

***TEST OF A NEW
MODERATION TREATMENT
FOR PROBLEM DRINKING***



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EXECUTIVE SUMMARY

- 1) A randomised controlled trial was carried out to examine the effectiveness and cost-effectiveness of Moderation-oriented Cue Exposure (MOCE), a novel form of “controlled drinking” treatment for alcohol problems based on previous reports in the literature. MOCE was compared with Behavioural Self-control Training (BSCT), the standard form of moderation-oriented treatment in countries, like the UK, where the goal is an accepted part of treatment services.
- 2) The main hypothesis tested was that MOCE would be more effective than BSCT among a sample of problem drinkers aiming at a goal of moderate drinking. Two subsidiary hypotheses were also tested: (a) that MOCE would be relatively more effective than BSCT among problem drinkers with higher levels of alcohol dependence (defined as a score of 30 or above on the *Severity of Alcohol Dependence Questionnaire- Community Version*); and b) that MOCE would be relatively more effective than BSCT among problem drinkers with higher levels of impaired control over drinking (defined as those above the median on the Failed Control score of the *Impaired Control Scale*.)
- 3) From a total of 171 individuals screened, 91 clients who preferred a moderation goal to total abstinence, and who were not unsuitable for the moderation goal on other grounds, were randomly allocated to either MOCE or BSCT. These clients were either self-referred via newspaper advertisements (64%) or referred from general medical practitioners and other sources (36%). The self-referred clients were more likely to be women and to be in employment than those referred from general practitioners or other agencies, showed lower alcohol dependence and alcohol-related problem scores and were less likely to have received treatment in the past. Thus the majority of clients in the trial were problem drinkers with relatively mild problems who may have been deterred from seeking treatment through conventional channels.
- 4) Although the average level of alcohol dependence in the treatment sample was low, it included 14 clients with levels of alcohol dependence above the commonly-accepted cut-point for a moderation goal ($SADQ-C \geq 30$) and who would not normally be offered a moderation-oriented treatment programme in conventional treatment practice in the UK.

- 5) The treatment sample was, nevertheless, less impaired in terms of alcohol consumption and problems than a typical sample of problem drinkers who would normally be offered abstinence-oriented treatment in British treatment services. The sample was also higher in social stability and socio-economic status than the typical population of individuals in treatment for alcohol problems in specialist services.
- 6) In a nested, cross-over design, treatment was delivered by two therapists who had received special training. Treatment integrity was maintained by the selection of well-qualified and experienced therapists, by the use of treatment manuals and by formal assessment of a 10% random sample of tape-recorded treatment sessions. No differences in the effectiveness of the two therapists were detected in the outcome data.
- 7) Mean treatment attendance for MOCE was 7.1 sessions with a range of one to 16 sessions, while for BSCT it was 6.6 sessions with a range of one to 16 sessions. There was no statistically significant difference in the number of sessions attended between the two treatments. However, each MOCE session normally took 90 minutes compared with 60 minutes for BSCT.
- 8) At follow-up six months after the termination of treatment, a total of 77 clients were successfully contacted, giving a follow-up rate of 85%. In the analysis of treatment outcome, 39 clients who had received MOCE were compared with 38 who had received BSCT. Values for gamma-glutamyl transferase (GGT) were available at both pre-treatment assessment and follow-up for 68% of the follow-up sample and collateral reports of progress from “significant others” from 43%.
- 9) Although in the total treatment sample MOCE resulted in significantly greater improvements in global psychopathology at follow-up, differences between the treatment groups in alcohol-related outcome measures were not statistically significant. Thus the main hypothesis of the study was not confirmed. The results also suggested that BSCT was a more cost-effective treatment than MOCE. It is concluded that the trial provides no support for the replacement of BSCT by MOCE in routine treatment delivery.

- 10) Clients with higher dependence at baseline (SADQ > 29) showed a much larger reduction in drinks per drinking day if they had received BSCT than if they had received MOCE, while those with lower dependence appeared to benefit equally from both types of treatment. In addition, clients higher in dependence showed a significantly greater increase in percentage days abstinent if they had received BSCT than if they had received MOCE, while those in the lower dependence group showed a significantly larger increase in percentage days abstinent if they had received MOCE than if they had received BSCT. These findings directly contradict predictions from subsidiary hypothesis (a) above which is therefore not confirmed.
- 11) The possibility that problem drinkers showing dependence below a score of 30 on the SADQ-C can benefit more from cue exposure treatment than from cognitive-behavioural therapy (including BSCT) is strengthened by the results of a recent Australian study. A tentative explanation is also available for why those higher in dependence might benefit more from BSCT than MOCE. However, the small numbers in some of the cells of the relevant analysis in the present study suggest that these unexpected findings should be regarded very cautiously.
- 12) Also not confirmed was subsidiary hypothesis (b) above regarding the interaction between level of impaired control over drinking and the relative effectiveness of the two treatments. Considering moderation-oriented treatment as a whole, however, a significantly greater proportion of those showing low impaired control at intake achieved a full recovery (34%) than those showing high impaired control (15%) and there were also non-significant tendencies for the low impaired control group to show more “improved” outcomes and greater reductions in drinks per drinking day. This suggests that a measure of impaired control over drinking, such as the *Impaired Control Scale*, would be a better indicator of the advisability of moderation-oriented treatment than a measure of alcohol dependence.
- 13) Self-referred clients showed greater reductions in drinks per drinking day if they had received MOCE than if they had received BSCT, whereas those referred from general practitioners or other agencies showed better outcomes in this respect if they had

received BSCT. Given that self-referrals showed a lower average level of alcohol dependence at baseline, this finding may be due to the interaction between treatment modality and level of dependence noted at 10) above.

- 14) Considering the effects of both forms of treatment together, the moderation-oriented treatment delivered in the trial produced clear benefits to clients. Immediately after receiving either type of treatment, clients showed substantial decreases in alcohol consumption; average drinks per drinking day nearly halved and the average percentage of days abstinent in the previous two months was more than doubled. After treatment, 44% of clients described themselves as regular moderate drinkers and 11% saw themselves as non-drinkers. Decreases in alcohol consumption and problems were accompanied by marked improvements in psychopathology and confidence in the ability to control drinking.
- 15) The gains observed immediately after treatment had clearly been maintained at follow-up six months later. A total of 24% of clients followed-up reported a full recovery, defined either as total abstinence or as drinking without any alcohol-related problems in the previous two months. A further 23% were classified as much improved and 16% as somewhat improved, making a total of 63% with evidence of some improvement in drinking status from pre-treatment to follow-up. Significantly more clients were classified as in the “action” stage of change at follow-up than at pre-treatment. Significant changes in self-reported drinks per drinking day and percentage days abstinent from baseline to follow-up were validated by a significant decrease in levels of GGT. Outcomes from the present trial compare favourably with those from studies of moderation-oriented treatment previously reported in the literature even though the present study was conducted among a relatively more impaired sample of problem drinkers.
- 16) Again considering moderation-oriented treatment as a whole, it was found that, compared to those initially low in dependence, the higher dependence group of 14 clients showed a significantly larger reduction in drinks per drinking day and a significantly greater increase in percentage days abstinent from pre-treatment assessment to follow-up. It is

argued that this finding is unlikely to have been due to “regression towards the mean”. A conservative and cautious conclusion from the present data is that there is no evidence that clients showing higher levels of dependence at baseline, at least within the range of “high” dependence included here (SADQ-C = 30-45), benefit any less from moderation-oriented treatment than clients lower in dependence.

- 17) When attention was focussed on outcomes for the 14 clients with scores on the SADQ-C above the conventional cut-point for a moderation goal, it was found that positive outcomes were not restricted to total abstinence and that in four cases out of seven self-reports of improvements in drinking were supported by reductions in GGT from baseline to follow-up.
- 18) The validity of self-reports of drinking at follow-up was supported by statistically significant correlations between GGT levels and both drinks per drinking day and severity of alcohol problems. Despite the low number of collateral reports, there was a highly significant correlation between significant others’ reports of the extent of the client’s drinking problems at follow-up and those of the clients themselves. Both sources of confirmatory data strongly suggest that self-reports of drinking behaviour at follow-up were generally valid.
- 19) When “health care utilisation” was compared from before to after treatment, highly significant reductions were found in non-alcohol-related GP consultations. There were also significant reductions in alcohol-related GP consultations and alcohol-related inpatient stays in hospital. When health-care utilisation of all kinds was costed, highly significant reductions in costs per client were observed. The mean total reduction in costs was nearly £240 per client. This evidence suggests that moderation-oriented treatment produces substantial cost-benefits for the health care system.

INTRODUCTION

Role of the moderation goal in treatment of alcohol problems

Following the fierce controversy in the alcohol problems field regarding the legitimacy of the “controlled drinking” treatment goal (Heather & Robertson, 1981; Marlatt, 1983; Miller, 1983; Sobell & Sobell, 1984; Roizen, 1987), this goal is now an accepted part of treatment services in some countries of the world. In the UK, as early as 1979, Robertson and Heather (1982) found that over two-thirds of the 70 treatment agencies they surveyed endorsed a controlled drinking (or “moderation”) goal for some of their clients. Ten years later, Rosenberg *et al.* (1992), using a more comprehensive sample, reported a broadly similar use of the moderation goal in the UK. The moderation goal also appears to be in common use in Australia (Donovan & Heather, 1997) and Norway (Duckert, 1989) and, from anecdotal evidence, in several other countries in Europe and elsewhere.

The situation is very different in North America. In the USA, Perkins *et al.* (1981) found that only 37% of treatment providers they surveyed endorsed moderation for any of their clients and a similar proportion was reported by Rush and Ogborne (1986) from their survey of treatment agencies in Ontario, Canada. More recently, Rosenberg and Davis (1994) surveyed a random sample of treatment agencies in the USA using the questionnaire developed by Rosenberg *et al.* (1992). Three-quarters of respondents stated that any non-abstinence treatment goal was unacceptable.

In summarising “the great debate” on controlled drinking after 25 years, Sobell and Sobell (1995) reached the following two conclusions from research: 1) recoveries of individuals who have been severely dependent on alcohol predominantly involve abstinence; 2) recoveries of individuals who have not been severely dependent on alcohol predominantly involve reduced drinking. These conclusions appear to be reflected in treatment practice. In the Robertson and Heather (1982) survey of UK agencies, it was found that the majority of services allocated less than 20% of their clients to a moderation goal and that the main factor determining this allocation was a low level of alcohol dependence. Similar findings were reported by Rosenberg *et al.* (1992) for the UK and by Donovan and Heather (1997) for New South Wales, Australia.

A commonly accepted cut-point for use of the moderation goal is a score of 30 on the *Severity of Alcohol Dependence Questionnaire* (SADQ: Stockwell *et al.*, 1979), with clients at or above this score being advised to become totally abstinent. Support for the use of this cut-point comes from the original validation study of the SADQ when scores below 30 corresponded with a psychiatrist’s rating of “none or minimal” and “mild to moderate” alcohol dependence (Stockwell *et al.*, 1979). Subsequently, in a 10-12 year follow-up of problem drinkers who had received abstinence-oriented treatment, Edwards *et al.* (1983) found that 7 out of 8 subjects who had achieved “social drinking” showed a maximum degree of dependence ever experienced of less than 30 on the SADQ. Although Heather (1995a) has warned that choice of treatment goal is an essentially clinical decision that should depend on unique characteristics and circumstances of the individual client, it is clear that conventional treatment practice favours the virtual restriction of the moderation goal to clients with low (i.e., SADQ < 30) levels of dependence.

Sobell and Sobell (1995) went on to argue that the major contribution of the moderation goal had been to the public health approach to alcohol problems. In particular, the use of the goal in brief

interventions by general practitioners and in other primary care settings (e.g. Wallace *et al.*, 1988; Babor & Grant, 1991), in which excessive drinkers are advised and assisted to cut down drinking to below recommended levels, had been largely non-controversial and had been fully consistent with an emphasis on early identification and intervention for alcohol problems in the non-treatment seeking population at large. In a commentary on the Sobells' editorial, Heather (1995b) accepted that the major role for moderation approaches had been in the public health arena and that there was a *de facto* consensus that the moderation goal should be largely confined to drinkers with low levels of dependence. However, Heather also argued that this consensus might be premature for the following reasons.

First, there is convincing evidence that some severely dependent problem drinkers do in fact succeed in controlling their drinking, despite having been directed towards total abstinence or having received no treatment at all, and are able to maintain a moderate pattern of drinking over extended periods of time (Shea, 1954; Kendell, 1965; Hyman, 1976; Polich *et al.*, 1980; Vaillant & Milofsky, 1982; Nordström & Berglund, 1987). Secondly, reasons why severely dependent individuals usually find the reinstatement of control over drinking very difficult are far from clear but may include modifiable beliefs about the nature of alcohol problems in addition to neurophysiological factors (Elal-Lawrence *et al.*, 1986; Orford & Keddie, 1986). Thirdly, some severely dependent drinkers simply refuse to countenance abstinence and it is not acceptable that such individuals should be turned away from treatment because they refuse to accept the policy of the agency in question. This raises the issue of the harm reduction goal in treatment (Heather, 1993), where the aim is not to eliminate alcohol problems but to reduce them to a less harmful level in association with improvements in other areas of life functioning. Fourthly, many severely dependent problem drinkers have failed many times, either with or without the assistance of treatment, to maintain abstinence over any substantial period. It seems sensible to

suggest that a moderation goal should be tried for problem drinkers of this kind, again with the implication that it is a significant reduction in alcohol-related harm that is being sought. Fifthly and finally, it is possible that new forms of moderation training could be developed, based perhaps on novel theoretical leads, that could increase the likelihood of successful moderation among severely dependent drinkers. The research to be described here concerns the effectiveness of a new form of treatment aimed at “controlled drinking”.

Theoretical background of alcohol cue exposure

The new treatment tested in this study is *Moderation-oriented Cue Exposure* (MOCE). This is based on the general treatment method of “cue exposure” which has proved highly successful in the treatment of anxiety disorders (Marks, 1978) and obsessive-compulsive disorders (Rachman & Hodgson, 1980). Applied to alcohol dependence, the assumption is that craving for alcohol is, partly at least, a classically conditioned response to alcohol-related stimuli (or “cues”) that have been frequently encountered during a drinking career. Such conditioned responses are thought to play an important role in the maintenance of excessive drinking and to persist after extended periods of abstinence. In this way, conditioned craving responses are seen as making a crucial contribution to relapse following treatment (Heather & Greeley, 1990; Drummond *et al.*, 1995).

Cue exposure treatment for alcohol problems is based on the classical conditioning (i.e., Pavlovian) account of the extinction process, the aim being to expose the alcohol dependent person to alcohol-related cues that are associated with excessive drinking in the individual case in the absence of the reinforcing effects of the unconditioned stimulus (i.e., drinking). It is assumed that this will lead to the extinction of the conditioned craving response. Thus, for

example, the sight and smell of the client's preferred alcoholic beverage would be presented without allowing drinking to take place (i.e. response prevention). In this way, the visual and olfactory cues associated with drinking would be extinguished, or at least weakened, thus reducing the probability of craving and relapse when such cues are encountered in the natural environment.

