Controlled drinking: more than just a controversy

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Purpose of review

We intend to provide clinicians and clinical scientists with an overview of developments in the controlled-drinking literature, primarily since 2000. A brief description of the controversy surrounding controlled drinking provides a context for a discussion of various approaches to controlled drinking intervention as well as relevant clinical research.

Recent findings

Consistent with previous research, behavioral self-control training continues to be the most empirically validated controlled-drinking intervention. Recent research has focused on increasing both the accessibility/availability and efficacy of behavioral self-control training. Moderation-oriented cue exposure is a recent development in behaviorally oriented controlled drinking that yields treatment outcomes comparable to behavioral self-control training. The relative efficacy of moderation-oriented cue exposure versus behavioral self-control training may vary depending on the format of treatment delivery (group versus individual) and level of drinking severity. In general, the efficacy of both techniques does not appear to vary as a function of drinking severity but may vary as a function of drinking-related self-efficacy. Guided-self change is a relatively new and brief cognitive-behavioral intervention that has demonstrated efficacy with problem drinkers. Interventions based on harm reduction principles have decreased alcohol use in various student populations. Finally, Moderation Management is the only self-help program that supports non-abstinence goals, a feature that makes it popular with problem drinkers who are avoidant of traditional treatment services.

Summary

The controversial past of controlled drinking is slowly giving way to a hopeful future in which individuals are less likely to be forced into an abstinence-only treatment scenario. The enhanced accessibility of effective controlled-drinking interventions should significantly expand the treatment options of individuals within the full spectrum of alcohol-related problems.

Keywords

controlled drinking, behavioral self-control, moderation-oriented cue exposure, guided self-change, harm reduction

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Abbreviations

BAC	blood alcohol concentration
BASICS	Brief Alcohol Screening and Intervention for High-Risk College Student Drinkers
BSCT	behavioral self-control training
DCU	Drinker's Check Up
GSC	guided-self change
MOCE	moderation-oriented cue exposure
SHAHRP	School Health and Alcohol Harm Reduction Project

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Introduction

The disease model of alcoholism [1–4] and the folk wisdom promulgated by the Alcoholics Anonymous, or AA, fellowship [5,6] continue to greatly influence the treatment of alcohol problems in the US. Proponents of the disease model and Alcoholics Anonymous assert that excessive alcohol use is a progressive disease (also known as alcoholism) in which the ingestion of even small amounts of alcohol can lead to a loss of control. Over time, the alcoholic's excessive use of alcohol leads to an uneven and painful path of morbidity that can terminate in death. Consequently, the primary goal of most US treatment providers/agencies has focused on abstinence [7] or complete cessation of alcohol use as a means of interrupting the inexorable path of self-destructive behavior.

Despite the dominance of abstinence-focused treatment, there is an increasing tide of treatment alternatives that emphasize goals other than abstinence. This class of treatments or interventions goes by a host of names including, but not limited to, controlled drinking, reduced-risk drinking, moderated drinking, and asymptomatic drinking [8]. In the present review, we will use the term controlled drinking when making a general reference to non-abstinence interventions but will use designated nomenclature when discussing specific intervention approaches, such as behavioral self-control training (BSCT). Controlled drinking interventions emphasize the notion that a hazardous pattern of excessive alcohol consumption can be changed to a sustained pattern of relatively modest consumption that does not yield appreciable negative consequences. As a general class, these treatments do not assume that everyone who misuses alcohol can achieve a sustained pattern of safe drinking but rather acknowledges this potential outcome as an acceptable and realistic goal that is in parity with abstinence.

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The literature on controlled drinking dates back to the early 1960s and is now quite vast. The present review will make no attempt to chronicle developments spanning this entire period but rather, will be restricted primarily to the period between 2000 and 2003. Out of necessity, certain papers and research reports prior to this time will be discussed. Most notable in this regard is the following brief account of the historical literature pertaining to the 'controversy' surrounding controlled drinking. It is our hope that placing the present review of controlled drinking in a historical context will both inform and convey a sense of how much progress has been made despite the intervention technique's troubled early years.

Brief history of the controlled drinking controversy

The controversy surrounding controlled drinking has waxed and waned for most of the past 50 years. While it has mostly waned in the past 10–15 years, it is now widely acknowledged that most of the early debate was associated with three important defining events [9–11]. The first event was D.L. Davies' publication of a report indicating that seven of 97 serious 'alcoholics' at Maudsley Hospital, London, UK were able to control their alcohol consumption over a 7–11-year follow-up period [12]. This important first event was inconsistent with the prevailing European belief that abstinence was the only viable treatment goal. As several authors have noted [10,13], most of the numerous published responses to the Davies findings were largely negative or dismissive. While the overall influence of the Davies article was modest, it did set the stage for several subsequent confirmatory reports on controlled drinking.

The second defining event was the publication of the Rand Report on 18-month follow-up outcomes of men receiving abstinence-focused treatment at 45 National Institute on Alcohol Abuse and Alcoholism-funded centers across the US [14]. Aside from documenting a high improvement rate, the authors noted that 22% of the improved men were reporting non-problematic drinking. They also noted that relapse to problematic drinking was no more likely amongst those with a controlled drinking outcome than those with an abstinence outcome, thereby mitigating the argument that moderate drinking outcomes are unstable and prone to relapse. Additional evidence for the stability of the moderate drinking outcomes was marshaled by a 4-year follow-up of the Rand study [15] in which 18% of the patients were found to be drinking moderately (i.e. without problems or symptoms of dependence). Collectively, these reports were difficult to dismiss because of the national scale of the study, the participation of prestigious research organizations, and the extensive coverage by the popular media. Nonetheless, numerous challenges and critical responses to the Rand Reports were forwarded, most of them faulting the research on methodological grounds. Clearly, the debate surrounding the controlled drinking controversy had intensified.

