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A Review of Computer-based Alcohol Problem Services Designed for the General Public

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Abstract

This review summarizes the literature on computer-based drinking assessment and intervention programs evaluated using members of the general public. The primary aims were to summarize the demand, usage, and effectiveness of these services. A systematic search of the literature identified seven on-line drinking assessments and eight computerized interventions that were evaluated using members of the general public. Internet assessment users tend to be in their early thirties, are more often male, tend to be at risk for or are experiencing alcohol-related problems, more fully explore assessment sites and are more likely to enroll in interventions linked to these sites when their drinking problem is more severe. Although drop-out from computer-based interventions is often very high and treatment models vary widely program completers appear to show improvements.

Keywords

drinking assessment; alcohol intervention; treatment; Internet; alcohol

1. Introduction

Despite the rapid growth of the Internet and the popularity of home computers in the past two decades, computer-based interventions for alcohol use disorders designed for the general public are relatively new, rare, and scarcely studied. For example, when Cloud and Peacock (2001) searched the Internet in the spring of 1998, they found nothing that resembled an automated screening or brief intervention. Two years later, a review of the top 30 results from ten well-known search engines (e.g., Yahoo, Google, AltaVista, etc.) revealed only five web sites that offered on-line services for people with alcohol problems (Toll, Sobell, D'ariento, Sobell, Eickelberry-Goldsmith, & Toll, 2003). On the other hand, a sizable amount of research has examined the effectiveness of a wide variety of Internet and CD-ROM based interventions for college students (e.g., Elliott, Carey, and Bolles, 2008). As a result, several questions remain unanswered with respect to the computer-based services that are available to members of the general public via either the Internet or take-home software packages (CD-ROM). First, it is unclear what services are available to the general public, if there is a demand for these services, who is using them, and how these services are being used. Second, it is unclear how effective interventions developed for the general public are at reducing consumption. Finding answers to these questions through a review of the published research on computer-based alcohol assessment and intervention services is the purpose of this paper.

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Declarations of interest

None.

1.1. The Internet and Health Information

According to the most recent estimate, 24.7% of the world's population is now connected to the Internet. While only 15.1% of Internet users are North American, Internet use is highest in North America where 73.9 % of the population is now connected followed by Australia (60.1%), Europe (50.1%), Latin America (30.0%), and the Middle East (23.7 %) (Internet World Stats, 2009). Although systematic international studies of Internet health resource utilization have yet to be conducted, website usage statistics (provided by Alexia.com) show that the world's most popular health information website (Webmd.com) is used most by users from the United States (74.7%) followed by India (6.3%), Canada (2.2%), the United Kingdom (2.1%), and Australia (1.1%). In turn, public health researchers are increasingly recognizing that health information is widely available, frequently sought after, and is reaching increasingly large numbers of lower income, less-educated, and minority Americans over the Internet (Fox & Fallows, 2003; Cotten, 2001; Suarez-Amazor, Kendall, & Dorgan, 2001; Elliott & Elliott, 2000; Brodie, Fournoy, Altman, Blendon, Benson, & Rosenbaum, 2000). As recent estimates indicate, approximately 223 million Americans are now connected to the Internet (Harris Interactive, 2008), and between 75% and 80% of these Americans routinely use the Internet to find health information (Pew Internet and American Life Project, 2008). Approximately 8% of health-related searches conducted by American Internet users are aimed at finding information on drug and alcohol problems (Pew Internet and American Life Project, 2006). Research on Canadians which has shown that drinkers are significantly more likely to be connected to the Internet than abstainers indicates that drinkers in the general public are within reach of Internet-based alcohol services (Cunningham, Selby, Kypri, Humphreys, 2006).

1.2. Advantages of Internet-Based Services

There are numerous advantages to providing assistance over the Internet to people experiencing problems with alcohol (for review see Cunningham, 2007). As researchers suggest, the privacy of the Internet should appeal to drinkers who might not otherwise seek help due to the embarrassment or stigma associated with having an alcohol problem (Klingemann, Sobell, Barker, Blomqvist, et al., 2001; Toll et al., 2003). Similarly, the impersonal, unthreatening nature of the Internet may also appeal to socially unskilled drinkers who are uncomfortable disclosing their problems to therapists or groups (Griffiths, 2005). Internet-based services should also be convenient for drinkers with psychiatric problems that can interfere with the ability to seek help from others (Kennedy, Hegerl, Bussfeld, & Seemann, 2001). In some cases, the Internet may be the only way to find help in areas where treatment services are limited, too inconvenient, or are completely unavailable.