These principles are supported by a great deal of research with both animal (Mackintosh, 1983) and human (Drummond *et al.*, 1995) subjects, using both laboratory and naturalistic settings. Although theoretical accounts of the conditioning process with respect to alcohol and drug dependence vary sharply (Wikler, 1980; Siegel, 1979; Stewart *et al.*, 1980; Robinson & Berridge, 1993), these differences seem to have no implications at present for cue exposure practice. Moreover, while many questions remain to be resolved regarding relationships between physiological, behavioural and subjective components of craving (Drummond *et al.*, 1995), there is no reason why this uncertainty should delay the evaluation of practical cue exposure methods (Heather & Bradley, 1990).

It is also possible that cue exposure methods chiefly work, for all disorders in which they are used, not by extinguishing classically conditioned responses but by increasing the client's self-efficacy in coping with high-risk situations without resorting to the maladaptive response that constitutes the disorder (Bandura, 1977). While a basic assumption of self-efficacy theory is that performance-based methods leading to "mastery experiences" are superior to purely verbally-based methods, it is clearly changes in cognitions rather than in conditioned responses that represent the effective ingredients of therapy here. This kind of account of successful cue exposure in the addictions field has been provided by Wilson (1987). Again, however, this hypothesis does not invalidate a test of cue exposure in practical settings, although it does

suggest that some elements of “cognitive restructuring” might usefully be added to cue exposure procedures. It may be that both conditioning and self-efficacy elements contribute to successful cue exposure.

For alcohol dependence, a particularly important class of cue for excessive drinking is the interoceptive effects of low or moderate doses of alcohol. Clinical experience suggests that, for many problem drinkers, impaired control over consumption sets in following the ingestion of a few drinks and this led Glatt (1976) to propose the existence of a critical blood alcohol level at which “loss of control” is elicited. The idea of a threshold at which the alcohol dependent individual begins to “feel” the effects of alcohol and crave for more is embedded in clinical wisdom on the topic (Kjølstad, 1963). In support of this hypothesis, animal research indicates that the interoceptive effects of low doses of alcohol can become conditional stimuli for the ingestion of higher doses (Greeley *et al.*, 1984). This suggests a form of extinction procedure in which alcohol dependent clients are given a “priming dose” of alcohol and are then asked to resist further drinking despite the craving for more alcohol that they will probably experience, with the expectation that craving will gradually diminish over successive exposures of this kind. This is essentially the method used in the MOCE procedure. Moreover, following the development of a specific measure of impaired control over alcohol consumption (Heather *et al.*, 1993a; 1998), it is possible to test the hypothesis that clients showing higher degrees of impaired control would benefit most from a priming dose cue exposure treatment method.

Clinical trials of cue exposure

There have been two randomised trials of cue exposure treatment in the alcohol field, both with positive results. Monti *et al.* (1993) compared cue exposure integrated with coping skills training

with standard inpatient treatment and found better drinking outcomes among clients receiving cue exposure during the second three months after treatment. Similarly, Drummond and Glautier (1994) compared cue exposure with relaxation training and found more favourable outcomes for cue exposure in terms of length of time to relapse to heavy drinking and total alcohol consumption at six months follow-up. However, both these trials used an abstinence treatment goal and did not give clients priming doses of alcohol before cue exposure. Their results are therefore not directly relevant to the present study.

Development of Moderation-oriented Cue Exposure

The first use of a priming dose of alcohol in a cue exposure paradigm was reported in a case study by Hodgson and Rankin (1976). This involved a middle-aged, male client showing a high level of alcohol dependence and serious alcohol-related problems. A strong priming dose of the client's preferred drink was used to elicit craving and an expectation of withdrawal symptoms on further presentation of the beverage without consumption. Over repeated presentations of this cue, the client's reported desire for a drink decreased markedly, as did his expectation of withdrawal symptoms. At a six-month follow-up, the client reported a much-decreased level of drinking combined with improvements in the relationship with his wife and in work performance. Both the client and his wife believed that the cue exposure treatment had increased his control over drinking. At a five-year follow-up, the client continued to show an improvement over his pre-treatment condition (Hodgson & Rankin, 1982).

It is noteworthy that this treatment was formally directed at abstinence, the authors suggesting that the cue exposure procedure could serve as a kind of "fire-drill" experience in the event of relapse. It seems more logical, however, to use the priming dose method in conjunction with a

controlled drinking goal; certainly, the gains demonstrated in this case were in terms of continued but reduced and less harmful drinking. Another case study by Rankin (1982) was directed expressly at a moderation goal and reported similar improvements to those of the earlier study.

Rankin *et al.* (1983) pursued these early findings in a controlled comparison of cue exposure with response prevention and a control condition involving a form of imaginal cue exposure. In the experimental group, after receiving 1.2g/kg ethanol in their preferred alcoholic beverage, subjects were asked to look at, hold and sniff a glass of the same beverage for 15 minutes periods while actively resisting the temptation to drink. In the control group, subjects were asked simply to imagine scenes that normally involved drinking for similar periods of time. Results showed that the experimental condition produced significantly greater decreases on behavioural and subjective measures of craving. Although supportive of the use of cue exposure methods, this study was not a clinical trial and subjects were not followed up.

Heather (1989) complained that the promising lead for improved treatment in the case studies and laboratory research reported by Hodgson and colleagues had not been followed up in a clinical trial and suggested that it was the controlled drinking controversy that had prevented this obvious development from taking place. The present report concerns a clinical trial of the kind called for by Heather (1989). No limit was set on the level of alcohol dependence that permitted entry to the trial, provided that clients were suitable for a controlled drinking goal on other grounds (see below).

The priming dose version of cue exposure was further developed in a case study carried out in Australia by Heather *et al.* (1993b). The client was a 24 year-old man with a medium level of

alcohol dependence and alcohol-related problems. He had attended meetings of Alcoholics Anonymous but had been put off by what he described as its “religious overtones”. He also believed that total abstinence would interfere with his work as a journalist and wished to try to drink in a controlled fashion. In addition to other areas of assessment, the client’s craving for alcohol was periodically assessed by an analogue measure of “desire to drink” in which he rated his desire for a further drink following the presentation of small amounts of alcohol every five minutes over a 90 minutes period (see Heather *et al.*, 1993b). Improvements on a range of outcome measures were found at 3-, 6- and 12-month follow-ups and were supported by the results of the analogue measure.

The cue exposure method used in this case study was based on the method described by Rankin *et al.* (1983) but also included an adaptation of a method described in a series of case studies by Blakey and Baker (1980) in an abstinence-oriented approach to cue exposure. In this method, clients and relatives were interviewed to establish salient “triggers” or cues for drinking in the individual case (e.g. walking along the local high street past a familiar public house). These situations were then rated in terms of how tempting they were to the client from the least to the most salient cue. Clients were then exposed to the cues in a graded manner while not being permitted to drink. Practice supervised by the therapist was usually followed by unsupervised practice. At follow-ups ranging from 0 to 9 months, most clients reported a good outcome with decreased desire to drink. Again, however, despite these encouraging results, the effectiveness of this procedure has not been examined in a clinical trial. The MOCE method to be described in more detail below is based on that used by Heather *et al.* (1993b), with some refinements to cue exposure procedures.

Control condition: Behavioural Self-control Training

In the study reported here, the control condition against which the effectiveness of MOCE is tested is *Behavioural Self-control Training* (BSCT). This treatment modality was developed by W.R. Miller and colleagues in a series of studies carried out in the late 1970s (Miller, 1978; Miller & Taylor, 1980; Miller *et al.*, 1980,1981) and was based on the “self-management” principles described by Thoresen and Mahoney (1974). According to Hester (1995), BSCT can be directed either at an abstinence or a moderation goal but it is clear that it has been used mainly with the latter. It can be carried out either in therapist-directed format or in the form of a self-help manual. In the case of therapist-directed intervention, BSCT can be delivered either in a group setting or on an individual basis, as in the current study. The contents of BSCT as used in this study will be described below.

BSCT is probably the most researched single treatment modality in the alcohol problems field, with over 30 controlled trials devoted to it (Hester, 1995). Further, in a meta-analysis of research on treatment effectiveness by Miller and colleagues (1995), BSCT was the second best supported treatment modality in the literature. Follow-ups of self-referred, low dependence problem drinkers treated by BSCT and contacted between 3 and 12 months post-treatment have revealed impressive success rates in the region of 60% to 70% (Miller & Taylor, 1980; Miller *et al.*, 1980). A two-year follow-up of clients in these studies (Miller & Baca, 1983) reported a success rate of 67%. Longer-term follow at 3 to 8 years post-treatment (Miller *et al.*, 1992) found an increasing proportion of clients becoming total abstinent but a consistent 10-15% of all treated clients sustaining moderate and problem-free drinking.

Given this impressive evidence of effectiveness, BSCT has become the standard moderation-oriented treatment in all countries where the goal is an accepted part of treatment services. Therefore, any new treatment that is hypothesised to improve the effectiveness of moderation training, for all clients aiming at moderation or for a section of them, must show itself to be superior to BSCT before it can be considered for a place in routine practice. Thus a comparison with BSCT represents a stringent test of the effectiveness of MOCE.

Hypotheses

To summarise the foregoing discussion, the study was designed to test two linked hypotheses, a main hypothesis and two alternative versions of a subsidiary hypothesis:

- 1) MOCE will be more effective than BSCT among a sample of problem drinkers aiming at a goal of moderate drinking;
- 2a) MOCE will be relatively more effective than BSCT among problem drinkers with higher levels of alcohol dependence (defined as a score of 30 or above on the *Severity of Alcohol Dependence Questionnaire-Community Version*.)
- 2b) MOCE will be relatively more effective than BSCT among problem drinkers with higher levels of impaired control over drinking (defined as those above the median on the Failed Control score of the *Impaired Control Scale*.)

The general superiority of MOCE to BSCT is hypothesised on the basis of its theoretical foundations in the explanation of conditioned craving and impaired control over alcohol consumption, constructs which are central to an understanding of alcohol dependence itself.

Thus, because it is believed to address the basic processes involved in the development of alcohol dependence, it is reasoned that MOCE will be a more powerful form of treatment than BSCT, which does not directly address dependence processes.

By the same token, it is hypothesised that MOCE will be of relatively greater effectiveness among clients with higher levels of dependence who would not conventionally be offered moderation training. Alternatively, since a priming dose cue exposure method is directly relevant to the phenomenon of impaired control, it is hypothesised that MOCE will be of relatively greater effectiveness among clients with higher scores on a measure of impaired control over alcohol consumption.

METHOD

Clients

Clients were recruited for the trial within Tyneside and surrounding areas over a period of approximately one-year from April 1996 to April 1997. A total of 173 individuals actively seeking help for alcohol problems were screened for inclusion in the trial, of whom 108 entered the trial and were randomised to treatment conditions. Referral sources included the Northern Regional Drug and Alcohol Service (NORDAS) (n=13), general practitioners (GPs) (n=33), a voluntary alcohol agency (n=1), a mental health unit (n=2), a general hospital physician (n=1) and self-referral via local media advertising (n=58). Forty referrals (40) failed to attend the screening interview and a further 16 attended screening but failed to attend the pre-treatment assessment.

Inclusion/exclusion criteria

To be included in the trial it was necessary for clients to express a preference for a treatment goal of moderate drinking over total abstinence. Given such a preference, clients were excluded in the following circumstances:

(i) values of alanine transferase (ALT). If ALT was recorded as above 60, clients were asked to attend an examination by a physician who advised whether or not the client should be excluded from the trial on health grounds, taking into account the results of liver function tests. Four referrals were excluded by this rule.

(ii) continued alcohol consumption at any level contraindicated on medical grounds. This was determined by contact with the client's GP or, if the client did not wish the GP to be contacted, by a specially arranged medical examination. This resulted in two exclusions.

(iii) severe psychiatric disturbance. Clients at screening who scored 63+ on the Global Psychopathology scale of the Brief Symptom Inventory (Derogatis & Meslaratos, 1982) were referred to an experienced clinician and were excluded if they were thought to be unsuitable for the trial for this reason. Only one referral was excluded in this way.

(iv) severe cognitive impairment. If cognitive impairment was suspected at screening, the protocol called for the client to be given tests of cognitive functioning. This contingency never arose.

(v) current dependence on other substances, excluding cannabis and nicotine. Two clients were excluded because of evidence of current dependence on heroin. However, poly-drug users were included provided alcohol was the main source of current problems.

(vi) pregnancy or client planning to become pregnant during the lifetime of the trial. Again, this exclusion criterion was not invoked.

Further conditions of participation in the trial were: written consent to random allocation to one of the two treatment modalities, physical ability to attend NORDAS for treatment sessions, a

willingness to suspend involvement with any other therapeutic intervention for the duration of the trial treatment and a willingness to have all sessions tape-recorded.

Design

Following pre-treatment assessment and signing of informed consent, clients were randomly allocated to one of the two treatment conditions, with 58 randomised to MOCE and 50 to BSCT. Two therapists (see below) were used in the trial in a nested, crossover design. Therapist A delivered MOCE and therapist B delivered BSCT for roughly half the trial and they then switched to the other form of treatment for the second half of the trial.

Seventeen (17) clients completed pre-treatment assessment and were randomised to treatment groups but failed to attend the first treatment session (10 from the MOCE group and 7 from the BSCT group). Owing to resource limitations, these clients were not followed up and were excluded from further analysis. This left 91 clients in the treatment sample, 48 in the MOCE group and 43 in the BSCT control group. These clients were followed-up approximately six months after the end of treatment. Six-month follow-up assessments were carried out by a research assistant blind to the treatment condition of the client who was asked not to reveal what kind of treatment he or she had received.

The design and procedures of the trial were approved by the Joint Newcastle Health Authority/ University of Newcastle upon Tyne Ethics Committee.

Treatments

Moderation-oriented Cue Exposure. The delivery of MOCE in this study was based on the treatment method described by Heather *et al.* (1993) with two main modifications. First, in the method described by Heather *et al.*, taken from that developed by Rankin *et al.* (1983), the length of exposure to each type of cue (i.e., visual, tactile, olfactory) was set at three minutes and progressive exposure to the three types of cue was conducted in blocks, of which there were normally three in a treatment session. In the present study, however, and in line with advances in cue exposure practice (Dawe & Powell, 1995), exposure to each cue was prolonged until the client's self-reported desire to drink had returned for two consecutive ratings to within 10% of the baseline reading taken before the priming dose was poured. Throughout exposures, the client was encouraged to verbalise his/her thoughts and the therapist attempted to ensure that thoughts remain alcohol-focussed.

The other modification to procedures entailed the inclusion of therapist scripts and client exercises aimed at restructuring expectations and beliefs relevant to control over drinking. This restructuring process mainly involved (i) challenging beliefs about the disease of alcoholism and the inevitability of "loss of control", and (ii) training in cognitive techniques for coping with craving. It took place mainly during intervals in the cue exposure procedures (e.g. during the ingestion of the priming dose, the absorption period etc.).