The third and most divisive event concerning controlled drinking pertains to a series of reports by psychologists Mark and Linda Sobell in the early to mid 1970s. These treatment studies attracted a great deal of ideologically motivated criticism that, at times, was more vitriolic than scholarly [16–19]. Briefly, the Sobells' initial investigational report [20] and two follow-up reports [21,22] indicated that severe alcoholics could be trained to moderate their drinking and that persons so trained ($n = 40$) had better outcomes at 2-year follow-up (functioning well for 85% of days) than those who received standard abstinence-focused treatment ($n = 30$; functioning well for 42% of days). A 3-year follow-up study of the Sobells' subjects [23] indicated that moderate drinking participants maintained superior drinking and adjustment outcomes than abstinence-oriented participants. What sets the Sobells' work apart from the numerous studies that preceded and followed was that the integrity of their scientific and professional conduct was questioned [16,17,19,24]. Importantly, a number of impartial panels/committees convened to review the Sobells' work ultimately exonerated them of any misconduct [18]. While a more subdued version of 'the controversy' has persisted to the present day, there is growing consensus in the research arena that controlled drinking is a viable outcome for people who misuse alcohol [25].

Controlled drinking strategies early in the new millennium

As already noted, the present review of the controlled-drinking literature will emphasize treatment developments that have occurred over the last 3 years. To organize the review, it became apparent that there was a need to define what constitutes a controlled-drinking intervention. It was concluded that any treatment strategy or intervention that addressed an alcohol-related problem and which did not require abstinence as a treatment/intervention goal should be included. Thus, not only should interventions targeting either treatment-seeking alcohol dependent individuals or problem drinkers be considered but also interventions that address alcohol-related problems such as binge drinking in college students. Accordingly, the following discussion is organized by intervention type as follows: (1) BSCT; (2) moderation-oriented cue exposure (MOCE); (3) guided self-change (GSC) treatment; and (4) harm reduction. For each intervention, we provide a general description of its conceptual underpinnings, procedures involved in its application, and recent/relevant clinical research pertaining to its efficacy. On a final note, we will briefly comment on a relatively new non-Alcoholics

Anonymous self-help approach to recovery, Moderation Management, which is specifically inclusive of individuals who are interested in controlling their drinking.

Behavioral self-control training

Behavioral self-control training is a multi-component behavioral intervention for teaching skills that target controlled drinking as a treatment goal [26]. While variants of BSCT exist [27], it typically consists of, but is not restricted to, the following treatment elements: (1) self-monitoring of drinking and urges to drink; (2) specific goal setting; (3) rate control of alcohol consumption and drink refusal; (4) behavioral contracting in which reward and consequences for goal adherence are specified; (5) identification and management of triggers for excessive drinking; (6) functional analysis of drinking behavior; and (7) relapse prevention training [26]. Earlier forms of BSCT attempted to train individuals to estimate their blood alcohol concentration (BAC), and thereby enhancing recognition of impending intoxication. However, this component is no longer considered an essential feature of BSCT because of difficulties associated with using subjective experience to estimate BAC [28]. Overall, BSCT employs a range of behavioral strategies (e.g. self-monitoring, rate control, drink refusal) to regulate both drinking behavior and urges in order to achieve and maintain adherence to specific drinking goals.

BSCT is by far the most intensely studied controlled-drinking treatment approach, with more than 30 studies published to date. Walters' meta-analysis [29] of randomized controlled trials published between 1984 and 1997 indicated that BSCT was superior, relative to alternative non-abstinence interventions and no intervention, on measures of alcohol consumption and drinking-related problems. The analysis also suggested that BSCT outcomes tended to be superior to abstinence-oriented interventions, albeit not significantly. Walters attributed this lack of significance to the relatively low number of studies comparing BSCT with an abstinence-oriented intervention ($n = 6$). This study also noted that BSCT was equally effective for persons with moderate and severe impairment (either problem drinkers or alcohol dependent). Outcomes assessed at or after 1 year of follow-up were comparable between BSCT and abstinence interventions, indicating similar lasting treatment effects. In sum, Walters' review, together with that of other investigators [30], indicates that BSCT is a highly effective treatment for moderate to severe alcohol-related problems.

While the effectiveness of BSCT has been well documented, more recent research has examined methods of enhancing either its accessibility and cost-effectiveness or its therapeutic effectiveness. With respect to accessibility and cost-effectiveness, a study by Hester and Delaney [31] found that 40 heavy drinkers who were administered a personal computer-based version of BSCT evidenced significant reductions in drinking behavior (i.e. standard drinks, mean peak BAC per week and mean drinking days per week) post-treatment and at a 10-week and 1-year follow-up assessment. To illustrate the size of the observed effects, the mean number of drinking days per week pre-treatment was 5.1 whereas at 12-month follow-up it was 3.5. This corresponded to a mean reduction of 20.1 standard drinks per week from pretreatment (mean, 38.7) to 12-month follow-up (mean, 18.6). It is also noteworthy that the use of other drugs (e.g. marijuana, cocaine) did not adversely affect treatment outcome. Whereas greater alcohol use occurred in participants who reported use of other drugs at intake, they exhibited a non-significant trend towards a greater reduction of alcohol use after treatment. The treatment-related decline in alcohol consumption was not offset by a compensatory increase in other drug use and, in fact, there was some evidence of a decrease. Finally, the authors note that the effect sizes observed with the personal computer-based version of BSCT were comparable in magnitude to the effect sizes achieved in studies in which BSCT was delivered by a therapist or via a self-help manual with minimal therapist supervision.