Researchers also speculate that the motivational readiness needed to quit or reduce drinking is often a temporary state resulting from a negative consequence or drinking-related change in lifestyle (Cunningham, Sobel, Sobel, & Gaskin, 1994). Following this idea, others have emphasized that assessments, self-help materials, and interventions should be readily available (Cloud et al., 2001). Internet-based services answer this call by providing assistance that is typically free and available 24 hours a day, year-round.

Consistent with several of these ideas, a study of Moderation Management's (MM) online components (Humphreys & Klaw, 2001) showed that users of these services had access to a computer (69%), liked being able to access MM at any time of the day (38%), found it easier to write about their feelings and experiences rather than speaking about them in front of a group (females = 35%, males = 13%), and reported that online participation was easier than attending live meetings due to interference from work (23%).

For treatment providers, computer-based interventions are completely consistent in application of their therapeutic model, and eliminate problems due to therapist fatigue, forgetfulness

(Fotheringham, Owies, Leslie, & Owen, 2000), and biases that can interfere with clinical relationships (Miller & Sovereign, 1989). These services are also efficient and economical in that they can reach large numbers, eliminate costly therapist fees (Elliot et al., 2008), require no training, and have low development costs (Doumas & Hannah, 2008) that become vanishingly small considering the unlimited numbers who can be treated. Finally, Internet-based services are highly efficient in the sense that when changes or updates are needed, they are made at one location and immediately appear to all users.

1.3. Findings of Previous Reviews

To date, most attention to the development and evaluation of computer-based interventions for alcohol problems has focused on college students. In an extensive review of Internet-based student interventions, Elliott et al. (2008) showed that these interventions are sometimes equivalent to alternative approaches (i.e., brief motivational interviews, cognitive-behavioral therapy), sometimes out-perform education-based interventions, and are superior to assessment-only control conditions on some measures of drinking. In a review of Internet-based interventions including only studies utilizing random assignment, which mostly (4 of 5) involved students, Bewick et al. (2008) showed that although Internet-based interventions are typically well-received, the evidence for their effectiveness is inconsistent. In contrast, a review of 13 student interventions that utilized normed feedback as a major component has shown that feedback delivered over the Internet has effects that can last up to six months or more (Walters & Neighbors, 2005).

1.4. Purpose of Current Review

There are several aims of this review. The first is to discover how much demand exists for computer-based assessment and intervention tools in the general public. The second aim is to create a profile of the users of these services that includes their sex, age, treatment history, and Alcohol Use Disorder Identification Test (AUDIT) score. The third aim is to describe how these services are being used and whether they are effective in terms of reducing consumption.

2. Method

2.1 Procedure

The search strategy used to discover the studies for this review proceeded in three steps. First, a broad initial list of references that would be likely to contain studies that evaluated computer applications designed to assess or treat alcohol problems were gathered by querying five well known literature search engines (i.e., PubMed, Science Direct, PsycInfo, Web of Science, and Google Scholar (top 100 results)) four times each using keywords that have been used by other reviewers of computer-based alcohol services (Bewick et al., 2008). These keyword sets included: 1) intervention *and* web *and* alcohol, 2) intervention *and* electronic *and* alcohol, 3) internet *and* alcohol consumption, and 4) internet *and* drinking behavior. These queries produced 822 references. To these an additional 181 references found in the bibliographies of four previous reviews of Internet-based interventions (Bewick, et al., 2008; Copeland & Martin, 2004; Elliott, et al., 2008; Walters & Neighbors, 2005) were added. In the second step, all references were hand searched to identify studies that appeared to be evaluations of computerized applications designed to assess or reduce alcohol consumption. The abstract of each article whose title suggested it met my inclusion criteria was then examined. A search of the initial list of 1,003 references led to the discovery of 23 studies. A search of the reference sections of these 23 articles led to the discovery of an additional 19 studies. In total, an additional 1,539 references were searched based on the citations found in discovered articles. This brought the total number of non-distinct references searched to 2,542, which led to the discovery of a total of 42 articles. Next the full text of each article was examined. Twenty three did not meet my criteria for inclusion and were subsequently thrown out. Discarded articles

either focused on college students or were evaluations of services did not involve alcohol as the primary outcome. The final set of articles includes eight intervention and seven assessment studies that were published as of July 2008. All of these studies involved members of the general public.