A detailed description of MOCE principles, methods and procedures is contained in a Therapists' Manual (Heather & Wale, unpublished) available from the authors. In brief, the structure and contents of the MOCE treatment programme were as follows:

Introductory session. This had six aims: (i) to provide a brief introduction to the main features of MOCE treatment; (ii) to place the client's problem in the context of his or her life history and present circumstances; (iii) using principles and techniques of “motivational interviewing” (Miller & Rollnick, 1991), to raise the client's general level of motivation to cut down drinking; (iv) to offer a comprehensible rationale for the MOCE method; (v) to negotiate a level of drinking that would serve as a limit on consumption on any particular occasion and also as an amount of alcohol for the priming dose in cue exposure sessions; and (vi) to set out ground rules for the conduct of treatment, including the rule that the client should be totally abstinent during Phase I of treatment (see below), and obtain the client's agreement to these. No cue exposure took place during the Introductory Session.

Phase I: clinic-based cue exposure. Phase I sessions began with the recording of Breath Alcohol Concentration (BAC). If this was above 20mg%, the session was re-scheduled following a discussion of why drinking had taken place and encouragement to continue attending treatment. A baseline measure of subjective Desire to Drink (DD) was then taken on an 11-point scale ranging in intervals of 10 from 0 ("No desire to drink whatever") to 100 ("The greatest desire to drink I can imagine"). Events occurring since the last session were reviewed but breach of the rule of total abstinence during Phase I of treatment did not result in discharge. Instead, the client was asked about the circumstances of the drinking episode and the importance of abstinence during Phase I was re-emphasised.

Following this review, clients consumed the agreed amount of their preferred alcoholic beverage (PAB) which was normally completed within 20 minutes. Ratings of DD and Subjective Intoxication (SI) were taken at the end of the priming dose period. If during the consumption of the priming dose the client wished to discuss his or her problems, including alcohol-related

problems, this was not discouraged but the therapist responded by using motivational interviewing techniques. Direct advice and problem-solving suggestions were not given to avoid overlap with BSCT.

When the client had finished the priming dose, a period of 15 minutes was allowed for maximum absorption of alcohol before the commencement of formal cue exposure. At the end of the absorption period, pre-exposure measures of BAC, DD and SI were taken. The therapist then removed the empty beverage container from the table and poured another drink that was placed within easy reach of the client. Clients were reminded that the idea of the treatment was that they should resist the temptation to drink but would not be physically prevented from doing so and that it was therefore their own decision not to drink.

After habituation to the visual cue (see above), clients were presented with the tactile cue (i.e., asked to hold or cradle the glass or can in their hands) until the criterion for habituation to this cue had been reached. The client was then presented with the olfactory cue which involved holding the beverage container to the nose and sniffing the contents for approximately 30 seconds, repeated roughly every 60 seconds until the usual habituation criterion was reached. Further recordings of DD and SI were taken immediately after the start of each cue presentation and then every five minutes until criterion had been reached. In a few cases, clients did not report sufficiently high levels of DD for the MOCE method to be effective, despite self-reports of intense craving and impaired control after moderate amounts of alcohol in the natural environment. In such cases, the therapist attempted to increase craving by eliciting scenes from the client that were associated with high desire to drink.

After habituation had been achieved to the last cue presentation, the therapist re-administered the Mood Checklist, collected money from the client for the alcohol consumed as the priming dose

(if funds were available) and took a further BAC reading. At the end of each session, the client was asked to sign a disclaimer form. If the client's BAC was at or above 70mg%, she/he was strongly encouraged to remain at the treatment centre until BAC had subsided to below this level and a suitable relaxation area was provided for this purpose. If the client insisted on leaving against this advice, she/he was asked to sign a form acknowledging this fact. These matters had been agreed with the client during the Introductory Session.

The criterion for terminating the clinic-based phase of treatment and moving on to the next phase concerned across-session habituation. The principle on which this was based was that DD at the commencement of a session should start low and continue low until the end of the session. In practice, this meant that DD to the first presentation of the visual cue was 20 or lower and that DD did not increase to more than twice this initial level at any time during the session. Only one occurrence of these conditions was needed for the across-session habituation criterion to be reached and for Phase I to be terminated.

Phase II: supervised "in vivo" exposure. The second phase of the MOCE method was based on the work of Blakey and Baker (1980) and represented an attempt to increase generalisation of new responses acquired in the clinic-based phase to the client's normal environment. The specific objectives were to provide a relatively safe transition from the clinic situation to the outside environment, to prepare for unsupervised practice in Phase III by giving the client supervised experience in monitoring desire to drink and ability to resist in realistic situations; and to give the therapist some insight into the client's behaviour and attitudes to drinking in realistic drinking settings, thus assisting communication between therapist and client in Phase III of the programme.

The initial task in Phase II was the drawing-up of a *Hierarchy of Tempting Situations* associated with increasing temptation to drink heavily and exceed the agreed drinking limit. This usually commenced towards the end of Phase I and proceeded in three steps: (i) The *Controlled Drinking Self-efficacy Scale* (CDSEQ - see below), which had been completed at baseline assessment, was re-administered to help the client think about generalised drinking circumstances associated with increased temptation to drink heavily or lack of confidence in the ability to resist drinking heavily; (ii) following the more general review of issues related to drinking temptation at Step 1, the therapist and client next developed a list of specific drinking situations with different degrees of risk attached to them; (iii) after the Hierarchy of Tempting Situations had been completed and checked with the client, it was typed out and made ready for use at subsequent therapy sessions. The therapist and client then agreed on two or three situations from the hierarchy that could be used for supervised drinking practice, taking into account the need for a range of degrees of temptation, the avoidance of situations with a very high degree of temptation and the selection of situations that were feasible to visit and would not cause the client embarrassment or disrupt the treatment process.

All treatment sessions in Phase II began at the clinic and started with a BAC reading, with the same rule for rescheduling sessions as in Phase I. Brief notes were made of drinking episodes and related issues since the last meeting. Any problems experienced with keeping to the drinking limit were noted and discussed. This discussion was continued during supervised practice in the drinking situation. The client and therapist then proceeded by the most convenient method of transport to the selected drinking situation.

In the drinking setting, the client was asked to drink the agreed priming dose (drinking limit) and then consume one or more non-alcoholic drinks until desire to drink had subsided to within one

10% point above baseline recorded at the beginning of the session in the clinic (i.e., the same criterion for the termination of a cue exposure segment in Phase I). As before, it was considered essential that the session should not be terminated before the client had reached this criterion. If the priming dose consisted of more than one drink, the therapist bought the first round of drinks and then suggested that the client bought subsequent rounds.

It sometimes happened that a loss of acquired tolerance to alcohol resulted in the client experiencing a greater than anticipated degree of intoxication after the priming dose. If this occurred, the client was asked to agree to a lowering of the priming dose and therefore of the moderation drinking limit.

Conversation between client and therapist was regularly interspersed with requests as to the current level of DD. This always occurred just before the first sip of each drink. A careful but unobtrusive note was made of these ratings and the time they were taken. In addition to ratings, interaction between client and therapist followed the guidelines given for Phase I. When the criterion for terminating the session had been reached, therapist and client left the drinking situation together and, if appropriate, the client was driven home or to some other place she/he requested. During all Phase II sessions, the therapist's drinking was confined to non-alcoholic beverages.

Phase II was normally terminated after two or three sessions. Only when the client specifically requested further supervised drinking sessions was Phase II prolonged beyond this and then for only a few sessions more.

Phase III: unsupervised drinking practice. The final phase of MOCE treatment aimed to complete the generalisation of the learning experience by having the client practice moderate

drinking on his or her own, accompanied by regular discussion of progress with the therapist. Phase III sessions had two objectives: 1) a review of drinking behaviour and related matters since the client was last seen; 2) a formulation of plans for drinking "experiments" during the period until the next therapy session.

In practice, the conduct of Phase III merged with that of Phase II. After the first session of supervised drinking practice, the client had been encouraged to begin experimenting with unsupervised drinking episodes and the results of these experiments were discussed at the beginning of the next session. Thus, Phase III could be said to have begun while Phase II was still in progress.

Each Phase III session started with a review of events since the client was last seen. The client was asked for a detailed account of any drinking episode that had taken place, including precise time, location, social situation, exact quantities of alcoholic beverages consumed, and associated behaviour and emotions. The client had been encouraged to continue making occasional DD ratings and to make a careful note of these ratings for later feedback to the therapist. If the client had kept to the drinking limit, the therapist attempted to reinforce this success by praising the client's achievement and emphasised that each successful experience of this kind made it easier for moderate drinking to be maintained in future. However, any discomfort, temptation or difficulties the client reported as accompanying the successful drinking episode were discussed.

If the client had failed to keep to the agreed limit, the therapist initiated a careful analysis of the reasons for this failure. The therapist was vigilant for the presence of the "rule violation effect", i.e., a tendency on the client's part to see the failure to moderate drinking on one occasion as evidence that all such attempts were hopeless and that she/he may as well abandon efforts to

control drinking. Rather, the client was encouraged to see the episode as a temporary lapse from which valuable lessons could be drawn for avoiding similar lapses in future (Marlatt & Gordon, 1985).

After the discussion of past events had concluded, the therapist guided the discussion towards a consideration of plans for drinking in the period until the client was next due to be seen. The Hierarchy of Tempting Situations was used to identify the next task in the client's progress towards stable moderate drinking. Unless there were practical reasons for not doing so, items in the hierarchy were taken one by one in ascending order. Clients were asked to describe any special difficulties they anticipated in being able to keep to the drinking limit in that particular situation and to devise a specific plan for dealing with these difficulties. Role play and imagery rehearsal were sometimes used to prepare for the situation in question.

In certain circumstances, the Hierarchy of Tempting Situations was abandoned, on either a temporary or permanent basis. For example, the client may have been confronted with a special event, such as a wedding, banquet or some other kind of celebration, that was not on the hierarchy because it was not a regular drinking situation. Such an event called for unique preparations and, if the event was regarded as so threatening that the client had very little confidence about resisting the temptation to drink heavily, it was permissible simply to avoid the situation, at least until the client had built up confidence in dealing with very high risk situations. In either case, the normal hierarchy could be re-introduced after the special event had passed. Another possible reason for revising the original hierarchy was that, as treatment progressed, clients may have come to put an entirely different interpretation on drinking behaviour and the nature of the temptation to which they felt exposed. In such cases, the hierarchy was reconstructed to suit the client's new perception of risk.

An important part of the therapist's advice to the client concerned the issue of habituation of the desire to drink. A fundamental principle of the MOCE method is that DD should return to baseline level before the drinker leaves the drinking situation. If this does not occur, it is possible that desire to drink in that situation will be strengthened. Thus the client was urged, if possible, to conduct unsupervised drinking practice sessions in the same way as the supervised and clinic-based sessions were conducted, i.e., to remain in the situation, having soft drinks if necessary, until DD had returned to baseline.

The most essential aspect of Phase III drinking practice was the attempt to persuade the client always to make careful plans for any drinking episode that occurred. It was aimed to convince them that going for a drink on an impulse, without the necessary thought and preparation, should be strictly avoided.

The mean length of MOCE sessions was 88 minutes ($sd=7.5$) and the modal value was 90 minutes.

Behavioural Self-control Training. BSCT was based on the guidelines provided by Hester and Miller (1989) and was also described in manual form. Treatment began with an Introductory Session similar to that in the MOCE treatment programme and containing a similar motivational emphasis. Subsequent sessions covered the following areas: behavioural techniques of limit-setting; self-monitoring; consumption management; drink refusal skills; self-reinforcement of goal attainments; functional analysis of drinking situations; and learning alternative behaviours for coping with high-risk drinking situations. Depending on the results of the functional analysis, clients were offered optional sessions in anxiety management, social skills and assertiveness training, and anger management.

Mean length of BSCT sessions was 63.5 minutes (sd=9.7). The modal value was 60 minutes.

Therapists

Two male clinicians delivered the trial treatments, one an A-grade Clinical Psychologist and the other an G-grade Psychiatric Nurse with extensive experience in the treatment of alcohol problems.

The Chief Investigator (NH) carried out therapist training over a 8-week period before the commencement of the trial. General training in the cognitive-behavioural approach to treatment of alcohol problems was followed by intensive training in each of the specific therapeutic modalities. The cross-over of therapists occurred after 40 (20 clients per therapist) of the 91 clients in the treatment sample had been seen and entailed a two-week re-training period.

Treatment integrity

The integrity of the delivery of the two treatments was addressed in the following ways: selection of well-qualified and experienced clinicians; thorough, manual-led training for therapists in both treatments; and weekly or fortnightly supervision sessions concerned with clinical issues throughout the treatment phase of the trial. In addition, treatment integrity was formally assessed by the analysis of a 10% random sample of tape-recorded treatment sessions conducted by two of the investigators (NH & SM). No evidence for therapist drift became apparent during these assessments.

Procedure

Potential clients were referred (or referred themselves) by telephone, in person or by post. In all cases, a referral form was completed to facilitate the early screening-out of clients who clearly did not meet eligibility criteria (e.g., where alcohol was not the main problem or the referred person was pregnant). Referrals who appeared to be potentially suitable for the trial were asked to attend NORDAS for a more in-depth screening interview. This took from 30 to 60 minutes and consisted of a checklist of eligibility criteria, including a finger-prick blood sample for measurement of ALT and gamma-glutamyl transferase (GGT) using the Reflotron device (Boehringer Mannheim Diagnostics, 1989). Clients eligible for the trial after screening were invited to attend a pre-treatment assessment session and those ineligible were offered alternative treatment or advice outside the trial.

Pre-treatment assessment. The pre-treatment assessment session lasted about 60 minutes and was usually scheduled for one week after the screening interview. The session comprised demographic information, alcohol consumption over the past two months and alcohol/non-alcohol-related treatment experiences over the previous six months. It also included a self-report battery of questionnaires including measures of alcohol-related problems, impaired control over drinking, stage of change, self-efficacy over drinking and perceived costs and benefits of reduced drinking. A summary of research questionnaires is provided in Table 1.