There has been little research on ways to bolster the therapeutic efficacy of BSCT. However, a recent study by Rubio and colleagues [32] examined the possibility that the opioid antagonist naltrexone could augment BSCT outcomes. Their study was based on two lines of research that suggested that naltrexone might be a beneficial adjunct to a controlled-drinking intervention. First, several studies in which naltrexone was used in the context of an abstinence focused therapy have variously reported reduced craving and drinking, decreased likelihood of heavy drinking, and increased latency to relapse [33–38]. Second, two uncontrolled open studies [39,40] that were not aimed at abstinence suggested that naltrexone and a brief intervention can reduce consumption in early problem drinkers.

In the Rubio *et al.* study, mild-to-moderate alcohol-dependent men without comorbid psychiatric disorder were randomly assigned to receive either naltrexone and BSCT ($n = 30$) or BSCT alone ($n = 30$). During treatment, both groups evidenced similar levels of drinking but individuals receiving the combined treatment reported lower craving. At 1-year follow-up, the number of heavy drinking days, number of drinks and craving was lower in the naltrexone treated group. An examination of outcomes for those men in each group that reported heavy drinking days (i.e. more than three drinks per day) during treatment indicated that men receiving naltrex-

one reported fewer drinking days, a lower total number of drinks and fewer total drinks on heavy drinking days. Regardless of treatment received, approximately 60% of men in the study reported no heavy drinking days at 1-year follow-up.

The literature on BSCT, old and new, is unequivocal with regard to its efficacy. BSCT produces robust reductions in drinking behavior among individuals with mild to severe alcohol problems. Importantly, these treatment gains do appear to persist over time and are no less stable than treatment gains attained via abstinence-focused treatment. Some very recent evidence indicates that a computer-based version of BSCT can produce substantial reductions in alcohol consumption, at least with mild-to-moderately impaired individuals. This particular mode of treatment delivery has several potential advantages over therapist-delivered BSCT including decreased cost, increased accessibility, enhanced convenience and efficiency afforded by the self-administration format, and lower perceived or real treatment-related stigma (the harm reduction section below discusses computer-based treatment further). Future studies should focus on the assessment of the relative therapeutic benefit, cost effectiveness and client satisfaction of computer- versus therapist-delivered BSCT. There is also some evidence that the treatment benefits of BSCT may be enhanced by concurrent administration of pharmacological agents that serve to moderate alcohol consumption (e.g. naltrexone). The positive findings with male problem drinkers are encouraging and should be extended to women, ethnic minorities and individuals with psychiatric comorbidities. Other related pharmacological agents should also be investigated (e.g. acamprosate).

Moderation-oriented cue exposure

MOCE is a variant of cue exposure treatment for alcohol dependence [41] and is specifically designed to train moderation of alcohol consumption. In general, cue exposure is based on the assumption that cues associated with alcohol consumption acquire the capacity to elicit conditioned responses that bear a functional relationship to craving for alcohol. Cue exposure treatment presumably exerts it therapeutic effects via unreinforced exposures to these cues (i.e. Pavlovian extinction) in an effort to reduce conditioned responses associated with the motivation to drink. The treatment involves systematically exposing patients to cues, such as the sight and smell of their preferred beverage, without being allowed to consume the beverage. While controlled clinical trials of cue exposure aimed at abstinence have not demonstrated a clear superiority over comparison treatments, they have generally shown cue exposure to decrease alcohol consumption and increase the latency to relapse during follow-up [42,43]. Since cue exposure does confer some moderation benefits, it seemed logical that it might be profitably combined with a non-abstinence treatment goal.

Three controlled trials comparing MOCE and BSCT have been conducted. In the first trial [44], problem drinkers were randomly assigned to receive 6, 90-min sessions of either MOCE ($n = 22$) or a modified version of BSCT ($n = 20$) in group format. MOCE incorporated therapist-guided consumption of priming doses of alcohol (i.e. three standard drinks for men and two for women) to enhance learning of moderate alcohol use and to diminish desire to drink excessively. It also included directed homework practice in which patients (1) identified one or two 'natural' situations (occurring between treatment sessions) in which controlled drinking would be an achievable challenge, and (2) were instructed to have the same number of priming drinks as in a session and then refrain from further drinking. The results at 6-month follow-up indicated that MOCE was superior to BSCT in reducing the frequency of drinking bouts and amount consumed per drinking bout. The authors also noted that 6-month follow-up drinking was not predicted by pretreatment measures of drinking frequency, thereby indicating that treatment responsiveness did not vary as a function of pretreatment drinking severity. Remarkably, drinking outcomes at 6-month follow-up were strongly predicted (mean $r = -0.8$) by a self-efficacy measure [45••] that assessed confidence in ability to control drinking in difficult situations. This latter finding parallels previous research identifying an association between drinking-related self-efficacy and treatment outcome [46,47].

Two more recent studies comparing MOCE and BSCT found substantial but similar reductions in drinking outcome [48,49]. In these two trials, MOCE and BSCT were delivered in an individual therapy format, a difference that may account for the differential treatment effects observed in the first study. While it is possible that the group format employed in the first study increased the efficacy of MOCE relative to BSCT, there is no obvious and compelling explanation why this might be true. Similar to the first study, these two also failed to identify any association between pretreatment drinking severity and treatment outcome. In one of the studies [49], a sub-sample of individuals with pre-treatment levels of dependence above the commonly accepted cut-point for a moderation goal evidenced drinking outcomes comparably favorable to those below the cut-point. This same subsample of more dependent drinkers reported significantly less drinks per drinking day and greater percent days abstinent at 6-month follow-up if they received BSCT rather than MOCE, thereby conferring a therapeutic advantage to BSCT with more severely dependent persons.