2.2 Statistics

In Table 1, assessment usage is expressed as the percentage of visitors who assessed themselves using the tools available on the website, and was calculated by dividing the number of visitors to the site by the number of assessments administered in a period of six months. Effect size estimates for intervention outcomes are shown as Cohen's D (see Table 2). Cohen (1998) suggests that effect sizes from .2 to .3 should be considered small, effects from .4 to .7 should be considered medium, and any .8 or greater should be considered large. In order to control for differences in sample size, average percents mentioned throughout were calculated by weighting individual percentages by their respective sample size.

3. Results

3.1. Summary of Internet-Based Drinking Assessments

A summary of the discovered Internet-based drinking assessment studies that includes the amount of traffic at the site (i.e., demand), and the age, sex, and AUDIT scores of assessed drinkers is presented in Table 1. These studies reveal that, in a period of six months, nearly 60,000 people will visit an Internet-based drinking assessment site and between 12% and 63% of visitors assess themselves using the measures provided. After differences in sample size are accounted for, four studies show that an average of 56.4% ($N = 57,963$) of those who visit assessment web sites will take the assessment offered (Cunningham, Humphreys, & Koski-Jännes, 2000; Cloud et al., 2001; Linke et al., 2004; Saitz, Helmuth, Aromaa, Guard, et al., 2004). In contrast, drinkers appear much less willing to pay for an Internet-based assessment. As Hester and Squires (2008) have reported, an average of only 400 drinkers pay for access to their pay-per-use site (www.drinkerscheckup.com) yearly.

All seven assessment studies reported the age and sex of assessed drinkers. Of the six *free* sites studied, the average age ranged from 30.4 to 34.9. After adjusting for differences in sample size, the average age of the Internet-based drinking assessment user, based on a pooled sample of 45,986 drinkers, was 32.1 years. In contrast to *free* assessments, the average age of drinkers willing to pay \$25 to be assessed was considerably higher at 48.2 (Hester & Squires, 2008). With respect to sex, males appeared more often at most of the sites studied, and when differences in sample size are accounted for, men appear in greater numbers at pay-per-use (60%) (Hester & Squires, 2008), and free online assessments (65.2%, $N = 47,550$).

Findings from *Down Your Drink* (Cloud et al., 2001) and www.carebetter.com (Linke et al., 2004) provide the only detailed information on the treatment history and family background of the users of Internet-based assessments. A majority of the drinkers assessed at www.carebetter.com reported they had *not* been diagnosed by a professional (93.8%, $N = 2,213$), come from a family with a history of alcoholism (67.8%, $N = 1,527$), and many already consider themselves to be an alcoholic (32.6%, $N = 734$). These findings are similar to what was reported by those who provided feedback in the pilot study of *Down Your Drink* where 74% ($N = 27$) of participants indicated they had sought no previous help for their drinking problem, and 90% ($N = 34$) reported the website was their only source of help.

Four studies that reported AUDIT scores reveal that the average Internet-assessed drinker has a score that exceeds the cutoff value of 8, which is indicative of problematic consumption. AUDIT averages range from 10 to 16.9 (see Table 1) (Babor, de la Fuente, Saunders, & Grant,

2001). In turn, these and several other studies show how problem severity affects the way drinkers use assessment sites. When drinkers have a more severe problem they are more likely to explore an assessment website, to utilize the additional information or features available, and to perceive the assessment as helpful. At *AlcoholScreening.org* (Saitz et al., 2004), for example, individuals with higher AUDIT scores were significantly more likely to visit areas of the site that offered information about where to find additional help (e.g., treatment referral). At the Finnish site developed by Koski-Jännes and her colleagues (2007), drinkers were more likely to participate in a follow-up survey when their AUDIT scores were significantly higher than average. At *The Alcohol Checkup* (Lieberman, 2003), greater alcohol abuse was positively associated with perceiving all components of the assessment as more helpful. The high-risk workers who used *CopingMatters* were significantly more interested in the alcohol information presented and spent more time using the website than those who were less at risk (Westrup, Futa, Whitsell, Mussman, et al., 2003). Finally, at *www.alcoholscreening.org*, users who chose “learn more” or “get help” after receiving feedback had significantly higher AUDIT scores than those who did not choose these options (Saitz et al., 2004).

