norms	0 (0%)
Didactic information: Educational information about alcohol, its effects, or tips on using alcohol safely	37 (86%)	*Blood Alcohol Level (BAL) information*	
		Physiological and psychological effects of different levels of BAL	33 (77%)
		Factors that impact BAL	22 (51%)
		Myths about “sobering up”	12 (28%)
		How to calculate BAL (chart)	7 (16%)
		General information about risk	29 (67%)
		Definition of binge drinking	26 (60%)
		Definition of tolerance and/or withdrawal	23 (53%)
		Definition of a standard drink	18 (42%)
		Effects of alcohol on mood (biphasic effects)	6 (14%)
		Interactions with other consumables (caffeine, medicines, drugs)	13 (30%)

Component/definition	*n* (%)	Facet	*n* (%)
		Effects of alcohol on body (ability to burn calories, build muscles, or heal; liver function)	5 (12%)
		Placebo effects	4 (9%)
		Information related to sleep or physical activity	2 (5%)
		How to handle an alcohol-related emergency	1 (2%)
		College students as targets of alcohol marketing	1 (2%)
Risk factors for future consequences: Individual factors that place individuals at increased risk for developing AUD or for encountering health or social consequences	33 (77%)	Past consequences	26 (60%)
		Tolerance level	23 (53%)
		Family history of alcoholism	22 (51%)
		Binge drinking or drinking game participation	14 (33%)
		Other drug use	11 (26%)
		Current psychiatric symptoms	4 (9%)
		Age of onset (first drink)	3 (7%)
		Genetic factors	1 (2%)
Level of intoxication (BAC): Estimated level of intoxication achieved for typical or peak drinking occasions	31 (72%)	Estimated peak BAC	31 (72%)
		Estimated typical BAC	29 (67%)
		Estimate of time required for BAC to return to 0	15 (35%)
Strategies to limit risk: Behavioral strategies to limit consumption or intoxication or protective strategies to limit risk exposure	28 (65%)	Role played strategies	2 (5%)
Negative consequences of alcohol use: List of consequences reported by individual	26 (60%)	Provided list	26 (60%)
		Provided a consequences score without listing consequences reported	10 (23%)
Practical costs: Reframing alcohol consumption patterns in other terms	23 (53%)	Money or percent of income spent on alcohol	22 (51%)
		Expressed as monetary equivalent (e.g., flat-screen televisions)	6 (14%)
		Calories consumed	19 (44%)
		Expressed as caloric equivalent (e.g., lbs of butter)	13 (30%)
		Hours of exercise required to burn consumed calories	16 (37%)
		Projected pounds of body fat gained	6 (14%)
		Time allocated to alcohol use	6 (14%)
Local resources: Contact information for local referral or information sources	14 (33%)		
Alcohol expectancies: Psychological, physical, emotional, or social effects that individuals expect to occur as a result of alcohol consumption	13 (30%)	Challenged alcohol expectancies	4 (9%)
Decisional balance: Summary of individual's reported pros and cons of current drinking behavior and/or of making changes to that behavior	12 (28%)		

Note. BAL = blood alcohol level; AUD = alcohol use disorders; BAC = blood alcohol concentration.

Table 3

Feedback Components Included Across Personalized Feedback Conditions

Study	Group(s)	Profile and norms	BAC	Didactic	Negative consequences	Practical costs	Risk factors	List of strategies	Referral or resources	Expectancies	Decisional balance
Agostinelli et al. (1995)	Mailed PFI	X	X	X			X				
Barnett et al. (2007)	In-person PFI-BMI	X	X	X	X		X	X			(Δ)
Borsari & Carey (2000)	In-person PFI-BMI	X	X	X	X		X	X		Δ	Δ
Borsari & Carey (2005)	In-person PFI-BMI	X	X	X	X			Δ		X	
Butler & Correia (2009)	In-person PFI-BMI Computerized PFI	X	X	X	X	X	X	Δ	Δ		
Carey et al. (2006)	In-person PFI-BMI w/or w/o TLFB	X	X	X	X		X	X		X	(Δ)
Carey et al. (2009)	In-person PFI-BMI	X	X	X	X		X	X		X	(Δ)
Carey et al. (2011)	In-person PFI-BMI	X	X	X	X		X	X		X	(Δ)
Collins et al. (2002)	Mailed PFI	X	X	X	X		X				
Doumas & Haustveit (2008)	Computerized PFI	X		X	X	X	X	X			
Doumas et al. (2009)	Computerized PFI	X		X	X	X	X	X			
Doumas et al. (2010)	Computerized PFI	X	X	X		X	X	X	X		
Doumas et al. (2011)	Computerized PFI	X	X	X		X	X	X	X		
Fromme & Corbin (2004)	Pro-led or peer-led PFI-BMI group	X		Δ	X			Δ			
Geisner et al. (2007)	Mailed PFI	X		X	X		X	X	X		
Hendershot et al. (2010)	Computerized PFI			X			X	Δ			
Hustad et al. (2009)	Computerized PFI	X	X	X		X	X		X		
Jouriles et al. (2010)	Computerized PFI: typical/read/written	X	X	X		X	X		X		
Juárez et al. (2006)	Mailed or in-person PFI w/or w/o BMI	X	X	X	Δ	X	X	X	X	X	(Δ)
Larimer et al. (2001)	Grp + individual PFI-BMI	X	X	X	X	X	X	X		X	
Larimer et al. (2007)	Mailed PFI + postcards	X	X	X	X	X	X	X		X	
Lewis & Neighbors (2007)	Computerized PFI GN or GS	X									
Lewis et al. (2007)	Computerized PFI GN or GS	X									
Marlatt et al. (1998)	In-person PFI-BMI + delayed mailed FB	X	X	X	X		X	X		X	
Murphy et al. (2001)	In-person PFI-BMI	X	X	X	X		X	(X)		(X)	
Murphy et al. (2004)	Computerized PFI w/or w/o in-person BMI	X	X	X	X	X	X	Δ			
Murphy et al. (2010): Study 1	In-person PFI	X	X	X	X	X	X	Δ			Δ