The results of three controlled trials comparing MOCE with BSCT suggests that both treatments produce substantial reductions in drinking behavior at 6–8-month follow-up. These studies also uniformly indicate that individuals with a broad range of drinking problem severity benefit from both MOCE and BSCT. With regard to differential treatment effects, it appears that MOCE may offer some advantage over BSCT when the treatments are offered in a group format. Conversely, severely dependent individuals may benefit more from individual BSCT than MOCE. Confidence in the differential treatment effects observed in these three studies should remain modest until the effects have been replicated in studies with longer follow-up. Future studies should examine the relative merit of a combined MOCE and BSCT treatment relative to either treatment alone. It might also be beneficial to develop a computer-based version of MOCE that could be compared with the existing PC version of BSCT described above. Such efforts would substantially increase the accessibility of empirically validated controlled-drinking interventions.

Guided self-change

GSC is a brief cognitive-behavioral motivational intervention designed to assist problem drinkers to recognize and use their own personal strengths to resolve drinking problems [50]. GSC typically targets problem drinkers with either identifiable alcohol use problems or those with mild-moderate alcohol dependence but without severe alcohol consequences or withdrawal symptoms [51]. The conceptual underpinnings of GSC are based on the finding that a significant proportion of individuals who misuse alcohol can and do recover naturally as a result of self-change [51]. This self-change process is bolstered in GSC via the application of motivational strategies [52] such as advice-giving, removing barriers to change and decreasing the attractiveness of drinking.

Increased interest in GSC and similar interventions based on the natural recovery process stems from the observation that there are four times as many problem drinkers as severely dependent drinkers [53] and yet, most traditional treatments target severely dependent drinkers [50]. Problem drinkers are less likely to seek traditional treatment services because they tend not to view themselves as alcoholic and, therefore, they view such treatments as unappealing or inappropriate [50]. The lack of treatment alternatives means that problem drinkers are frequently left untreated and are underserved [54]. Guided self-change may be more attractive to these individuals because it is a non-intensive treatment alternative that aids the problem drinker in asserting control over his or her behavior [50].

Another reason why GSC may be attractive to problem drinkers pertains to its compatibility with both abstinence and non-abstinence treatment goals. There is some evidence suggesting that problem drinkers are less successful in abstinence-focused traditional treatment than moderation-focused treatment [27,55]. For example, a study comparing drinking outcomes in abstinence versus moderation treatment goals found that although problem drinkers with either goal significantly reduced their drinking over the 2-year follow-up, individuals with an abstinence goal drank significantly more during treatment than participants who received counseling on how to regulate their drinking [27]. It may be that the occurrence of any drinking represents a more significant deviation from an abstinence than a non-abstinence goal, thereby producing a negative affective state (i.e. disappointment, frustration) that drives further drinking. In any case, it appears that a moderation goal may help reduce drinking earlier in the treatment process, at least for some problem drinkers.

The manualized version of GSC [50] consists of an initial assessment and four 60-min individual treatment sessions, followed by two follow-up telephone calls. In the initial assessment, drinking behavior, high risk drinking situations and self-efficacy are assessed and drinking goals are identified (e.g. abstinence or moderation). Treatment sessions address the content of two reading assignments, the first of which presents a general behavioral analysis of drinking, and the second of which focuses on problem-solving skills and relapse prevention. Each reading is followed by two homework assignments involving identification and analysis of high- versus low-risk problem drinking situations, generating a set of options or alternatives to high-risk drinking situations and their likely consequences, and completing a checklist that asks about lifestyle behaviors as they relate to alcohol use. As noted previously, motivational strategies [52] are used to enhance commitment to change while cognitive relapse procedures are taught to assist in identifying triggers and facilitating recovery from relapse [56]. Individuals with medical contraindications (e.g. severe liver disease) are advised to adopt an abstinence goal, while clients choosing a moderation goal are taught drinking guidelines (e.g. consume no more than three standard drinks/day on four or fewer days/week, drink at a rate of no more than one drink per hour if driving).

The efficacy of GSC has been previously documented in studies showing a 53.8% reduction in alcohol consumption following intervention and significantly higher abstinence rates 1 year after treatment [50]. Only three investigations examining the effectiveness of GSC have been conducted since 2000. In the first study [56], problem drinkers and their spouses were randomly assigned to either a directed social support condition or a natural support condition. The social support condition involved teaching the spouse to play an active role in

recovery by being supportive and helping to identify and carry out plans for dealing with high risk drinking situations. The natural support condition involved giving the spouse reading materials without instruction for being supportive. All clients received an identical program of guided self-change. Although the two groups did not differ on indices of drinking by level of spousal social support, participants from both groups improved significantly from pretreatment to the end of treatment in that they exhibited a significant decrease in drinking, a decrease in heavy drinking days (five to nine drinks), and a decrease in very heavy drinking days ($\geqslant$10 drinks). Results also showed that abstinent days doubled (e.g. from 22 to 45%) and positive gains were maintained over the 1-year follow-up.

In the second study [57], investigators examined whether four sessions of GSC were more effective for reducing alcohol consumption and alcohol-related problems than one session of advice. Problem drinkers in the advice-only condition received assessment and one session of feedback/advice guided by motivation enhancement principles, including a 24-page self-help manual. Participants in both conditions reported significant and similar reductions in number of standard drinks, degree of alcohol dependence, negative consequences, and significant improvements in health-related quality of life. However, most outcome measures tended to favor the four-session GSC condition and patients in GSC also expressed significantly greater satisfaction with GSC treatment.

To this point, the discussion has focused on the efficacy of GSC when delivered via the individual/couple therapy format. However, the Sobells and their colleagues have recently conducted a study of GSC [58] delivered as a community-level mail intervention. From a public health perspective, this intervention was designed to promote community-wide self-change among problem drinkers who were resistant to using formal treatment services. The supporting logic for the study was based on evidence showing that one of the major pathways to recovery from addiction is natural recovery via self-help behaviors without formal treatment [51].