Finally, several studies suggest that although drinkers seeking help on the Internet often may be consuming amounts comparable to treatment-seeking alcoholics, they do not experience the same level of negative consequences. As Hester and Squires (2008) discovered, the users of their pay-per-use site report significantly fewer lifetime and recent consequences despite consuming amounts equivalent to the patients in project MATCH. Likewise, 70% of high scoring drinkers assessed at *www.checkyourdrinking.net* (Doumas et al., 2008) reported that, in their opinion, their drinking represents only a minor problem, or no problem whatsoever.

3.2. Summary of Computer-Based Interventions

Eight studies were discovered that evaluated the effectiveness of computer-based interventions using members of the general public. Three of these interventions were conducted through the workplace (Doumas et al., 2008; Matano, Koopman, Wanat, Winzelberg, et al., 2007; Westrup, et al., 2003) while the remainder used participants from the general public. The distinguishing features of these studies and the components employed in these interventions are summarized in table 2 and table 3.

Because most of these studies recruited participants through traditional means (e.g., newspaper ads, health-related web sites, Internet links), very little of this research reveals how often members of the general public will seek out and participate in computer-based interventions on their own. Nevertheless, the research on *Down Your Drink* (Linke et al., 2004, 2007) shows that one way to encourage members of the general public to participate in online interventions is to link these programs to online assessments. In less than two and a half years, 10,000 people who assessed themselves at the *Down Your Drink* site enrolled in the intervention offered.

Possible sex differences appeared with respect to the type of interventions people will participate in voluntarily. In the evaluations of freely available Internet-based interventions where participants selected themselves (Linke, Brown, & Wallace, 2004; Linke et al. 2007; Riper, Kramer, Smit, Conijn, et al., 2007), men and women enrolled in equal numbers (49.8%, $N = 11,580$). However, the three workplace studies discovered, which included voluntary participants from 7 workplaces (Doumas et al., 2008; Matano, Koopman, Wanat, Winzelberg, et al., 2007; Westrup et al., 2003), women made up more than 70% of the sample in each study.

The only information discovered in these studies related to how people use computer-based interventions were predictors of drop-out. In the second study of *Down Your Drink*, Linke and his colleagues (2007) compared first-week completers ($N = 8,933$) to program finishers ($N = 1,654$) and found that women, people married or living with a partner, and those without

children were significantly more likely to complete the program. Those who dropped out also were at significantly *greater* risk for alcohol dependency and harm than completers.

With respect to effectiveness, the participants in all but one of these evaluations (Linke et al., 2004) showed a significant improvement on at least one of the drinking outcomes studied. However, due to the wide variation in the types of interventions that have been employed and the research designs used in their evaluation, it remains impossible to determine which of these interventions is most effective. Furthermore, none of the discovered studies used the same measures of consumption which prohibit the use of effect size estimates as a basis for comparison. Research showing that pre-intervention drinking levels influence the amount of improvement seen in drinking outcomes (Elliott, et al., 2008) further complicates attempts to make such a comparison since it is equally unclear how the pre-intervention consumption levels of these participants compare.

4. Discussion

The findings of this review very clearly indicate there is a demand for online assessment and intervention services among members of the general public. As these studies show, the users of these services are indeed consuming amounts that put them at risk for experiencing alcohol-related problems and those with greater problems also are the ones who utilize these services most thoroughly. Although the findings showing that people with greater problems are more likely to use what is available to them are based only on the results of five studies, it is important to note that these findings represent the behavior of more than 41,000 Internet service users. Although it continues to remain unclear what the most effective computer-based intervention is, it is encouraging to see that all the reviewed interventions were successful at reducing alcohol consumption regardless of how it was measured. In addition, there were a number of findings across these and several related studies that provide clues about how these services can be improved.

User experience research focusing on how people search for health-related information has revealed findings that can be used by intervention and assessment developers to improve the chances that drinkers will be able to find the services they make available on the Internet. Generally, people are most hampered by their use of less sophisticated terminology, misspellings (Skinner et al., 2003; Bader & Theofanos, 2003; Hansen, Derry, Resnick, & Richardson, 2003), and the tendency to rarely look beyond the first two pages of search engine results (Fox & Raine, 2002; Berland, Elliot, & Morales, 2001; Hansen et al., 2003). In turn, alcohol researchers may be able to increase the usage of Internet-based services by studying the search strategies used by drinkers seeking assessment or treatment-related information. For example, a study of the most common search phrases used by drinkers to find various types of alcohol information would allow intervention developers to tailor keywords on their sites so they appear closer to the top of the results generated by Internet search engines.