Table 1. Summary of Research Questionnaire Battery

Dimension	Instrument	*1	*2	*3	*4
<i>Outcome Measures</i>					
Alcohol consumption (Drinks per Drinking Day DDD & Percent Days Abstinent PDA)	Form 60 Intake/ Form 60 Follow-up				
Alcohol-related problems	Alcohol Problem Questionnaire (APQ)				
<i>Prognostic Measures</i>					
Demographic information	Demographic questionnaire developed specifically for the trial				
Severity of alcohol dependence	Severity of Alcohol Dependence Questionnaire - Community Version (SADQ-C)				
Psychopathology	Brief Symptom Inventory (BSI)				
Impaired control over drinking	Impaired Control Scale (ICS)				
Stage of change	Readiness to Change Questionnaire – Treatment Version (RCQ-TV)				
Self-efficacy over drinking	Controlled Drinking Self-efficacy Questionnaire (CDSEQ)				
Outcome expectancy	Controlled Drinking Outcome Expectancy Questionnaire (CDOES)				
Alcohol and non-alcohol related treatment history	Health Care Utilisation Questionnaire (HCUQ)				
Liver function	GGT and ALT				
<i>Other measures</i>					
Client treatment satisfaction	Client Satisfaction Questionnaire (CSQ8)				
Corroboration of self-report	Form 60 C – Collateral Form				

* 1=Screening Assessment

2=Pre-treatment Assessment

3=Post-treatment Assessment

4=Six-month Follow-up

At the end of the pre-treatment assessment session, all eligible clients were provided with information on the trial and the randomisation procedure and were asked to sign informed consent. There were no refusals. In cases where medical confirmation of eligibility for the trial was necessary, randomisation and informed consent were postponed until this had been received. An appointment for the first treatment session, usually one week following the assessment, was made directly after randomisation.

A post-treatment assessment took place at the end of the final treatment session or as soon as possible thereafter. The assessment comprised details of alcohol consumption over the previous 2 months and a self-report battery of questionnaires (see Table 1). It also included a question related to the client's own characterisation of his or her drinking at the post-treatment point. (This question was introduced after the study had started and applied only to a proportion [n=63] of the treatment sample.) The post-treatment assessment took about 30 minutes.

Follow-up

Follow-up in this study was carried out six months after the date of the post-treatment assessment. Due dates for the six-month follow-ups were tagged on a computer data-base and clients were sent out an appointment ten days before this due date. If neither of two assessment appointments were attended, a more rigorous search was carried out. This included tracing the client through contact names provided at intake or through other agencies, e.g., GPs or social workers. If there was no response from the client after a period of one month from the assessment due date, the questionnaire battery was posted to them with a return stamped-addressed envelope. If no response had been received after a period of two months, six-month follow-up data were regarded as missing.

At six month follow-up, baseline and post-treatment self-report questionnaires were repeated. Alcohol consumption levels over the previous two months and alcohol/non-alcohol-related treatment experiences over the prior six months were recorded. A further fingerprick blood sample was taken for measurement of ALT and GGT. The session lasted approximately 60 minutes.

Postal questionnaires were used when the client was found to have left the region and a forwarding address was available. Also, if all attempts to make personal contact with the client had failed, a postal questionnaire was sent. The postal questionnaire contained the same self-report measures as used in the in-person follow-up assessments together with the Steady Pattern Chart and Episodic Drinking Chart from Form 60 with instructions on how to complete whichever form was more appropriate. Clients were also asked for any other information (e.g. number of days of abstinence) that was relevant to the evaluation of their drinking pattern during the previous 60 days. The Health Care Utilisation Questionnaire was also converted to a self-report instrument for the purposes of the postal questionnaire.

Collateral information

Collateral information was collected as soon as possible after the six month follow-up. A short telephone questionnaire (5-15 minutes) based on the collateral questionnaire in the Form 90 battery (Miller, unpublished) asked about the client's alcohol consumption, number of days abstinent, alcohol-related problems and alcohol-/non-alcohol-related treatment. Collateral informants were mainly spouses or partners (58%), together with friends/work colleagues (18%), parents (15%), other family members (6%) and one sibling (3%).

Measures

The trial assessment battery employed measures from a variety of sources (self-report, interviewer-led and biological measures) in order to provide baseline, outcome and corroborative data. Table 1 summarises the main variables measured, the specific instruments used and at which assessment point they were given.

In more detail, measures and instruments were as follows:

Form 60. This was an adaptation of Form 90 as used in Project MATCH (Project MATCH Research Group, 1997) but based on Miller's (unpublished) version. Using the Time-line Follow-back method (Sobell *et al.*, 1988), alcohol consumption over the two months prior to assessment was reconstructed. Additional questions in Form 60 related to other treatment experiences, work, housing and other activities in the assessment period.

Alcohol Problems Questionnaire (APQ) (Drummond, 1990). This self-report questionnaire consists of 44 items divided into five subscales measuring the perceived costs of drinking in terms of financial, legal, physical, social and psychological problems. Further subscales that may not be applicable to all clients measure the impact of drinking on relationships with a spouse or co-habiting partner, on relationships with children and on work. The APQ provides an indication of the impact of problem drinking within these domains over the previous six months and norms are based on a clinical population.

Severity of Alcohol Dependence Questionnaire – Community Version (SADQ-C) (Stockwell *et al.*, 1994). This questionnaire consists of 20 items each scored on a 4-point scale resulting in a score of 0 to 60. The community version of the SADQ described by Stockwell *et al.* (1994)

differs from the original version (Stockwell *et al.*, 1979) in various aspects of instructions to subjects and response categories but also in asking subjects to focus on the last three months rather than “a recent period of heavy drinking”. In the present study, clients were asked to focus on the six months prior to the follow-up assessment.

Health Care Utilisation Questionnaire (HCUQ). The HCUQ is an interviewer-administered questionnaire comprising two sections - non-alcohol-related treatment and alcohol-related treatment. This unpublished questionnaire was developed specifically for the current study in order to undertake an economic analysis of treatment. Information recorded includes details on the level of contact with residential, outpatient, daypatient, accident and emergency, and GP services.

Brief Symptom Inventory (BSI) (Derogatis & Mesilaratos, 1982). The BSI is a 53-item self-report questionnaire designed to identify problematic psychological symptoms. The Inventory is scored 0-4 on a five-point scale and comprises the following nine dimensions: somatisation, hostility, obsessive-compulsivity, phobic anxiety, interpersonal sensitivity, paranoid ideation, depression, psychoticism, and anxiety. Scores equal to or above 63 on each dimension are indicative of caseness. The inventory also includes three global scores reflecting overall psychological distress (most commonly used as a global indicator of psychopathology), intensity of symptoms and the number of symptoms reported. Scores are based on a 7-day period prior to assessment and norms are provided for both non-treatment and clinical populations.

Impaired Control Scale (ICS) (Heather *et al.*, 1993b; 1998). This self-report instrument consists of three sections measuring the degree to which control over drinking has been attempted, failed

attempts at control and perceived control over drinking. Items are scored on a 5-point scale resulting in maximum scores of 20, 40 and 40 for each section respectively. A “substitution method” described by Heather et al. (1998) enables a single measure of impaired control to be derived from the instrument. All items relate to the previous six months except the final section, perceived control over drinking, which relates to how the client feels about impaired control at the point of filling out the questionnaire. Norms are based on a clinical population.

Controlled Drinking Outcome Expectancy Scale (CDOES) (Rollnick *et al.*, 1996). The CDOES is a 12-item self-report questionnaire with each question consisting of two parts. The first part measures the degree of importance attributed to a particular outcome, for example, ability to relax or ability to enjoy oneself; the second part examines the client’s perception of the impact of reduced consumption on these outcomes versus drinking as usual. Two final sub-scores are obtained, mean costs and mean benefits of cutting down drinking, together with a global score reflecting an overall positive or negative outcome expectancy of reduced alcohol consumption. The questionnaire relates to the time of assessment and was validated on a clinical population.

Controlled Drinking Self-efficacy Questionnaire (CDSEQ) (Rollnick, 1993). This questionnaire comprises 18 self-report questions. There are two sub-dimensions which reflect confidence in resisting the urge to drink heavily in 1) various social and 2) various emotional situations (0% = not confident at all and 100% = very confident.) A global score is also included which reflects level of overall confidence in resisting the urge to drink heavily. The questionnaire measures a client’s self-efficacy over drinking as it is at the time of assessment and is based on a clinical population.

Readiness to Change Questionnaire - Treatment Version (RCQ-TV) (Heather *et al.*, in press).

The RCQ-TV is based on Prochaska and DiClemente’s (1992) model of the “stages of change”

and reflects the client's status on the change model at the time of assessment. There are 15 items on the self-report questionnaire with a five-point rating scale (-2 to +2). A score is calculated for each of three stages - pre-contemplation, contemplation and action. The highest of the 3 scores is regarded as the stage of change for the client in question. The instrument was developed in a clinical population of problem drinkers.

Liver Function Tests. Finger-prick blood samples were taken for measurement of levels of liver enzymes by the Reflotron device (Boehringer Mannheim Diagnostics, 1989). GGT and ALT were measured. These served as assessment and baseline data, as well as corroboration of self-report measures. GGT is an indicator of recent drinking levels, reflected in elevated results for those clients drinking heavily at the time of the test. ALT is an indicator of more chronic, long-term liver damage which may be due to prolonged heavy drinking. It is important to note that both liver enzymes can be elevated by other factors, such as prescribed medication, and also that those clients who have liver damage and/or are very heavy drinkers may still give results within the normal range.

Statistical analysis

The two main outcome measures used in the trial were Drinks per Drinking Day (DDD) and Percentage Days Abstinent (PDA). Both these measures were used in Project MATCH (Project MATCH Research Group, 1997) and were included here to reflect conceptually independent aspects of drinking outcome. DDD and PDA were derived from data gathered in Form 60. A subsidiary outcome measure was change in alcohol-related problems from before to after treatment, as measured by the APQ. Additionally, for descriptive purposes, outcome was categorised according to the classification scheme developed by Heather and Tebbutt (1989).

Following inspection of the distributions of outcome and other variables, those with non-normal distributions according to the Kolmogorov-Smirnov statistic were subjected to log or square-root transformations to render them normal for the purposes of statistical analysis. (However, data in tables are presented in raw form.) If log or other types of transformation failed to achieve an approximately normal distribution, non-parametric statistics were used throughout. (This applied to only one variable, PDA.) All tests of statistical significance were 2-tailed.

RESULTS

Sample characteristics

Alcohol dependence

Table 2 shows characteristics of the treatment sample (n=91) at initial assessment. As seen from Table 2, mean SADQ-C score for the sample was 18.7 (sd=11.0). The median value was 17.5 and the range was 2 to 46 (missing = 1). There were 14 clients with SADQ-C scores of 30 or above. Thus, the average level of dependence in the sample was low but it included clients with levels of dependence ranging from moderate to the lower end of the severe range (cf. Stockwell *et al.* [1979] where the mean for those with clinical ratings of severe dependence was 50.6, sd=12.2).

Comparisons between treatment sample and non-participants

The treatment sample was compared on baseline measures with the subset of clients who were randomised to treatment conditions but *did not* attend the first treatment session and were, therefore, not followed up (n=17). There were no significant differences among these comparisons for gender, age, relationship status or other socio-demographic variables. However, the treatment non-attenders included a higher proportion (83%) who were unemployed compared with the treatment sample (50%) ($\chi^2=4.7$, $p=0.029$). There were no significant differences on alcohol-related variables (DDD, PDA, APQ score, SADQ-C score, GGT, ALT) or psychopathology as measured by BSI score.

The treatment sample was also compared with the subset of clients who were found eligible for the trial at screening but who did not attend for assessment (n=16). On this occasion, there was a significant difference in BSI scores ($t= 2.52, p =0.013$), with the assessment non-attenders having a higher mean BSI score (60.5, $sd=12.2$) than the treatment sample (51.4, $sd=12.0$). There was also a significant difference in level of alcohol dependence as measured by the SADQ ($t=4.75, p=0.001$), with the assessment non-attenders having a substantially higher mean SADQ score (33.4, $sd=14.0$) than the treatment sample (18.6, $sd=11.0$). No other differences among these comparisons were statistically significant.

Comparisons between “self” and other referrals

Significant differences were also observed between those clients who referred themselves to the trial via newspaper advertisements (n=58) and those who were referred from GPs and other agencies (n=33). Self-referred clients showed a lower mean level of alcohol-related problems on the APQ (8.96, $sd=5.00$) than the referred clients (11.40, $sd= 4.60$) ($t=2.40, p=0.018$) and a lower mean level of alcohol dependence on the SADQ (15.7, $sd=10.5$ versus 22.2, $sd=10.6, t=2.90, p=0.004$). Significantly fewer clients in the self-referred subsample reported having previously received treatment for alcohol problems (38%) than in the referred subsample (62%) ($\chi^2=9.25, p=0.002$). The subsamples also differed in gender (65% versus 86% male, $\chi^2=5.0, p=0.025$) and employment status (65% versus 33% full-time, $\chi^2= 9.25, p=0.002$). Thus, the self-referred subsample contained more women and more clients in employment than the referred subsample.

Table 2. Baseline characteristics of clients in the overall treatment sample and by treatment group

Variable	Overall Treatment Sample N=91	MOCE Group N=48	BSCT Group N=43	p<
Sex (N(%))				
<i>Male</i>	68 (75%)	38 (80%)	30 (70%)	NS
<i>Female</i>	23 (25%)	10 (20%)	13 (30%)	NS
Age in Years (mean ± SD)	41.4 ± 9.9	40.6 ± 10.5	42.2 ± 9.2	NS
Relationship Status (N(%))				
<i>Married/Living Together</i>	48 (53%)	24 (50%)	24 (57%)	NS
<i>Single</i>	23 (25%)	14 (29%)	9 (21%)	NS
<i>Separated/Divorced</i>	19 (21%)	10 (21%)	9 (21%)	NS
<i>Widowed</i>	1(1%)	0 (0%)	1 (1%)	NS
School Leaving Age (mean ± SD)	16.2 ± 1.3	16.3 ±1.3	16.1 ±1.4	NS
Education (N (%))				
<i>Higher/Further Education</i>	28 (31%)	18 (37%)	10 (23%)	NS
<i>Vocational</i>	24 (26%)	11 (23%)	13 (30%)	NS
<i>No Post-school Education</i>	39 (43%)	19 (40%)	20 (47%)	NS
Source of Income (N (%))				
<i>Employed</i>	46 (51%)	21 (44%)	25 (58%)	NS
<i>Dependent on State for Income</i>	45 (49%)	27 (56%)	18 (42%)	NS
Prior Treatment for Problem Drinking (N(%))	45 (50%)	26 (54%)	19 (44%)	NS
Drinks per Drinking Day (DDD) (mean ± SD)	18.4 ± 12.0	19.9 ±10.5	16.9 ±13.3	0.05
Percent Days Abstinent (PDA) (mean ± SD)	18.7 ± 16.2	15.1 ± 17.6	10.9 ± 14.4	NS
Alcohol Dependence (SADQ-C) (mean ± SD)	18.7 ± 11.0	20.2 ±10.4	17.0 ±11.3	NS
Global Psychopathology (BSI) (mean ± SD)	51.4 ± 12.0	54.2 ± 11.6	48.4 ± 11.8	0.05
Alcohol-related Problems (APQ) (mean ± SD)	10.0 ± 4.9	11.0 ± 5.0	8.8 ± 4.5	0.05
Liver Function Tests (mean ± SD)				
<i>ALT</i>	30.21 ± 18.62	31.58±19.96	28.63±17.08	NS
<i>GGT</i>	82.22 ± 175.13	87.50±224.05	76.45±99.77	NS

Comparisons between treatment groups at initial assessment

It will have been noted that a subset of clients were randomised to treatment groups but not included in the analysis because they failed to attend the first treatment session. The analysis is therefore not by “intention to treat”. Although the only significant difference to emerge in comparisons between these clients and the treatment sample was for employment status, it is possible that their exclusion affected the randomisation process and resulted in unmatched treatment groups entering the analysis of treatment outcome. The characteristics of the two treatment groups at baseline were therefore carefully compared and are shown in Table 2.