The intervention offered free and confidential treatment to individuals with alcohol use problems through the mail. Participants responded to community advertisements soliciting the public to call for drinking-related treatment materials that could be completed at home. The advertisements were designed to be attractive to problem drinkers because they (1) were free, (2) referred to 'changing' one's drinking rather than forcing an abstinence goal, and (3) indicated that a sizable number of individuals can change their drinking on their own. Respondents who met screening criteria over the phone received an assessment packet in the mail that was to be completed and returned. Participants were randomly assigned to either a motivational enhancement/personalized feedback condition or a bibliotherapy/drinking guidelines condition. The motivational enhancement condition consisted of feedback on drinking levels in comparison with national norms and health risks, high-risk situations, and motivation for change, while the bibliotherapy condition consisted of two alcohol informational packets containing low-risk drinking guidelines.

The 1-year follow-up results revealed significant declines for mean number of drinking days per week (28.3% decline), drinks per drinking day, drinks per week, number of binge drinking days (e.g. five or more drinks consumed, 33.2% decline) and number of alcohol-related consequences, with no differences between the motivational and bibliotherapy conditions. The absence of differential treatment effects indicates that the more costly and time intensive personalized feedback was not required for significant reductions in drinking and alcohol-related consequences. On a related note, three of the greatest benefits of this type of intervention were its low cost, its amenability to being delivered to large numbers of problem drinkers who are not able/willing to attend formal treatment, and its yield of significant health benefits.

Overall, the results of the most recent research on GSC [56] are consistent with previous research [59] in terms of an overall reduction in amount of alcohol consumed (48.5% reduction), an increase in abstinent days, and a decrease in days of heavy drinking. Especially noteworthy were the observed increases in abstinence despite the fact that many participants chose moderation goals. The treatment effects of the community level intervention based on GSC were substantial and lasting. Collectively, studies of GSC conform with those of previous studies showing that the requirement of abstinence is not necessary for the problem drinker to achieve increases in abstinent days and reductions in alcohol consumption [27,55,60,61].

Harm reduction

Harm reduction in the area of controlled drinking [9] has been conceptualized as an attempt at 'meeting people where they are' with respect to their motivation to change high-risk behavior. Rather than focusing on the elimination of high-risk behaviors, the harm reduction approach tends to favor reducing the harm or risk of harm [62]. While the present discussion will focus on alcohol problems, harm reduction approaches have been used to address a range of public health problems (e.g. methadone maintenance for opiate dependence and needle exchange program to reduce HIV infection

among injection drug users [62,63]). Like GSC, harm reduction is often targeted towards individuals who would, ordinarily, 'fall through the cracks' or never present themselves for treatment.

Harm reduction began in 1980 with the 'Junkiebond' movement in Rotterdam, The Netherlands. This movement evolved into a trade union that was formed to represent the needs and health concerns of Dutch hard drug users. The philosophy of the Junkiebond focused on the understanding that drug users know best what their needs are in terms of health care and housing and so they should be actively involved in deliberations affecting them. As 'junkie' league groups spread throughout The Netherlands, addicts' concerns about dirty needle use among their peers led to the establishment of the first needle exchange program in Amsterdam in 1984. This program provided disposable needles and syringes and collected used needles with the aim of reducing the spread of HIV infection among injection drug users [64].

Borrowing from the harm reduction philosophy in Europe, advocates of harm reduction began applying its tenets to alcohol misuse problems in the US. Controversy was not far behind as harm reduction approaches did not require commitment to an abstinence goal [65]. Although adherents of the dominant disease model viewed this as a significant weakness, harm reduction proponents characterized their methods as more pragmatic, compassionate and inclusive [66]. Harm reduction rejects the 'all or nothing' abstinence approach based on evidence that alcohol misuse is distributed along a continuum rather than existing as a binary (present or absent) disease state [67]. By lowering the threshold for treatment entry, harm reduction encourages greater numbers of problem users to seek and access treatment.

From a harm reduction perspective, the zero-tolerance message communicated by abstinence-focused treatment programs is unrealistic and impractical [65]. It fails to acknowledge that some problem users (e.g. college students) are unwilling to abstain [68]. Harm reduction accepts this reality and seeks to reduce the negative consequences associated with continued use. By offering a choice of treatment goals, clients are more likely to remain in treatment and do not experience an increased risk of uncontrolled drinking [9]. A likely benefit of remaining in treatment is that it affords more opportunity for problem users to modify their drinking behavior. This point was illustrated well in a recent study [60] in which chronically alcohol-dependent individuals who were given the choice between abstinence and moderation and who initially chose moderation, often changed their goal to abstinence after 4 weeks of treatment. Thus, the harm reduction principle of goal choice can increase treatment retention and foster important changes in drinking, either in the form of moderation or abstinence.

It can and has been asserted that all controlled-drinking strategies could be subsumed under a heading of harm reduction [65]. However, the development of some controlled approaches (e.g. BSCT) significantly predated the presence of the harm reduction movement in the US and Europe. Furthermore, although BSCT is consistent with a harm reduction perspective, it cannot be said that it is a direct conceptual product of it. For these reasons and for general organizational purposes, we elected to present harm reduction approaches as a special case of controlled drinking.

Prevalence data on alcohol use indicate that 82% of 12th graders and 80% of college students drink alcohol [69], with approximately 20% of the latter group being identified as problem drinkers [70]. As a group, college students are at especially high risk to engage in binge drinking and experience alcohol related consequences [71]. Fifty-four million Americans above the age of 12 years report consuming five or more drinks at least once in the past month (i.e. binge drinking) and 15.9 million report consuming five or more drinks on five or more days in the past month (i.e. heavy drinking) [72]. According to a 1992 survey [73], 11% of American men and 4% of American women met criteria for alcohol dependence or abuse during the past year. While these prevalence data represent clear evidence of substantial high-risk drinking among adolescents and adults, harm reduction interventions that could potentially address the broad spectrum of alcohol misuse in the US have not attracted the level of interest observed in Europe and Australia [64,74].