Several findings (Doumas et al., 2008; Hester & Squires, 2008) suggest that although many Internet assessment seeking drinkers may be consuming amounts that are equivalent to treatment seeking alcoholics (i.e., project MATCH patients), they do not report experiencing the same level of negative consequences. As Hester and Squires have (2008) noted, these findings indicate that feedback using norms from clinical populations may not be appropriate for individuals seeking help over the Internet. Furthermore, the intended impact of normed feedback may weaken if and when the assessment taker realizes the feedback they have received differs from their experience.

The sex ratio of the participants within and between the reviewed interventions and assessments need to be considered with population base rate differences in alcohol consumption and

associated problems in mind. Because men tend to drink more and experience greater problems as a result, the findings showing that men and women appear in equal numbers at online interventions indicate that women may actually be more motivated to use these services. Although findings showing that women appear more often in workplace interventions are consistent with this idea, no solid conclusions can be made regarding the reviewed workplace studies without knowing the numbers of males and females within the studied workplaces. In contrast, the finding that approximately 65% of online assessment takers are men is in line with what should be expected considering base rate differences in consumption.

Although most users of the unadvertised (e.g., Cunningham, Sobell, Sobell, & Gaskin, 1994; Cunningham, Humphreys, & Koski-Jännes, 2000) Internet-based drinking assessments appear to come from America, Canada, and other English-speaking countries, this may be due to the fact that the studies reporting this information employed materials that were presented only in English. One exception is the Finnish version of *Try Our Free Drinking Evaluation*, which was the second most active assessment discovered. This site, in turn, provides support for the idea that Internet services can reach greater numbers if presented in minority languages (Linke et al., 2004), and suggests that greater effort to post multi-lingual assessments and interventions will be worthwhile.

One somewhat surprising finding was that those who dropped out of the *Down Your Drink* intervention (Linke et al., 2007) were at significantly *greater* risk for alcohol dependency and harm than completers. One possible explanation for this finding is that this intervention did not adequately meet the needs of many high-risk drinkers. Because users were only allowed access to this intervention once per each week of the program, many high-risk drinkers may have simply turned to other services that were more available. This possibility makes sense considering the range of findings showing that drinkers with greater problems are actually *more* interested in, likely to explore, and utilize the tools and information that is made available to them on assessment and intervention websites.

Because computerized interventions typically employ a range of components (e.g., normed feedback, information on risk levels, general information, user discussion forums, etc.) previous reviewers of this literature have pointed out that in order to improve effectiveness, developers will eventually need to gain a greater understanding of which components have the greatest effects on drinking (Elliott et al., 2008). One fairly simple way to gain this type of information, that avoids the use of potentially cumbersome multi-arm trials, is to adopt the technique employed by Lieberman (2003), who asked the users of his assessment to rate how helpful each component was in the drinker's efforts to understand their problem. In more elaborate interventions, for example, user ratings of component helpfulness can be used along with information on component usage to predict short-term and long-term outcomes, and to clarify whether problem severity, risk level, or other drinker characteristics are associated with how drinkers perceive and benefit from the different components that can be made available.

Granted that a sizable portion of people who visit assessment sites leave without assessing themselves, and many report taking assessments purely out of curiosity (about 18% according to Cloud et al., 2001), assessment developers may be able to increase the number of visitors who do use these assessments by noting up front the types of information that will be provided after taking the assessment. Requests for user feedback to determine what users wanted to know but did not learn through the assessment also would allow developers to tailor these assessments to better meet the needs of visiting drinkers. These findings also indicate that assessment users should be routinely asked to clarify whether their responses reflect their own drinking or someone else's. Obtaining this information would help reduce the error introduced into reported findings when the assessment is being evaluated for research purposes.

Recent research showing that assessment of a person's drinking can alone reduce their consumption (Kypri, Langley, Saunders, & Cashell-Smith, 2007) indicates that the intervention studies reviewed here are likely contaminated with error introduced through measurement-related demand characteristics. Future effectiveness studies could easily eliminate this problem, at least in measurement-only control groups, by employing disguised alcohol measures (Sawyer, 1975). Readers are encouraged to see articles by Clifford and Maisto (2000), and Clifford, Maisto, and Davis, (2007) for more extensive discussions of how subject reactivity affects alcohol treatment outcomes and ways to minimize these effects if desired.