Study	Group(s)	Profile and norms	BAC	Didactic	Negative consequences	Practical costs	Risk factors	List of strategies	Referral or resources	Expectancies	Decisional balance
Murphy et al. (2010): Study 2	In-person PFI	X	X	X	X	X	X	Δ			Δ
	Computerized PFI	X	X	X		X	X	X	X		
Neighbors et al. (2004)	Computerized PFI	X									
Neighbors et al. (2006)	Computerized PFI	X									
Neighbors et al. (2010)	Computerized PFI	X									
Palfai et al. (2011)	Computerized PFI	X	X		X	X					
Saitz et al. (2007)	Computerized, minimal PFI-BMI	X		X					X		
	Computerized, extended PFI-BMI	X	X	X	X	X			X		
Tevyaw et al. (2007)	In-person PFI-BMI w/or w/o peer	X		X	X	X	X	X			X
Wagener et al. (2012)	Computerized PFI In-person PFI	X	X	X	X	X	X			Δ	X
Walters (2000)	Mailed PFI w/or w/o BMI group	X	X	X		X	X	X	X		Δ
Walters (2000)	Mailed PFI w/or w/o BMI group	X	X	X		X	X	X	X		Δ
Walters et al. (2007)	Computerized PFI	X	X	X		X	X		X		
Walters et al. (2009)	Computerized PFI In-person MI + PFI	X	X	X		X	X		X		
White et al. (2007)	In-person PFI-BMI Computerized PFI	X	X	X	X		X	X		X	
White et al. (2008)	Immediate or delayed computerized PFI	X	X	X	X	X	X	X		X	

Note. X = facets that were included in the feedback profile provided. Δ = facets that were not viewed in written profile but were described in the original article as having been included, and parentheses specify those facets that were included as a function of experimental condition or participant willingness. BAC = blood alcohol concentration; GN = gender-neutral; GS = gender-specific; PFI = Personalized Feedback Intervention; BMI = brief motivational interview; MI = motivational interview.

Psychol Addict Behav. Author manuscript; available in PMC 2016 July 18.

Table 4

Descriptive Information for Conditions Included in Mean Effect Size Comparisons (N = 35)

Content component	N_{with}	$M(d)_{with}$	Range$(d)_{with}$	$N_{without}$	$M(d)_{without}$	Range$(d)_{without}$	*Diff*
Drinking profile	34	.40	−.61–1.27	1	.26	NA	+.14
Norms	34	.40	−.61–1.27	1	.26	NA	+.14
Didactic info	26	.42	−.61–1.27	9	.32	.13–.51	+.10
Risk factors	24	.45	−.61–1.27	11	.28	.08–.51	+.16
BAC	21	.40	−.61–1.27	14	.39	.11–1.24	+.01
Practical costs	20	.50	.06–1.27	15	.26	−.61–.88	+.24*
Resources	14	.45	.06–1.27	21	.36	−.61–1.24	+.09
Strategies	10	.66	.11–1.27	25	.29	−.61–.88	+.37**
Consequences	14	.33	−.61–1.24	21	.44	.06–1.27	−.11
Decisional balance	5	.70	.14–1.27	30	.35	−.61–1.24	+.35*
Expectancies	3	.53	.24–1.09	32	.38	−.61–1.27	+.10

Note. Mean effect sizes for written feedback conditions that collected follow-up data within 6 months of baseline ($N = 33$). Difference values represent the difference in mean effect size between studies that included the component versus those that did not. BAC = blood alcohol concentration.

* $p < .05$.

** $p < .01$.