Harm reduction in school-age children and adolescents

As noted above, adolescents and young adults are particularly at high risk for alcohol-related problems and injuries (e.g. unsafe driving, academic problems, and family conflict) [53,75]. Historically, few interventions have had a positive impact on alcohol misuse and its associated consequences in young people, possibly because they focus too heavily on consumption and abstinence rather than emphasizing individual choice and risk reduction. The poor outcome of the Drug Abuse Resistance Education Program (DARE) is an unfortunate reminder that 'zero-tolerance' programs sponsored by institutional authorities (e.g. the police) are likely to fail [76].

However, recent studies have documented the effectiveness of harm reduction approaches in reducing the amount of harm associated with alcohol misuse in

primary and secondary school students [65]. For example, the School Health and Alcohol Harm Reduction Project (SHAHRP), conducted in Australia, is a large-scale intervention study aimed at reducing alcohol-related harm in secondary school students [77]. Students in the SHAHRP program received alcohol education, drinking choice information, skills training, assertiveness training, and other activities designed to minimize harm associated with the use of alcohol. Students receiving the harm reduction intervention were compared with a control group that received standard alcohol education classes. Results obtained over a 3-year period showed that students in the SHAHRP intervention exhibited a significantly lower level of alcohol consumption and decreased harm (e.g. hangovers, fighting, and troubles at school) associated with alcohol use compared with students in the control condition. Similar programs administered to children in US schools have reported either sustained reduction in alcohol use from junior high through the end of high school [78] or small reductions in the normative increases in alcohol use during adolescence [79].

Harm reduction in college students

Marlatt and colleagues [80] examined the efficacy of an intervention called the Brief Alcohol Screening and Intervention for High-Risk College Student Drinkers (BASICS). High-risk drinking was defined as drinking at least monthly and at least five to six drinks per drinking occasion in the past month and reporting at least three alcohol-related problems on three to five occasions in the past 3 years. Rather than focusing on abstinence, the BASICS intervention [81] targeted reductions in both alcohol use and alcohol-related negative consequences. High-risk college students were randomly assigned to receive either BASICS or assessment only. Those in the BASICS intervention received personalized feedback based on assessment data containing information about how their drinking levels compared with other college students, information regarding BAC, risk factors, alcohol-related consequences, tolerance, and methods for drinking moderately. BASICS was delivered in a motivational interviewing style [52] that was both non-confrontational and empathic, but geared toward highlighting discrepancies between heavy drinking and achievement of life goals. At 2-year follow-up, the BASICS students showed significantly reduced drinking rates and fewer harmful consequences compared with high-risk, assessment-only students.

To examine the clinical significance of the changes in drinking behavior and related consequences observed in the Marlatt *et al.* [80] study above, a follow-up study was performed involving both of the previously studied high-risk college student groups (BASICS and assessment-only) and a non-high-risk 'functional' comparison group [82]. Compared with the assessment-only high-risk drinking students, the BASICS students evidenced greater reductions in drinking and alcohol-related problems. According to Marlatt and Witkiewitz [65], the BASICS program may have altered the trajectory of drinking behavior of the BASICS students such that it more closely resembled the moderation trajectory of the non-high-risk functional control participants. The relatively dissimilar trajectories of the assessment-only group and the non-high-risk functional control participants suggested deterioration in the high-risk group.

A second follow-up report on the high-risk drinkers in the Marlatt *et al.* study [80] examined the impact of the BASICS intervention on alcohol use and alcohol-related problems at 4-year follow-up [83]. The results indicated that while BASICS had only a modest effect on drinking, it significantly reduced negative consequences 4 years following the initial intervention. Specifically, 67% of the high-risk BASICS students reported good outcomes versus 55% in the high-risk control students. In addition, dependence symptoms were more likely to decrease and less likely to increase for participants in BASICS than for the high-risk controls. This was the first study to demonstrate long lasting benefits of a brief, non-abstinence intervention for high-risk college drinking.

In a randomized controlled trial targeting high-risk college drinkers, Murphy and colleagues [84] compared the BASICS program with an educational intervention and an assessment-only control condition. Although there were no overall significant differences between groups at the 3-month follow-up, the BASICS group showed a significant advantage over the education and control groups for students who were heavy drinkers. Students in BASICS who drank at least 25 drinks per week and engaged in binge drinking at least three to four nights per week showed greater reductions in weekly alcohol consumption and participated in fewer binge drinking days compared with similar individuals in the education and control groups. Heavy drinkers in BASICS also maintained their comparatively large reductions in amount of alcohol consumed and number of binge drinking days at the 9-month follow-up.

Internet/PC-based harm reduction

It was noted above that a computer-based version of BSCT could produce substantial reductions in the drinking behavior of heavy drinkers [31]. Although not based on BSCT, Squires and Hester [85] have developed a computer-based intervention called the Drinker's Check Up (DCU). The DCU is a brief motivational intervention designed to assist clients with a goal of moderation or abstinence. This computerized treatment was designed for use with at-risk drinkers and alcohol-dependent individuals that are ambivalent about chan-

ging their drinking. The treatment is widely available, either on the Internet as a web-based application (website: http://www.drinkerscheckup.com) or as a Windows (Microsoft Corporation, Redmond, Washington, USA)-compatible PC application.