Because many of the assessment and intervention web sites covered in this review are no longer available on the Internet, it is impossible to know what additional insights might have been gained through a closer inspection of feedback, advice, information, and other types of materials that have been used. Given the wide variation in designs that have been employed in these projects it is likely that greater standardization of intervention and assessment-related materials and information would further enhance researchers' ability to study and understand the differences in effectiveness that exist between intervention components. Along the same lines, the designers of Internet-based interventions should be encouraged to use the most well-validated and frequently used measures of alcohol consumption and associated constructs (e.g., AUDIT, DrInc, SCORATES), as doing so would provide researchers with the much needed ability to compare the different types of interventions that have been designed, and to gain a greater understanding of how well computerized interventions compare to others that exist for alcohol problems.

5. Limitations

There are several limitations to this review. First, it was impossible to comment on the cost effectiveness of the reviewed services since this information was not reported in the reviewed studies. Second, although some researchers (e.g., Hester et al., 2005) have assessed and reported on the additional forms of help that were sought by their participants, none of the reviewed studies attempted to statistically control for the effects that additional help may have had on the intervention outcome. Although additional help seeking can itself be considered a positive outcome, confounds of this type very seriously threaten the validity of observed intervention effects when they are uncontrolled for. Finally, because the total number of studies reviewed is relatively small and user characteristics vary considerably across these studies, it is unclear how well the findings of any particular study generalize to the average person seeking help for alcohol problems on the Internet. However, by combining the results of these studies we are likely to be at least a little closer to understanding the problems and characteristics of alcohol-related web-service users.

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Figure 1.
Literature Search

Table 1

Summary of Online Drinking Assessments

Authors	Drinking-Related Measures	# of visitors in 6 months	*Usage (%) / Assessments in 6 months	% Male	N	Mean AUDIT	Mean Age (range)	Name of Assessment	Data Collection Time Period
Cloud et al. 2001	AUDIT SOCRATES	10,253	28%	64%	2,813	16.9	32 (18 – “over 60”)	Care Better	5/10/99 – 9/28/99
Cunningham et al. 2000	AUDIT SOCRATES WEEK PERIOD CONSEQUENCES	3,000	12%	42%	214	NR	33.8 (14 – 69)	Try Our Free Drinking Evaluation	NR
Hester et al. 2008	AUDIT SOCRATES DRINC BDP SADQ-C	NR	197 <i>assessed</i>	60%	1,564	15.9	48.2	The Drinker's Checkup	9/02 – 11/06
Koski-Jännes et al. 2007	AUDIT WEEK PERIOD CONSEQUENCES	NR	17,792 <i>assessed</i>	51%	343	14.09	30.4	Try Our Free Drinking Evaluation	3/10/04 – 10/31/04
Lieberman 2003	AUDIT SOCRATES	NR	1,455 <i>assessed</i>	53%	1,455	NR	34.9	The Alcohol Checkup	3/01 – 4/03
Linke et al. 2004	FAST	7,581	17%	56%	1,319	NR	32	Down Your Drink	10/1/01 – 3/31/2002
Saitz et al. 2004	AUDIT	57,963	60%	44%	39,842	10	32 (18 – 98)	AlcoholScreening.org	4/2/01 – 6/2/02

Note: BDP = Brief Drinkers Profile; SADQ-C = Severity of Alcohol Dependence Questionnaire for Community Samples; DrInC = Drinkers Inventory of Consequences; AUDIT = Alcohol Use Disorders Identification Test; BDP = Brief Drinkers Profile; SOCRATES = Stages of Change Readiness and Treatment Eagerness Scale; NR = Not reported.