As seen from Table 2, the two treatment groups did not differ on any socio-demographic characteristics but there were significant differences on alcohol-related variables. The MOCE group showed a statistically significantly higher mean DDD ($t= 2.03$, $p<0.05$) and APQ score ($t=2.38$, $p<0.05$). The MOCE group also showed a higher level of psychopathology ($t=2.28$, $p<0.05$). Each of these three variables was significantly correlated with treatment outcome (i.e., DDD or APQ score at follow-up) and these correlations are shown in Table 3. They were therefore included, as appropriate, as covariates in the analysis of treatment outcome described later.

Treatment attendance

The mean number of treatment sessions attended in the total treatment sample was 7.1 (sd=3.98, range 1-16, median=7.8). In the MOCE group, the mean number of sessions attended was 7.67 (sd=4.36, range 1-16) while in the BSCT group it was 6.56 (sd=3.45, range 1-16). The difference between means was not statistically significant ($t=1.35$, $p=0.18$).

Table 3. Correlations between alcohol-related variables differing between treatment groups at intake (APQ, BSI & DDD) and outcome measures (DDD & APQ)

Outcome variable	Alcohol-related variable at intake		
	DDD r (p)	APQ r (p)	BSI* r (p)
Drinks per drinking at follow-up (DDD)	.53 (.001)	.43 (.001)	.21 (.074)
Alcohol-related Problems at follow-up (APQ)	.20 (.090)	.50 (.001)	.39 (.001)

**Brief Symptom Inventory(BSI), a measure of psychopathology*

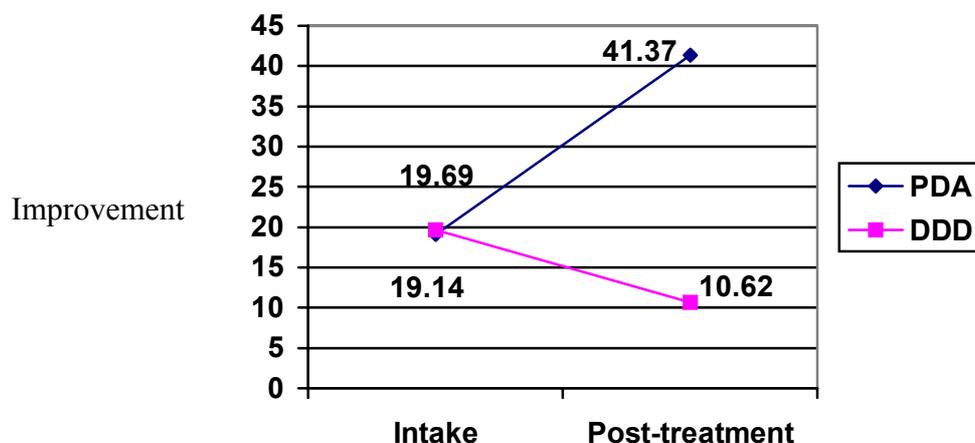
Changes during treatment

A total of 82 clients (90% of the treatment sample) completed a post-treatment assessment. The remainder failed to attend a specially-arranged post-treatment assessment interview.

Alcohol consumption

There was a statistically significant reduction in mean DDD during the 60-day period prior to post-treatment assessment compared with the equivalent period pre-treatment ($\xi=19.69$, $sd=14.42$, to $\xi=10.62$, $sd=6.11$, $z=-5.9$, $p=0.0001$). Subjects also reported a significantly greater PDA at post-treatment assessment compared to pre-treatment assessment ($\xi=19.14$, $sd=23.16$ to $\xi=41.37$, $sd=31.19$, $z=-4.89$, $p=0.0001$). Thus the treatment sample as a whole showed highly significant reductions in alcohol consumption from before to after treatment. These changes are illustrated in Figure 1.

Figure 1. Changes in Drinks per Drinking Day (DDD) and Percent Days Abstinent (PDA) in the total treatment sample from intake to post-treatment assessment.

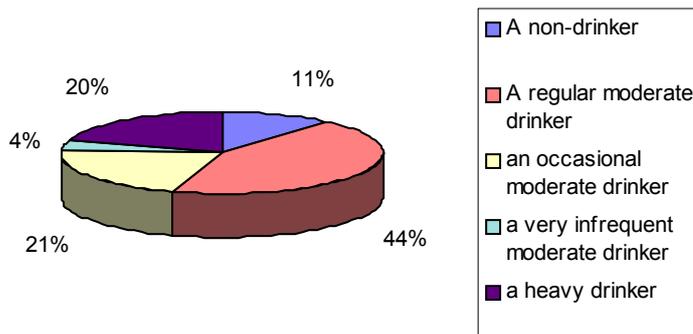


Repeated measures ANOVAs were run with treatment group as the independent variable and DDD or PDA as before-after measures. Results showed no significant differences between treatment groups in changes in these measures from baseline to post-treatment assessment. Thus there were no significant differences between the two treatment groups in changes in alcohol consumption from before to immediately after treatment.

At post-treatment assessment, clients (n=63) were asked how they would best characterise their drinking from the following options: non-drinker/ regular moderate drinker/ drinking with only occasional moderate consumption/ drinking with very infrequent moderate consumption/ heavy drinker. Responses are shown in Figure 2. It will be seen that the majority of clients (44%) described themselves as regular moderate drinkers, while a smaller number (11%) described themselves as non-drinkers. In addition, 21% described themselves as drinking with only

occasional moderate consumption and 4% with very infrequent moderate consumption. The remainder (20%) characterised themselves as heavy drinkers.

Figure 2. Client self-report of drinking category at post-treatment assessment



Psychopathology

Using the global indicator from the psychopathology subset of the BSI, it was found that clients' mean score was significantly reduced at post-treatment assessment (from $\xi=50.17$, $sd=12.0$ to $\xi=33.14$, $sd=18.50$, $t=7.07$, $p<.0001$). In a repeated measures ANOVA, there was no significant difference between groups in changes on BSI scores. Thus the treatment sample as a whole showed a significant improvement in psychopathology from before to after treatment but there was no differential treatment effect.

Expectancies

There were no significant changes in mean CDOES scores from pre- to post-treatment assessment (45.4 , $sd=37.0$ to 53.4 , $sd=38.70$; $t=1.47$, $p=0.15$). However, clients did show a

significantly greater mean CDSEQ score at post-treatment assessment compared to baseline level (from 723.5, $sd=332.1$ to 1147.0, $sd=404.7$; $t = 8.96$, $p=0.0001$). Thus, the treatment sample as a whole showed significantly more confidence in their ability to control drinking at post-treatment than at intake but did not show significantly greater expectations of the benefits of cutting down drinking after treatment. There were no significant differences between treatment groups in changes during treatment on either of the expectancy variables.

Treatment outcome

Six-month follow-up rates

Two clients had died during the follow-up period, one shortly after the post-treatment assessment and the other four months following his last treatment session. From clinical records, there was evidence to suggest that first of these deaths was not alcohol-related but the second was alcohol-related and was therefore associated with a poor treatment outcome.

A total of 77 clients were successfully contacted at the six month follow-up, giving a follow-up rate of 85% (87% of living clients). Of these, 63 clients were seen in person and a further 14 returned mailed questionnaires. There were no significant differences in outcome measures (APQ, DDD or PDA) at follow-up between these two modes of assessment. Compared with those successfully contacted, those lost to follow-up (including the 2 deaths, $n=14$) attended a markedly lower number of treatment sessions (2.79, $sd=1.72$ vs. 7.94, $sd=3.75$). Reasons for loss to follow-up among living clients were: refused ($n=4$), unable to trace ($n=5$), moved away ($n=3$).

Of those clients who were lost to follow-up, 9 came from the MOCE group and 5 from the BSCT group. Thus the follow-up rates for the MOCE and BSCT groups among all clients were 81% and 88% respectively. This difference in rates was not significant ($\chi^2=0.88$, $p=0.35$). In the MOCE group, 30 clients were seen in person (79% of successful contacts), while in the BSCT group, 33 were seen in person (85%). Treatment groups entering the analysis of continuous data consisted of 39 in MOCE and 38 in BSCT.

Baseline levels of GGT were available for 86 (95%) clients and ALT levels for 88 (97%). Among clients successfully followed up, GGT readings were available for 52 clients (68%) and ALT readings for 54 (70%). GGT levels were available on both occasions for 52 clients and ALT levels for 53 clients. In addition, collateral informants were contacted for 33 clients (43%). (In the remainder of the follow-up sample, the collateral source could not be contacted or the client withdrew permission for the source to be contacted at the follow-up point.) Either a GGT reading or a collateral report was available for 57 clients (63%). Rates of blood collection and collateral reports did not differ significantly between MOCE and BSCT groups.

Categorical outcome

Table 4 gives outcome numbers and percentages according to the classification system proposed by Heather and Tebbutt (1989). In this analysis, all clients who were lost to follow-up because they could not be traced were classified as “unimproved”. However, those clients who were contacted but refused a follow-up interview were not regarded as unimproved but were omitted from the analysis because of doubts as to whether such clients in fact have poor outcomes (Sobell *et al.*, 1984). Also omitted were the three clients who had moved away from the area and the client who had died shortly after ending treatment. The client whose death at 4 months post-

treatment was alcohol-related was classified as “unimproved”. The APQ was not completed by one client in a postal follow-up questionnaire. Thus the number of clients entering the analysis in Table 4 was 82. The table shows outcome categories for the total sample, for the two treatment groups, for those above (SADQ-C ≥ 30) or below (SADQ-C < 30) the conventional controlled drinking cut-point, for those above and below the median score on the ICS (=25) and “self” versus all other referral sources.

Table 4. Outcome categories

Treatment Outcome Category	Total Sample N (%)	Treatment Type N (%)		Alcohol Dependence* N (%)		Impaired Control N (%)		Referral Source N (%)	
		MOCE	BSCT	≤ 29	≥ 30	≤ 25	≥ 26	Self	GP/ Other Agency
Abstinent	6 (7)	3 (7)	3 (7)	3 (4)	3 (25)	4 (10)	2 (5)	2 (5)	4 (10)
Non-problem Drinker	14 (17)	7 (17)	7 (17)	12 (18)	2 (16.7)	10 (24)	4 (10)	9 (22)	5 (12)
Much Improved	19 (23)	12 (29)	7 (17)	16 (23)	2 (16.7)	9 (22)	10 (24)	10 (24)	9 (22)
Somewhat Improved	13 (16)	6 (15)	7 (17)	11 (16)	2 (16.7)	5 (12)	8 (20)	6 (15)	7 (17)
Unimproved	30 (37)	13 (32)	17 (42)	27 (39)	3 (25)	13 (32)	17 (41)	14 (34)	16 (39)
TOTAL	82 (100)	41 (100)	41 (100)	69 (100)	12 (100)	41 (100)	41 (100)	41 (100)	41 (100)

*SADQ-C missing for 1 follow-up

In Table 4, “abstinence” is defined as no alcohol consumption during the 60-day period prior to follow-up; “Non-problem drinking” is defined as drinking within the 60-day follow-up period but with a score of zero on the APQ; “Much improved” was defined as drinking together with a positive APQ score but with a reduction on the APQ from baseline to follow-up of at least two-thirds; and “Somewhat improved” entailed a reduction in APQ score of one-thirds or more but less than two-thirds. All clients with reductions in APQ scores of less than one-third were included with those showing no change or increases in APQ score as being “Unimproved” at follow-up. The justification for focussing on a measure of alcohol-related problems in the categorisation of treatment outcome will be found in Heather and Tebbutt (1989).

Inspection of Table 4 shows that 24% of clients given a form of moderation-oriented treatment achieved the stated programme goal of non-problem drinking or were totally abstinent at follow-up. A total of 47% were at least “much improved” at follow-up and altogether 63% had shown at least some improvement over pre-treatment alcohol problem status. In terms of the two treatment methods, an identical percentage (24%) showed a full recovery (abstinence or non-problem drinking) at the follow-up point but somewhat more in MOCE than in BSCT were “much improved” or better (53% versus 41%) and “somewhat improved” or better (68% vs. 58%). However, neither of these differences were found to be statistically significant.

In comparing clients with high or low alcohol dependence on the SADQ-C, a greater proportion of those showing high dependence at intake achieved a full recovery (42%) than those showing low dependence at intake (22%). Similarly, 58% of those in the high dependence group were much improved or better at follow-up compared with 45% of those showing low dependence, while 75% of those in the high dependence group were somewhat improved or better compared with 61% in the low dependence group. However, none of these differences were statistically

significant.

Clients with high or low impaired control scores from the ICS are also compared in Table 4. A greater proportion of those showing low impaired control at intake achieved a full recovery (34%) than those showing high impaired control (15%). This was statistically significant ($\chi^2=4.2, p=0.039$). Higher proportions were also found in the low impaired control group for clients much improved or better (56% vs. 39%) and somewhat improved or better (68% vs. 59%) but these differences were not statistically significant.

Finally from Table 4, outcome between agency-referred and self-referred clients may be compared. Full recovery was achieved by slightly more of the self-referred clients (27%) than the agency-referred clients (22%). There were no marked differences at other levels of categorisation, with 66% of self-referred clients being somewhat improved or better at follow-up compared with 61% of agency-referred clients.

Continuous outcome measures

Table 5 shows means and standard deviations for DDD, PDA and APQ scores at baseline and follow-up. These data are shown for the total sample, for the two treatment groups and for the same subsamples as in Table 4. There now follows the results of a statistical analysis of these three outcome measures (DDD, PDA and APQ).

Drinks per drinking day (DDD)

Main effects

The first analysis to be run was a repeated measures ANOVA of DDD, with treatment type as the independent variable and psychopathology and APQ score at intake as covariates. There was a statistically significant decrease in DDD across the whole sample from intake to follow-up ($F=9.90$, $p=0.002$, see Table 5 for means and sd's). Thus reductions in DDD observed at post-treatment assessment were maintained at follow-up. There were no differential treatment effects between MOCE and BSCT in reductions on the DDD variable.

Table 5. Means and standard deviations of outcome variables (by whole sample, treatment group, level of impaired control, level of dependence and referral source.)