There are three components to the DCU: assessment, feedback, and decision-making modules. During the assessment component, the user is presented with a choice of questionnaires to complete. The feedback module provides (1) a severity descriptor (e.g. low, medium, high, or very high) showing the user their risk, consumption, and alcohol-related consequences, (2) an indicator as to whether the user might benefit from proceeding further with the program; and (3) quantity/frequency normative data that can be used to compare the users' drinking with population norms. During the decision-making module, users are provided with three options that are tailored according to how ready the user is to make changes. The first option allows the user who is 'not at all ready to change' to obtain a printout of their feedback summary or to view literature on the PC called 'alcohol and you' before exiting the program. The second option allows the user who is 'unsure about change' to complete a decisional balance exercise. This exercise asks users to list the benefits of making a change versus the costs of not making a change. If after completing this exercise, users are still not ready to change, they are offered an option to exit the program. The third option allows the 'ready to change' user to work on a section that will assist him or her to develop a plan of action. At this point, users are given a choice between moderation goals and abstinence. If moderation is selected, the user is given guidelines for moderate drinking including: definitions, contraindications, and an assessment designed to determine the possibility for success with the goal.

Recently, Hester, Squires and Delaney (R.K. Hester *et al.*, in preparation) conducted a controlled clinical trial of the DCU Windows program for 61 problem drinkers randomly assigned to either immediate DCU treatment or to a 4-week wait list control group. Results showed that the immediate DCU group significantly reduced alcohol consumption at the 4-week follow-up, while the delayed control group did not. At 12-month follow-up, alcohol quantity and frequency measures had declined by 50% in both the immediate and delayed DCU conditions. Squires and Hester [86••] have recently published detailed case data and outcomes of three participants from this clinical trial. The reported percent decrease in number of standard drinks from baseline to 12-month follow-up for the three participants were 100 (abstinence), 66, and 18. The results illustrate the full range of treatment effects that can be obtained with the DCU. The results of the clinical trial are as encouraging as those described above for the computer-based version of BSCT, and together they suggest that computerized controlled-drinking interventions have considerable potential in terms of treatment gains, cost, accessibility and efficiency.

In sum, harm reduction approaches to alcohol misuse have successfully impacted the serious problem of alcohol misuse in school age and college students in the US and abroad. Although the emphasis of harm reduction approaches is on reducing harm secondary to alcohol misuse rather than 'moderation' of use *per se*, the outcomes of these school programs (e.g. SHAHRP) show appreciable reduction in drinking. In high-risk college students, there is evidence that administering a brief intervention based on harm reduction principles can reduce both the drinking behavior and its consequences over a 2-year period. However at a 4-year follow-up, the intervention effects appear to have persisted more with respect to alcohol-related consequences than drinking behavior. Perhaps 'booster' sessions provided every 2 years might promote maintenance of the 'moderation' effect on drinking behavior. Lastly, the internet/PC-based DCU is an excellent example of how to increase the availability of harm reduction procedures that specifically address 'moderation' of alcohol use or abstinence. Although limited, existing research with this and similar PC-based applications demonstrate problem drinkers can moderate their drinking with little or no involvement from health care professionals.

Controlled-drinking self-help

There are a considerable number of self-help organizations dedicated to helping individuals with alcohol-related problems. While the oldest, largest and most commonly accessed of these organizations is Alcoholics Anonymous [87], there are several alternatives including: Self Management and Recovery Training, or SMART; Women for Sobriety; Men for Sobriety; Secular Organization for Sobriety, or SOS; Rational Recovery, or RR; and Moderation Management, or MM. Of these programs, only Moderation Management supports moderation or controlled drinking [88•].

Moderation Management [88•,89,90] is a nine-step self-help program designed to assist individuals with mild to moderate levels of alcohol dependence achieve either moderation or abstinence. The program views moderation as a sensible and natural first step to change harmful drinking. Problem drinkers give themselves 30 days of abstinence before testing whether moderation will work. If a moderation goal proves to be unattainable, a goal of abstinence is typically recommended.

There are approximately 20 Moderation Management groups actively meeting across the US and Canada, as

well as a number of Internet-based forums [88•]. (Moderation Management information is available online at http://www.moderation.org.) At meetings, members provide each other with support, share experiences, and review Moderation Management guidelines for controlled drinking. Outside of the meetings, members are encouraged to examine how alcohol has affected their lives, identify and focus on life goals, and maintain an awareness of the guidelines and limits for moderate drinking. The guidelines for controlled drinking according to Moderation Management are as follows: (1) eat something before, during, or soon after drinking; (2) do not drink for more than an hour or two on any occasion; (3) do not drink faster than one drink per half-hour; (4) do not exceed the 0.055% BAC moderate drinking limit; (5) do not drink in situations that would endanger self or others; (6) abstain at least 3–4 days per week; (7) do not consume more than three drinks on any day and nine drinks per week for women; for men, do not consume more than four drinks on any day and 14 drinks per week; (8) for older adults (55+), do not drink more than one drink per day [91].

There are no published outcomes studies evaluating the effectiveness of Moderation Management. However, two recent studies [88•,92] attempted to identify characteristics and motives of problem drinkers who seek help from the program. Together, the two studies contain survey results from 644 individuals who either attended face-to-face or on-line meetings [92] or who contacted the national Moderation Management telephone information and referral service over a 1-year period [88•]. The findings indicated that Moderation Management attracts mostly Caucasians (over 90%) who are generally below the age of 50 years (over 66%). They tended to have less severe drinking problems, were more educated, and have greater economic resources, than the majority of persons in addiction self-help groups. Less than 25% of meeting attendees had ever received professional treatment services. Although reasons for interest in Moderation Management varied, callers frequently expressed that the service was a better match for their (1) drinking problem, (2) life experiences, and (3) view of the importance of personal control in managing their drinking. The findings suggest that Moderation Management tends to attract young, white, mid to high socioeconomic status problem drinkers who are unlikely to use traditional, abstinence-based self-help services.