Table 2

Summary of Intervention Studies

Authors	N	Target Drinker Group(s)	Sample	Mean Age	% Male	Tx / Tx Time	Follow up Period	Random Assignment / Groups	Significant Improvements on Drink Outcomes	Effect Sizes Estimates
Doumas et al. (2008)	124	18–24 year old workers	workplace	NR	27%	Check Your Drinking	30 days	Yes / with control group	30 Days Weekend drinking Drinking to intoxication Peak consumption	D = .86 D = .46 D = .66
Hester et al. (1997) *	40	Nonalcoholic Heavy Drinkers	local community	36.3	60%	BSCTWIN / 8- weeks	10 weeks 20 weeks 12 months	Yes / 10-week delayed control group	At All time points: SEC per week Peak BAC Drinking days per week	Mean Effect Sizes (all points) (immediate, delayed) D = 1.57, .64 D = 1.43, 1.06 D = .64, .49
Hester et al. (2005) *	61	AUDIT > 8	local community	45.5	52%	Drinker's Checkup	4 weeks 8 weeks 12 months	Yes / 4-week delayed control group	At 12 Months (immediate and delayed groups): AUDIT SEC per Drinking day BDP Peak BAC	Effect Size at 12 months (immediate, delayed) D = 2.32, 2.36 D = 1.31, 1.31 D = 1.97, 1.51
Linke et al. (2004)	1,319	FAST > 3	Internet users	middle age	56%	Down Your Drink / 6 weeks	6 weeks	No control	NA (96% drop-out)	NR
Linke et al. (2007)	10,000	FAST > 3	Internet users	37.4	49%	Down Your Drink / 6 weeks	6 weeks	No control	At 6 Weeks SADQ APQ	D = .80
Matano et al. (2007)	145	Low and moderate risk workers	workplace	39.9	22%	CopingMatters	90 days	Yes / limited or full feedback	At 90 Days Beer binges (moderate risk) Beer binges (low risk) Hard liquor binges (low risk)	D = .73 D = 1.16 D = 1.19
Riper et al. (2007)	261	Problem drinkers	general population	46	49%	Drink Less / 6 weeks	6 months	Yes / Information only control group	At 6 Months Weekly consumption	D = .40
Westrup et al. (2003)	187	Low, medium, and high risk workers	workplace	40.9	23%	CopingMatters	90 days	Yes / limited or full feedback	At 90 Days Self perceived change in drinking	NR

Note: Percentage of participants that were male has been rounded to the nearest whole number; Effect sizes for Dounas et al., (2008) were calculated by treating eta-squared as roughly equivalent to R^2 (Grimm & Yarnold, 1994); BAC= Blood Alcohol Content; BDP = Brief Drinkers Profile; SADQ = Severity of Alcohol Dependence Questionnaire; DrInC = Drinkers Inventory of consequences; AUDIT = Alcohol Use Disorders Identification Test; BDP = Brief Drinkers Profile; APQ = Alcohol Problems Questionnaire. Effect Sizes are shown in using Cohen's D (Cohen, 1988)

* Format was CD-ROM; Tx = Treatment; NR = Not reported.

Table 3

Summary of Intervention Program Components

Intervention Program	Components
<i>Check Your Drinking</i> Dumas et al. (2008)	1 Normed feedback 2 Summary of a yearly consumption in amount, cost, and calories 3 Risk status for negative consequences 4 AUDIT derived drinking problem status
<i>BSCP-WIN*</i> Hester et al. (1997)	1 Goal setting 2 Self-monitoring 3 Rate control 4 Setting rewards for achieving one's goals 5 Functional analysis of drinking situations 6 Learning alternate coping skills 7 Relapse prevention
<i>Drinker's Check-Up</i> Hester et al. (2005)	A brief motivational interview 1 Assessment 2 Feedback (norms based on Project MATCH data) 3 Decision making 4 Decisional balance exercise 5 Negotiating goals of change 6 Developing alternative plans for change
<i>Down Your Drink</i> Linke et al. (2004) Linke et al. (2007)	Treatment manual structure / Stage of change model 1 Contemplation 2 Action (including cognitive behavioral therapy) 3 Maintenance (including cognitive behavioral therapy) Website included the Fast Alcohol Screening Test, motivational questions, drinking diary, automated emails, quizzes, online discussion group and recreational area.
<i>Drink Less</i> Riper et al. (2007)	A four stage self-help program 1 Preparing for action 2 Goal setting 3 Behavioral change 4 Maintenance of gains and relapse prevention Included access to a moderated peer-to-peer discussion forum.
<i>CopingMatters</i> Westrup et al. (2003) Matano et al. (2007)	Unstructured program 1 Feedback 2 Recommendations 3 Mini-workshops 4 Drinking journal 5 Links to on-line resources

Note:

* BSCT-WIN will soon be replaced by an Internet-based version of this program called moderatedrinking.com (Hester, Delaney, Campbell, & Handmaker, 2009).