Outcome Variable	Total Sample Mean (SD)	Treatment Type Mean (SD)		Alcohol Dependence Mean (SD)		Impaired Control Mean (SD)		Referral Source Mean (SD)	
		MOCE	BSCT	≤29	≥30	≤25	≥26	Self	Other
Drinks per Drinking Day (DDD)									
<i>Intake</i>	18.5 (12.1)	20.1 (10.6)	16.9 (13.4)	16.4 (10.2)	29.4 (15.4)	14.8 (7.4)	22.1 (14.5)	16.2 (10.6)	21.1 (13.2)
<i>Follow-up</i>	11.1 (9.5)	13.1 (8.9)	9.2 (9.9)	11.3 (9.5)	10.6 (10.4)	8.0 (6.4)	14.4 (11.1)	9.8 (7.0)	12.5 (11.5)
Percent Days Abstinent (PDA)									
<i>Intake</i>	19.69 (14.42)	15.2 (17.6)	10.9 (14.4)	13.9 (17.1)	8.0 (8.7)	14.4 (16.6)	11.9 (16.0)	12.9 (15.4)	13.5 (17.3)
<i>Follow-up</i>	37.12 (32.08)	24.5 (18.2)	20.0 (20.3)	19.6 (18.2)	39.7 (18.7)	23.3 (20.2)	21.2 (18.4)	19.7 (18.4)	25.1 (20.0)
Alcohol-related Problems (APQ)									
<i>Intake</i>	10.0 (4.9)	11.0 (5.0)	8.8 (4.5)	9.2 (4.6)	14.4 (3.9)	8.4 (5.0)	11.7 (4.2)	9.0 (5.0)	11.2 (4.5)
<i>Follow-up</i>	4.5 (4.7)	4.9 (5.1)	4.2 (4.2)	4.5 (4.6)	5.0 (5.7)	3.5 (4.1)	5.7 (5.0)	3.8 (4.4)	5.3 (4.9)

Interactions with alcohol dependence.

To examine possible interactions with dependence, the analysis on DDD was again a repeated measures ANOVA with DDD as the dependent variable, but this time with treatment group and

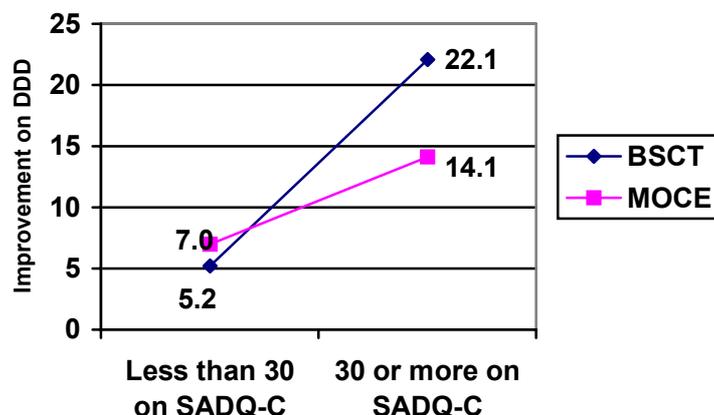
high versus low alcohol dependence as the independent variables. BSI score and APQ score at baseline were included as covariates. The results of this analysis are shown in Table 6.

Table 6. Comparisons of treatment outcome (DDD) between treatment groups for high/low alcohol dependence and high/low impaired control over drinking.

Treatment Modality by.....	<i>f</i>	<i>p</i>	<i>Covariates</i>	
			<i>APQ</i> <i>t (p)</i>	<i>BSI</i> <i>t (p)</i>
Alcohol Dependence (29 or less, 30+ on SADQ-C)	7.88	0.007	2.63 (.01)	.92 (.36)
Impaired Control (25 or less & 26+ on ICS)	1.85	0.178	2.7 (.009)	1.2 (.23)

Those in the higher dependence group (n=10) showed significantly greater reduction in DDD at follow-up than those reporting lower levels of dependence (n=64), (F=15.51, p=0.001, ξ =16.8 (sd=15.15) improvement on DDD for those with high dependence, compared to ξ =6.0 (sd=7.96) for those lower in dependence). There was a statistically significant interaction with treatment condition (see Table 6). Those high in alcohol dependence showed a greater improvement if they had received BSCT (n=4) than if they had received MOCE (n=6), (ξ =22.1 (sd=8.99) units of change in DDD for BSCT compared to ξ =14.1 (sd=17.58) for MOCE). This interaction is illustrated in Figure 3 below and is contrary to the stated hypothesis. However, the small numbers entering this analysis should be noted. Those low in dependence showed little difference in outcome between treatments (ξ =5.2 (sd=5.36) units of change in DDD for BSCT compared to ξ =7.0 (sd=9.98) for MOCE).

Figure 3. Interaction between treatment type and alcohol-dependence on DDD.



Interactions with impaired control

A further analysis was a repeated measures ANOVA with DDD as the dependent variable, and treatment group and high versus low impaired control as the independent variables. BSI score and APQ score at baseline were included as covariates. The results of this analysis (i.e., the “within subjects” effects relevant to change) are shown in Table 6. Using the median average (because of highly skewed distributions) those in the lower impaired control group improved almost twice as much in terms of DDD as those in the higher impaired control group ($\xi=5.53$ units of improvement on DDD compared to $\xi=3.37$ units). However, this was not statistically significant.

Those in the lower impaired control group appeared to do slightly better in the MOCE group than the BSCT group ($\xi=8.5$ units of improvement in DDD for the MOCE group, compared to $\xi=6.2$ for BSCT) for whom there was a poorer outcome than those reporting high levels of impaired control ($\xi=7.5$ units). However, these differences were not statistically significant (see

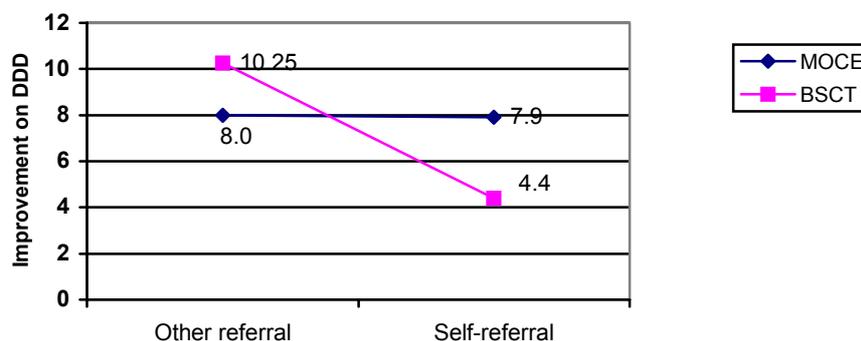
Table 6 above). Those high in impaired control over drinking appeared to fare equally well in either treatment group (mean changes = 7.4 for BSCT and 7.6 MOCE).

Interactions with referral source

The final analysis on DDD was a repeated measures ANOVA with DDD as the dependent variable, but with treatment group and *referral group* (other vs. self- referrals) as the independent variables. BSI score and APQ score at baseline were included as covariates.

The differential level of improvement in DDD between “other” and “self” referrals was on the borderline of statistical significance ($F=3.94$, $p=0.052$), with the mean level of improvement on other-referrals being 8.9 (sd=9.4) and self-referrals 6.0 (sd=9.8). There was a statistically significant interaction effect between treatment type and referral source ($F=4.65$, $p=0.035$), which is illustrated in Figure 4.

Figure 4. Interaction between treatment type and referral source in improvement on DDD.



From Figure 4, it can be seen that MOCE was equally effective for both sources of referrals in terms of improvement on DDD; however, BSCT showed a higher level of improvement than MOCE among other-referrals and a lower level of improvement among self-referrals.

Alcohol-related problems (APQ score)

Main effects

As with the DDD variable, the first analysis run on APQ scores was a repeated measures ANOVA with treatment type as the independent variable and BSI and DDD scores at intake as covariates. There was a statistically significant improvement in alcohol-related problems across the whole sample ($F=14.02$, $p<0.001$). Again, improvements observed at post-treatment assessment were maintained through to the six-month follow-up period (see Table 5 for means and sd's). However, there was no statistically significant differential treatment effect.

Interactions with alcohol dependence

A further repeated measures ANOVA was run with APQ score as the dependent variable and treatment condition and high/low alcohol dependence as independent variables. DDD and BSI score at intake were added as covariates. Results are shown in Table 7 below.

Table 7. Comparisons of treatment outcome (APQ score) between treatment groups for high/low alcohol dependence and high/low impaired control over drinking.

Treatment Modality by.....	<i>f</i>	<i>p</i>	<i>Covariates</i>	
			<i>DDD</i> <i>t (p)</i>	<i>BSI</i> <i>t (p)</i>
Alcohol Dependence (29 or less, 30+ on SADQ-C)	0.49	0.49	1.6 (0.12)	5.16 (0.001)
Impaired Control (25 or less & 26+ on ICS)	0.15	0.70	1.0 (0.3)	4.5 (0.001)

In terms of alcohol dependence, it was found that those higher in dependence showed greater improvement in alcohol-related problems than those low in dependence (8.8 mean units of change in APQ score compared to 4.5). There was little evidence of a differential treatment effect for either low (3.27 mean units of change on APQ score for BSCT compared to 6.0 for MOCE) or high dependence (9.8 mean units of change for BSCT compared to 8.3 for MOCE) drinkers. None of these values reached statistical significance.

Interactions with impaired control

Again, a repeated measures ANOVA was run with APQ score as the dependent variable and treatment condition and high/low impaired control as independent variables. DDD and BSI score at intake were added as covariates. Results are shown in Table 7.

On this occasion, there were no significant main effects or interactions. Those low in impaired control at baseline showed a similar reduction in APQ scores to those high in impaired control (4.8 mean units of change in APQ score for the former compared to 5.6 for the latter). There was little evidence of a differential treatment effect for those higher in impaired control (APQ, $\xi =$

5.0 BSCT, $\xi=6.0$ MOCE). However, those lower in impaired control appeared to show a greater improvement in the MOCE group than the BSCT group, although this was non-significant (6.7 mean units of change in APQ score for MOCE compared to 3.3 for BSCT).

Interactions with referral source

The final analysis on APQ scores was a repeated measures ANOVA with APQ as the dependent variable and with treatment group and *referral source* (other- vs. self-referrals) as the independent variables. BSI and DDD scores at baseline were included as covariates.

There were no statistically significant differences in the level of improvement in APQ scores between referral sources. In addition, there were no treatment by referral source interactions observed.

Percent Days Abstinent (PDA)

Main effects

Using a Wilcoxon Signed-rank Test (a non-parametric test because of the highly skewed distribution of the PDA variable), a statistically significant increase was observed across the whole sample in the number of days abstinent at follow-up compared to intake ($z=-4.68$, $p=0.0001$) (see Table 5). In order to assess any differential treatment effect, a simple factorial ANOVA using the difference scores of PDA from intake to follow-up (a normally distributed variable) was run. No statistically significant treatment effect was observed ($F = 0.98$, $p=0.33$)

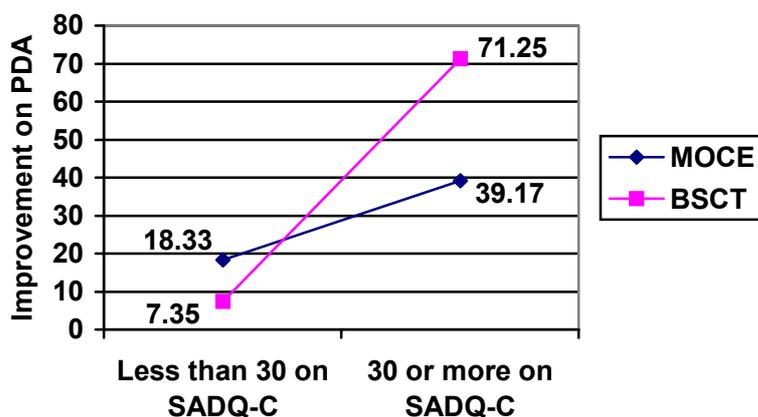
(14.08 mean increase in PDA for BSCT compared to 20.83 days for MOCE).

Interactions with alcohol dependence and impaired control

Two simple factorial ANOVAs were conducted with the PDA difference score as the dependent variable, one with treatment modality and high/low alcohol-dependence and the other with treatment modality and high/low impaired control as independent variables. PDA, BSI and APQ scores at intake were used as covariates. The results are detailed below.

Alcohol dependence: there were differences observed in the PDA variable between those in the high dependence group and those in the low dependence group. Those higher in dependence had a much greater increase in the number of days abstinent at follow-up ($\xi=52.00$ difference in PDA compared with $\xi=12.59$ for those in the low dependence group). This was found to be statistically significant ($F=17.35$, $p=0.0001$). In addition, there was a significant two-way interaction between dependence group and treatment group on the level of improvement in PDA ($F=5.39$, $p=0.02$, low dependence, MOCE, $\xi=18.33$ ($sd=27.3$), BSCT, $\xi=7.35$ ($sd=22.0$) and high dependence, MOCE $\xi=39.17$ ($sd=39.40$), BSCT $\xi=71.25$ ($sd=23.10$). This is illustrated in Figure 5 where it will be seen that clients low in dependence appeared to benefit more from MOCE than BSCT whereas those with high dependence at baseline benefited more from BSCT than from MOCE.

Figure 5. Interaction between treatment type and alcohol-dependence on PDA.



Impaired Control: there were no statistically significant interactions observed in the level of improvement in PDA for those low or high in impaired control or in either treatment modality.

Interactions with referral source

To assess the effects of referral source on PDA, a simple factorial ANOVA was used with PDA difference score as the dependent variable, treatment type and referral source as the independent variables and BSI score, APQ score and PDA at intake as covariates. There was no statistically significant difference in the level of improvement in PDA between referral sources and no statistically significant interaction with treatment type.

Changes in GGT

A further analysis was made with the GGT difference score as an outcome measure in a simple factorial analysis. Two analyses were conducted, one with treatment type and high/low impaired control and the other with treatment type and high/low dependence as independent variables.

Both analyses used BSI score, DDD and APQ score at intake as covariates. Although there was a significant improvement in GGT from intake to follow-up in the total sample ($t=2.10$, $p=0.04$), there were no differential treatment, impaired control or dependence effects observed. Similarly, there were no significant interactions between these factors.

Effects of treatment attendance

Correlations were calculated between the number of treatment sessions attended and outcome of treatment, expressed as the difference between baseline and follow-up scores for DDD and APQ.

Across the whole sample, treatment attendance was significantly related to level of improvement in alcohol-related problems (APQ) ($r=0.26$, $p=0.02$) but not drinks per drinking day (DDD). There was no differential treatment effect.

Changes in psychopathology

A repeated measures ANOVA was used to assess the impact of treatment on global psychopathology scores. Treatment modality was added as a factor and DDD and APQ at intake as covariates. There was a statistically significant improvement in BSI global psychopathology scores for the whole sample from intake to follow-up (mean=51.35, $d=11.91$ to 40.66, $sd=17.56$) $F=32.79$, $p=0.001$). Thus improvements in global psychopathology observed at post-treatment were maintained at follow-up.

There was also a statistically significant treatment interaction at follow-up, not observed at the post-treatment assessment ($F=4.32$, $p=0.04$), which favoured the MOCE treatment (mean level of

improvement in MOCE group = 15.24 (sd=18.62, n=36) and in the BSCT group = 7.23 (sd=11.66, n=30.)