Conclusion

Of the CD strategies we reviewed, BSCT has the most extensive history of evaluation in controlled clinical trials. Results of studies conducted in the past 3 years echo those conducted over the preceding 25 years; BSCT is a highly efficacious treatment for alcohol-related problems. Recent studies suggest that naltrexone may boost the efficacy of BSCT, especially in heavier drinkers, and that computer-based versions of BSCT may substantially increase the accessibility and cost-effectiveness without sacrificing efficacy when delivered by a therapist. More generally, the Internet accessible DCU intervention and the on-line forums of Moderation Management have the potential to greatly increased access to moderation-oriented approaches to problematic alcohol use. The Sobells' community-level self-change intervention, delivered via mail, represents yet another attempt to increase accessibility to moderation-friendly services.

MOCE is one of the newest developments in CD. All three extant controlled trials involving MOCE have employed BSCT as a comparison treatment. Overall, both treatments were found to produce substantial reductions in drinking over a 6–8-month follow-up. Although few differential treatment effects were identified, it appears that MOCE might yield greater reductions in alcohol consumption when delivered in a group format. Since most treatment services in the US are delivered in a group format, this finding could have considerable practical significance by guiding decision making about optimal treatment type–format combinations. Another potential differential treatment effect was that BSCT might be more effective than MOCE with heavier drinkers. This, together with the observation that naltrexone may enhance BSCT's effectiveness with heavy drinkers, suggests that naltrexone combined with BSCT, rather than MOCE, might be the optimal treatment combination for individuals who have a severe drinking problem and are seeking a moderation goal. It is also noteworthy that one of the MOCE studies identified a strong association between drinking behavior at 6-month follow-up and a self-efficacy measure assessing an individual's ability to control their drinking obtained 6 months earlier. One potential interpretation of this association is that a CD treatment will be effective to the extent that it enhances an individual's confidence in their ability to control drinking.

The severity of dependence hypothesis [93] states that the more problematic a person's alcohol use is, the less likely they will be able to control their drinking. While this hypothesis has garnered support in previous reviews of the literature [94], Walters' more recent review [29] has questioned the strength of this conclusion. His review of 17 controlled clinical trials of BSCT found no evidence of an association between severity of drinking problem and controlled drinking. Moreover, the present review of the BSCT and MOCE literature failed to identify one study confirming this association. In fact, all three of the reviewed controlled trials comparing MOCE with BSCT specifically reported no relationship between

severity of alcohol use and drinking outcome. As already noted, the best overall predictor of outcome was a measure of drinking-related self-efficacy. It might be the case that understanding drinking outcomes in controlled-drinking studies, both short and long term, might be better served by monitoring changes in efficacy over the course of treatment rather than focusing on static pretreatment factors like drinking severity.

GSC is a relatively new moderation-oriented intervention that has received considerable empirical validation. A recent study examining the contribution of social support to GSC reported significant changes in drinking outcome, none of which were uniquely associated with social support. Another study reported drinking outcomes that non-significantly favored GSC (four sessions) over a single session of advice combined with a self-help manual. Importantly, study participants preferred GSC to the briefer intervention. The last of three recent studies was unique in that it compared the effects of two community level mail-out, GSC-based interventions for problem drinking. Significant reductions in drinking-related outcomes at 1-year follow-up were reported for both treatments. One of the greatest strengths of this study was that it showed that an efficacious problem drinking intervention could be delivered inexpensively to a large number of individuals. A logical extension of this community-based study would be to examine the effectiveness of an Internet/PC-based version of GSC that problem drinkers could access on-line.

The problem of alcohol misuse in adolescents and college students is nearly epidemic in proportion. The application of harm reduction approaches to school-age children, adolescents and college students have been shown to significantly impact both drinking behavior and alcohol-related problems. In high-risk college students, it appears that the impact of brief interventions on drinking behavior *per se* may diminish over extended periods of time (i.e. 4 years). While 'booster' sessions every year or two might enhance maintenance of reduced drinking behavior, it would be interesting to determine if low-risk college peers could be trained to aid in the delivery of booster sessions (i.e. developing a buddy system). Not only could this substantially reduce the cost of delivering the booster sessions, but it also might enhance the effectiveness of the program because college peers who are role models for moderate drinking might be perceived as more credible, trustworthy and understanding than individuals from outside the student body. As already noted, the Internet/PC-based DCU intervention has the potential to greatly enhance the cost effectiveness and availability of controlled drinking. Once the efficacy of DCU has been firmly established, it might be potentially valuable to determine if a modified version of the application could be used to reduce alcohol misuse on US college campuses.

We are encouraged by some important developments in the last few years that have promise with regard to enhancing the utility and accessibility of this general class of interventions. While the overall tone of the present review is one of optimism, the stormy past of the controlled drinking treatment approach continues to have a disruptive effect on the social, political and economic factors that impact contemporary treatment research and service delivery. Searles [95] has noted that challenges to conventional wisdom, like controlled drinking, tend to attract harsh opposition that is remarkably persistent even in the face of compelling scientific evidence. He refers to this type of opposition as a 'kind of scientific fascism'. Both the scientific community and society in general appear to have an affinity for this kind of 'fascism', and this affinity has not abated with the passage of time. To illustrate, a 1998 meta-analytic study published in a respected psychological journal [96] attracted a litany of criticism including the first-ever, unanimous congressional vote to condemn the primary findings of a scientific publication [97]. The article questioned the strength of association between self-reported history of child sexual assault and psychopathology. Among other things, the authors were accused of trying to normalize pedophilia. Regardless of the belief/value being challenged, it is likely that the machinery of science will have to work overtime to ensure that reason and truth are not obscured by an impassioned 'herd mentality'. At least in the case of controlled drinking, the persistent efforts of clinical science have resulted in a significant expansion of treatment options for persons who misuse alcohol.

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