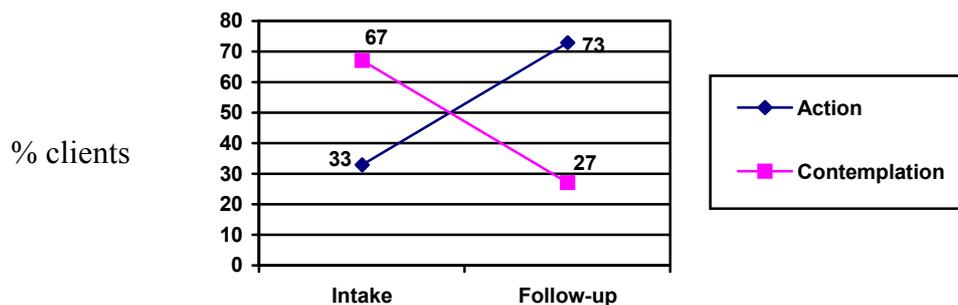
Changes in impaired control

There was a statistically significant improvement in clients' level of impaired control over drinking ($F=58.76$, $p=0.0001$) across the whole sample. The mean level of impaired control at intake was 24.50 (sd=6.84) and at follow-up 17.11 (sd=7.95), reflecting an improvement in the number of times clients successfully exercised control over their drinking. There were no statistically significant differential treatment effects with, on average, both treatments reducing the level of impaired control by seven units.

Changes in readiness to change

There was a statistically significant change in clients' stage of change as assessed by the RCQ-TV from intake to follow-up ($\chi^2=21.81$, $p=0.0001$). At intake 67% of clients were in the contemplation stage and 33% in the action stage (n=86, 4 missing); at follow-up there were 73% in the action stage and 27% in the contemplation stage (n=66, 25 missing). This change is illustrated in Figure 6. below.

Figure 6. Overall changes in 'Readiness to Change' status from intake to follow-up.



Changes in alcohol expectancies

There was a statistically significant improvement at follow-up in reports of clients' confidence in controlling their drinking when compared to confidence at intake ($F=41.47$, $p=0.0001$) (intake, $\xi=709.9$, $sd=337.4$; follow-up $\xi=1028$, $sd=1060.0$). Treatment modality did not produce any significant differential result.

The relationship between alcohol expectancy at intake (CDSEQ) and outcome measures at follow-up was assessed using a correlation analysis (Spearman's Rho because of a non-normal distribution of data). There was a statistically significant, negative relationship between DDD at follow-up and CDSEQ at intake ($r=-.27$, $p=0.023$). Therefore, greater confidence in the ability to control drinking at intake was associated with fewer drinks per drinking day at follow-up. The relationship between alcohol-related problems and CDSEQ was on the borderline of statistical significance ($r=-0.23$, $p=0.049$), suggesting that greater confidence over drinking at intake was also associated with fewer alcohol-related problems at follow-up. There was no relationship observed between CDSEQ and PDA. In addition, an assessment was made of the relationship between the level of improvement in self-efficacy (using difference scores) and associated improvements in outcome measures using a correlation analysis. There was a statistically significant relationship between improvement on CDSEQ and all outcome measures (DDD, $r=-0.30$, $p=0.01$, PDA, $r=0.31$, $p=0.008$, APQ, $r=-0.50$, $p=0.001$).

Although there was a significant improvement across the whole sample in controlled drinking outcome expectancy (CDOES) ($t=-3.31$, $p=0.001$), suggesting that following treatment clients held greater expectations of the benefits of cutting down on their drinking, there was no differential treatment effect. In a similar correlation analysis to the above, the relationship

between CDOES at intake and outcome variables (DDD, APQ, PDA) was assessed, but no statistically significant relationships were observed.

Differences between therapists

Differential treatment outcome was compared between therapists using a repeated measures ANOVA technique with DDD and APQ as the dependent variables (with BSI score and the dependent variable at intake as covariates). There were no statistically significant differences observed between therapists on either of the outcome measures. In a Mann Whitney U Test of PDA difference scores, no statistically significant differences were observed between therapists.

Confirmation of self-reports

To check the validity of self-report measures of drinking, biological data (intake and follow-up) and collateral information from a significant other (follow-up only) were collected. Using a correlation analysis on liver function tests taken at intake, it was found that there was a significant positive correlation between both DDD and APQ score at intake with ALT ($r=0.27$, $p=0.011$, $r=0.22$, $p=0.04$ respectively). GGT was not found to be significantly correlated with outcome measures at intake (DDD, $r=0.13$, $p=0.21$; APQ, $r=0.13$, $p=0.23$).

At follow-up a similar analysis was made using Spearman's rho correlations (due to non-normality of data) on outcome measures at follow-up and liver function tests at follow-up. At follow-up GGT had a significant relationship with DDD and APQ score ($r=0.43$, $p=0.03$; $r=0.42$, $p=0.03$). ALT was not found to be significantly correlated with outcome.

A further variable for corroborating clients' self-reports was the significant others' rating of the level of the client's alcohol-related problems. This was measured by 12 questions taken from the Form 60 collateral questionnaire, the scores for which produced a continuous outcome measure of alcohol-related problems as judged by the significant other at follow-up (potential range of scores 0-36). A correlation analysis was made of the significant other's rating of the client's alcohol-related problems and the client's own ratings from the APQ. There was a statistically significant positive correlation between these two measures ($r=0.78$, $p=0.0001$). Thus, greater levels of alcohol-related problems, as deemed by the significant other, were associated with greater levels of alcohol-related problems as reported by the client. The significant others' reports of clients' alcohol consumption were not found to be accurate enough to include in this analysis; in most cases, significant others were not aware of how much the client was drinking.

Health-care utilisation

An examination was made of the health care utilisation of clients participating in the trial. Details were collected on the quantity and type of health care contact in the *three* months prior to intake assessment and to follow-up assessment and a cost attached to each. Details of both alcohol- and non-alcohol- related contacts were collected. An examination was made of changes in the frequency of alcohol-/non-alcohol-related health care utilisation from before to after treatment and finally, a cost-benefit analysis of treatment was carried out.

Non-alcohol-related health care

At intake only 10% of respondents had received any form of inpatient care in the previous six months ($n=9/87$, 4 missing, mode=1 night); at follow-up this rate had reduced slightly to 7% of

respondents (n=5/67, 24 missing, mode = 1 night). This difference was not statistically significant. There were 22% of respondents at intake receiving some form of outpatient care (n=19/87, modal number of visits = 1) and this had reduced to 13% at follow-up (n=9/67, 24 missing, modal number of visits =1). This difference was not significant. Day programme attendance was reported at intake by only one client (a bladder operation) and at follow-up no clients reported receiving day services.

Visits to hospital accident and emergency departments were reported by 16% (n=12/86, 5 missing) of the sample at intake (separate number of visits = 15, mode = 1). Reasons for attendance are outlined in Table 8 below. There were fewer reports of accident and emergency visits at follow-up (8%, N=5/66, 25 missing) and the reasons for these visits are outlined in Table 8. The difference from before to after treatment approached, but did not reach, statistical significance (z=-1.70, p=0.088).

Table 8. Reasons for visits to Accident & Emergency units at intake and follow-up.

INTAKE		FOLLOW-UP	
Reported Reason	N	Reported Reason	N
<i>Client collapsed</i>	1	<i>Broken limbs</i>	2
<i>Head pains</i>	1	<i>Stitches</i>	1
<i>Broken limbs</i>	2	<i>Fell when drunk</i>	1
<i>Assault</i>	1	<i>Burns</i>	1
<i>Blackout</i>	1		
<i>Fight</i>	1		
<i>Injury</i>	1		
<i>Suspected coronary</i>	1		
<i>Attempted suicide</i>	3		
<i>Burns</i>	1		
<i>TOTAL (2 missing)</i>	13	<i>TOTAL</i>	5

At intake 67% of clients (n=58/86, 5 missing) reported that they had visited their general practitioner for non-alcohol-related consultations during the previous three months, constituting 127 separate visits. The modal number of visits was 1, the mean 1.6 (sd=1.77). At follow-up, 46% reported visiting their GP (n=31/67, 24 missing) representing 52 separate visits (modal number of visits =1, $\xi=0.81$ (sd=1.54)). There was a statistically significant difference between the number of GP visits at intake and at follow-up (Wilcoxon Signed Ranks Test, $z=-3.08$, $p=0.002$). In addition, there was also a statistically significant difference in the number of clients being prescribed drugs from intake to follow-up ($z=-2.69$, $p=0.007$), at intake, 72% (n=42/58) were prescribed drugs, whilst at follow-up 84% were prescribed (n=26/31). Therefore, at follow-up, there were significantly *less* clients visiting their GP than at intake however, a *greater* percentage of these visits resulted in a prescription for medication.

There were no statistically significant differential treatment effects for non-alcohol-related health care utilisation from intake to follow-up.

Alcohol-related health care

At intake 6% of clients in the sample had received inpatient care for problem drinking in the three months prior to the current episode (n=5/86, 5 missing). Of the five clients who received inpatient care, the mean number of days stay was 10.4 (sd=7.16) and all five were seen at a statutory, specialist hospital for alcohol and other drug problems. At follow-up, no clients received inpatient care for an alcohol problem. This difference was found to be statistically significant (McNemar Test, p=0.03).

At intake there were no clients who had received services at a rehabilitation centre for problem drinkers; at follow-up one client (n=1/65, 5 missing) had received non-statutory rehabilitation services for 1 night. Day programmes for alcohol-related problems were attended by 6% of the sample at intake (n=5/86, 5 missing) (number of attendances, ξ =7.8, sd=4.71) and at follow-up this was only 3% (n=2/65, 26 missing, attendances ξ =4, sd=2.83). These differences were not found to be statistically significant (Wilcoxon Signed Ranks Test, z=-1.69, p=0.09).

At intake, only 9% of the sample reported alcohol-related outpatient visits, (n=8/86, 5 missing, mean number of visits =2.63, sd=1.19, mode=3); all of these visits (total number of separate visits N=21) were to a statutory sector service. At follow-up there were also 9% of the sample receiving some form of outpatient care (not the same 9% as at intake) (n=6/66, 25 missing, ξ number of visits=5.17, sd=4.02, mode=2). About half of the visits to alcohol-related outpatient services at follow-up were to non-statutory services (14 out of 31 separate visits). There were no

statistically significant differences observed between the number of visits at intake and the number at follow-up.

In terms of alcohol-related visits to a general practitioner, at intake 21% (n=18/86, 5 missing) visited their GP compared with only 9% at follow-up (n=6/67, 24 missing). The mean number of visits at intake was 1.39 (sd=0.61, mode=1) and at follow-up, 2 (sd=2, mode=1). The total number of separate visits at intake was 25, while at follow-up this was reduced to 12. This difference was statistically significant ($z=-2.29$, $p=0.02$). At intake, two clients received prescriptions for medication and at follow-up this rose slightly to 3.

There were no statistically significant differential treatment effects observed in the alcohol-related health care utilisation of clients from intake to follow-up.

Cost-benefits of treatment

An examination was made of the cost-benefits of controlled drinking treatment. Two separate costs were calculated for *each* client. The first comprised the total cost of health care utilisation in the three months prior to intake. The second, the total cost of health care utilisation in the three months prior to the six-month follow-up point. These two costs were based on average figures for *types* of health care contacts; for example, an average inpatient stay had an associated cost of £192.00. This was not specific to any health care specialty (e.g., mental health) but an indicator of an average cost across the whole health service. The costs were generated from three sources: the Health Services Financial Database (1996/97), the Department of Health Expenditure Plans (95/96 to 97/98) and data from the Centre for Health Economics, York.

In terms of the total costs of health-care utilisation (alcohol- and non-alcohol-related) for the

whole sample, there was a statistically significant decrease observed from intake to follow-up (intake, ξ =£366.43 (sd=796.17); follow-up, ξ = £127.80 (sd=282.51), z =-3.57, p =0.0004). There were no statistically significant differential treatment effects in health care utilisation costs, as shown in Figure 9 below.

Table 9. Health care utilisation associated costs at intake and follow-up by treatment

HEALTH CARE UTILISATION COSTS (£)		
<i>(average cost per client, includes both alcohol & non-alcohol related treatment costs)</i>		
Assessment period (p)	BSCT (ξ (sd))	MOCE (ξ (sd))
<i>Intake (NS)</i>	370.92(802.86),	362.53(799.17),
<i>Follow-up (NS)</i>	133.02(335.85).	122.42 (219.72).

Non-alcohol related treatment

Using the whole treatment sample, the mean cost *per* client of treatment for non-alcohol-related health care in the three months prior to intake was £170.20 (sd=523.22). In the three months prior to follow-up, this had decreased to £81.55 (sd=249.01). This difference was found to be statistically significant using a Wilcoxon Signed-ranks test (z =-2.82, p =0.005). There was no statistically significant difference observed in cost reductions between the two trial treatments.

Alcohol-related treatment

Again, using the whole treatment sample the mean cost of treatment, this time for alcohol-related health care in the three months prior to intake, was £196.23 (sd=611.57). At follow-up this had decreased to £50.47 (sd=155.14), based again on the three months prior to follow-up assessment.

This difference was found to be statistically significant using a Wilcoxon Signed-ranks test ($z=-2.53$, $p=0.01$). There was no statistically significant difference observed in cost reductions between the two trial treatments.

Outcome among clients with high dependence at intake

It was reported earlier that, irrespective of treatment modality, clients with high dependence scores at intake to treatment (i.e., 30 or above on the SADQ-C) showed a significantly greater decrease from baseline to follow-up in drinks per drinking day and a significantly greater increase in percentage days abstinent than clients showing low dependence scores at intake. Since these results appear to contradict conventional practice regarding the level of dependence at which moderation-oriented treatment is considered to be beneficial, they are of special interest. We therefore examined in some detail the characteristics of the 14 clients who came into the high dependence category, paying particular attention to baseline characteristics, outcome of treatment and available data on the validity of clients' self-reports. Data relevant to these issues for each of the 14 clients in question will be found in Table 10. Information from collateral sources was available for only 5 of the 14 clients and these data are therefore omitted from Table 10.

As shown in Table 10, mean SADQ-C score at intake for these 14 clients was 37.57 ($sd=5.1$) ranging from 30 to 46 (see Table 5 for a breakdown of the characteristics of the high/low dependence groups compared to the whole sample). All but one of these clients were male. Five were referred to the project from general practitioners, one from another alcohol agency, one from a general hospital physician and seven clients were self-referrals. Levels of drinks per drinking day were on the whole very high and percentage days abstinent low, while level of

alcohol-related problems and impaired control over drinking were moderately severe compared to a typical population of problem drinkers in treatment.

Table 10 also shows that there were nine clients with what appear to be positive treatment outcomes (clients 1,2,3,4,6,8,12,13,14). Three of these reported being totally abstinent at follow-up, two reported drinking without any problems, two were classified as much improved and two as somewhat improved (see above for definitions of these categories). Thus it is not the case that positive outcomes among these clients were confined to those who became totally abstinent despite the treatment they had received. Neither was there any tendency for those who became abstinent to show relatively higher dependence or alcohol-related problems than those who were drinking but improved.

Levels of GGT at both intake and follow-up were available for 7 of the 9 clients showing a putative positive outcome. In 4 of these cases a reduction in GGT was evident, in one case GGT remained at the same level, and in two cases self-reports of non-problem drinking or “much improved” status appear to be contradicted by increases in GGT.

Table 10. Characteristics of those in the high alcohol-dependence group (SADQ-C >29).

ID	SEX	AGE	REFERRAL SOURCE	TREATMENT GROUP	INTAKE						FOLLOW-UP				OUTCOME CATEGORY
					SADQ	DDD	PDA	APQ	ICS	GGT	DDD	PDA	APQ	GGT	
1	M	30	GP	BSCT	46	37	5	15	31	34.6	6	50	7	17.9	Somewhat improved
2	M	33	GP	BSCT	41	62	3	16	26	48.0	6	67	0	26.7	Non-prob. drinker
3	M	29	Alc. Agency	MOCE	45	37	0	10	8	21.5	9	7	2	21.8	Much improved
4	M	30	GP	MOCE	43	24	17	15	24	42.7	0	100	0	-	Abstinent
5	M	42	Self	MOCE	37	27	0	17	3	44.0	-	-	-	-	Unimproved*
6	M	39	Gen. Hosp.	BSCT	37	22	0	8	-	-	0	100	3	-	Abstinent
7	M	30	Self	BSCT	41	27	0	18	10	43.0	-	-	-	-	-**
8	M	30	Self	MOCE	30	24	0	15	9	82.8	19	73	10	47.9	Somewhat improved
9	M	49	GP	MOCE	34	19	32	15	10	135.0	-	-	12	-	Unimproved
10	M	34	GP	MOCE	39	26	13	22	4	49.9	29	42	17	16.1	Unimproved
11	M	29	Self	MOCE	35	27	13	15	33	96.6	-	-	-	-	Unimproved*
12	M	36	Self	BSCT	31	13	23	13	33	68.7	0	100	3	40.3	Abstinent
13	F	41	Self	MOCE	32	9	27	7	15	27.1	14	83	0	49.7	Non-prob. drinker
14	M	50	Self	MOCE	35	60	43	16	16	143.0	24	50	1	162.0	Much improved

*(5) Unable to trace at follow-up, categorised as unimproved

*(11) Refused to take part in follow-up, categorised as unimproved

** (7) Moved out of the area therefore a category of unimproved cannot be assumed (Sobell *et al* 1994)

DISCUSSION

The treatment sample

The chief difference between the sample studied here and the typical clientele of moderation-oriented treatment programmes in the UK is that, although the average level of alcohol dependence was low, the sample included individuals with higher levels of dependence who would not normally be offered a moderation-oriented treatment regime. Fourteen clients who received treatment in the trial had scores on the SADQ-C that were above the commonly-accepted cut-point for a controlled drinking goal (>29). We will discuss treatment outcome among these 14 clients below.

It must nevertheless be stressed that the present sample was far less impaired than a typical sample of problem drinkers attending specialist treatment service in Britain and who would mainly be offered abstinence-oriented treatment. For example, in the sample described by Heather *et al.* (1998), a third of whom were drawn from the same treatment centre (NORDAS) in which the present trial took place, mean weekly consumption was 171 units per week compared with an baseline consumption of 107 units per week here. In the Heather *et al.* (1998) sample, the mean level of alcohol dependence from the SADQ was 33.5 and the mean level of alcohol-related problems from the APQ was 28.0. This compares with 18.7 and 10.0 here. In addition there are differences between the two samples in employment status (25% employed vs. 51%), educational level (20% with further education vs. 31%) and relationship status (31% married or cohabiting vs. 53%). Thus the present sample showed lower levels of alcohol consumption,

dependence and problems and higher levels of social stability and, probably, socio-economic status than the typical population of individuals receiving treatment for alcohol problems in specialist services.

It is of some interest that those clients who were found to be suitable for the trial at screening but who did not attend for assessment showed a higher level of psychopathology and a much higher level of alcohol dependence than those who attended for assessment. It may be that, on the basis of information provided at screening, these clients decided or were persuaded that a moderation goal was unsuitable for their problems and that this is why they failed to attend for assessment. It should also be noted that clients who were assessed and found appropriate for the trial but who failed to attend any treatment sessions were more likely to be unemployed than those who attended at least one treatment session. Both types of self-selection would tend towards to more favourable prognosis among the treatment sample studied.

A further difference between the present sample and the conventional population of problem drinkers in treatment was that the former included 64% who referred themselves to the project via newspaper advertisements. These clients were more likely to be women and to be in employment than those referred from general practitioners or other agencies and also showed lower alcohol dependence and alcohol-related problem scores. They were in addition less likely to have received treatment in the past. Thus it seems that the trial attracted a sizeable proportion of problem drinkers with relatively mild problems who may have been deterred from seeking treatment through conventional channels and were perhaps more than usually sensitive to the stigma of an alcohol-related diagnosis. The advantages of the moderation goal for early intervention in this kind of population were noted above (see also Sobell & Sobell, 1995). The

outcome of treatment for self-referred clients compared with that for the conventional referrals will be considered below.

Outcome of moderation-oriented treatment

Before summarising results bearing on the comparison between the two forms of treatment under study, we will consider the effects of moderation-oriented, or “controlled drinking”, treatment as a whole. It should first be noted that the mean number of treatment sessions attended by clients in the trial was just over 7; thus, compliance with treatment was on the whole satisfactory and a substantial “dose” of treatment was received by most clients in the sample. There was no evidence of any differences in the effectiveness of the two therapists who carried out the treatment.

It is clear that the treatment delivered in this trial was associated with clear benefits to clients. Immediately after receiving either type of treatment, clients showed substantial decreases in alcohol consumption; average drinks per drinking day nearly halved and the average percentage of days abstinent in the previous two months was more than doubled (see Figure 1). After treatment, 44% of clients described themselves as regular moderate drinkers, while 25% saw themselves as engaging in only occasional or infrequent moderate drinking (see Figure 2). It is interesting that, immediately after completing a programme of moderation-oriented treatment, 11% of the sample saw themselves as non-drinkers. The tendency for some people who have received treatment aimed at moderation to become abstainers has been noted previously (Heather *et al.*, 1986; Miller *et al.*, 1992).

Decreases in alcohol consumption and problems following treatment were accompanied by improvements in other domains. The treatment sample as a whole showed a marked decrease in psychopathology from before to after treatment and reported substantially more confidence in the ability to control drinking. However, there was no statistically significant increase at post-treatment in clients' perceptions of the benefits of cutting down drinking.

A follow-up scheduled at six months after the end of treatment succeeded in obtaining information from 85% of clients and it was evident that the gains at post-treatment assessment had been maintained at follow-up. The reduction in average drinks per drinking day and the increase in percentage days abstinent were approximately equivalent to those recorded at post-treatment assessment (see Figure 3). The mean number of alcohol-related problems had more than halved while the sample as a whole showed a significant decrease in a measure of impaired control over drinking. There was also a significant reduction from pre-treatment to follow-up in the mean level of GGT, thus tending to confirm the self-reported reduction in alcohol consumption. There was in addition a weak but statistically significant relationship between improvement expressed as reductions in alcohol-related problems and the number of treatment sessions a client had attended, adding some confidence to the inference that it was the effects of treatment that were responsible for the improvements seen.

At follow-up, improvements in drinking outcome continued to be accompanied by improvements on other measures. Thus, decreases in psychopathology seen at post-treatment were maintained at follow-up. The increase in clients' confidence in being able to control drinking that had been observed at post-treatment continued to be seen at follow-up and, in addition, it was found that level of self-efficacy at baseline was weakly but significantly associated with positive outcomes at follow-up. Unlike the post-treatment assessment, the follow-up assessment revealed a

significant increase in clients' expectations of the benefits of cutting down drinking. However, there was no evidence of an association between the intake level of outcome expectancies and follow-up drinking measures. There was also a highly significant change in clients' "readiness to change" from baseline to follow-up (see Figure 5). At pre-treatment assessment, 67% of clients were in the contemplation stage of change and 33% were in the action stage, whereas at follow-up, 27% were in the contemplation stage and 73% were in the action stage.

In terms of categorical outcome, a total of 24% of clients followed-up reported a full recovery, defined either as total abstinence or as drinking without any alcohol-related problems in the previous two months (see Table 4). A further 23% were classified as much improved and 16% as somewhat improved, making a total of 63% with evidence of some improvement in drinking status from pre-treatment to follow-up.

How do these success and improvement rates compare with those from previous trials of moderation-oriented treatment? Exact comparisons are difficult because of varying methods of data collection and different criteria for outcome categories. However, in an evaluation of three kinds of controlled drinking treatments, Miller (1978) found that 59% of clients were either abstinent or problem-free controlled drinkers according to self-report at follow-up one year after the commencement of treatment (the follow-up closest in time to our follow-up six months from the *end* of treatment); 54% were "moderately improved" or better according to non-contradicted criteria. From their comparison of bibliotherapy, individual and group BSCT training, Miller and Taylor (1980) reported that 69% of clients were at least "moderately improved" in terms of alcohol consumption at one-year follow-up. Miller *et al.* (1980), comparing focused with broad-spectrum BSCT, found that 69% of clients were "improved", defined as a confirmed reduction in consumption of one-third or more.

Given that many of the clients in the Miller studies received only a BSCT self-help manual, the above results appear somewhat better than those reported here. However, it is clear that these clients had lower levels of consumption, and probably lower degrees of alcohol-related problems and dependence, than our sample. The approximate average consumption at intake in these studies was 50 units per week (converted to UK standard units from US units); in our study the average baseline consumption was 107 units per week. Taking this difference into account, treatment outcome in the present study appears at least as favourable as that in the earlier studies by the Miller group.

Results from the present study can also be compared with those from an earlier British trial (Robertson *et al.*, 1986) which involved a comparison of minimal and intensive forms of controlled drinking treatment interventions. In this earlier study, mean consumption at baseline was 92 units per week and mean SADQ score was 14.1. Thus this sample showed somewhat lower consumption and dependence levels than the present sample. The overall success rate (defined as total abstainers and those drinking below 50 units/week for men and 35 units/week for women over the four weeks of the heaviest drinking month in the previous six) was 49% of those followed up and 43% when those lost to follow-up were counted as failures. The total “improved” rate, including clients drinking over prescribed limits but with reductions on “drinking symptom” scores, was 61% of those followed up and 54% when those lost to follow-up were counted as failures. Given especially the generous criteria for “controlled drinking” used in the earlier study, the results of the present trial among a heavier drinking and more dependent sample compare favourably with those reported by Robertson *et al.* (1986).

Health care utilisation and cost-benefits of moderation-oriented treatment

An important aspect of treatment outcome concerns changes in the use made of health care resources by clients in the trial. The analysis of this issue was based on clients' reported health care utilisation during the three months prior to initial assessment compared with that during the three month period from the end of treatment to follow-up.

In the treatment sample as a whole, this analysis found highly significant reductions from before to after treatment in non-alcohol-related GP consultations and the number of these consultations at which drugs were prescribed. There were also significant reductions in alcohol-related GP consultations and alcohol-related inpatient stays in hospital. Reductions in visits to accident and emergency departments and attendance at day programmes for alcohol-related problems approached significance. There were no differences between the two treatment groups on any of these variables.

These data should be seen in a context where the health care utilisation of the sample was initially low and where the "window" for recording this utilisation was relatively short at three months before assessment. Nevertheless, reductions in the health care utilisation of the sample as a whole were observed.

When health-care utilisation of all kinds was costed, there were highly significant reductions in costs per client. The total mean reduction in costs was nearly £240 per client. Savings were observed for both alcohol-related and non-alcohol-related health care. Non-alcohol-related costs were more than halved while those for alcohol-related health care were reduced by

approximately three-quarters. This evidence suggests that moderation-oriented treatment produces substantial cost-benefits for the health care system.

Outcome among clients higher in dependence

A surprising finding of the present study was that the small group of 14 clients with higher levels of dependence showed a better outcome than those lower in dependence. Thus, compared with the low dependence group, the high dependence group showed a significantly larger reduction in drinks per drinking day and a significantly greater increase in percentage days abstinent from pre-treatment assessment to follow-up. The high dependence group also showed a larger reduction in alcohol-related problems than the low dependence group but this difference did not reach statistical significance. Inspection of Table 5 reveals that, in respect of drinks per drinking day, the effects occurred because the high dependence group showed a roughly similar level of consumption at follow-up to the low dependence group but from a higher level at baseline. In respect of percentage days abstinent, the high dependence group started from a lower baseline level but showed a much higher percentage of abstinent days at follow-up than the low dependence group, although this was still less than 40% of all drinking days.

It could be argued that these changes were to some extent a result of “regression towards the mean” (Nesselroad *et al.*, 1980). This applies especially to the drinks per drinking day variable where the significant difference in changes between groups can almost entirely be accounted for by the higher initial level of consumption in the high dependence group rather than a lower level of consumption at follow-up. It could be argued, for example, that clients with high consumption levels at intake were showing high points in a fluctuating course of drinking and were therefore more likely to show large reductions over a given period of time than those with lower

consumption levels at intake. Going against this explanation, however, is the fact that the high dependence group was not identified on the basis of a high level of consumption but of a high level of alcohol dependence. Since high alcohol dependence is associated with heavier drinking, it is unlikely that the relatively high values for DDD shown in the high dependence group merely reflected the high points of a fluctuating drinking career which could be expected to decrease without treatment. At the very least, a conservative and cautious conclusion from the present data is that there is no evidence that clients showing higher levels of dependence at baseline benefit any less from moderation-oriented treatment than clients lower in dependence.

This conclusion is surprising because of the received clinical wisdom which states that a controlled drinking goal is contraindicated in cases where the client's score on the Severity of Alcohol Dependence Questionnaire is 30 or above. On the basis of the present findings it would seem that, assuming always that the client prefers a moderation goal to abstinence, there is no reason why such a client should not be offered a moderation goal, at least within the approximate range of 30-45 on the SADQ-C. Because this conclusion might be seen as controversial, we examined these 14 cases of high SADQ-C scores in some detail (see Table 10). This analysis showed that, while in two cases self-reports of improvement on drinking measures may have been dubious, in another four cases such self-reports were supported by reductions in GGT, a liver enzyme sensitive to levels of recent alcohol consumption (but see below for further comment on the validity of GGT recordings at intake). Neither was it the case that good outcomes among these high dependence clients were confined to abstinence.

Effectiveness of MOCE versus BSCT

It was noted above that the test of the effectiveness of MOCE was not "intention to treat"

because 17 clients who were randomised to treatment but failed to attend any treatment sessions were excluded from the analysis. Although the only significant difference between these clients and the treatment sample was that the former were more likely to have been unemployed, these exclusions may have affected the equivalence of the two treatment groups on baseline variables.

It was found that the MOCE and BSCT groups differed at intake on drinks per drinking day, level of alcohol-related problems and degree of psychopathology, with the MOCE group showing higher scores in each case. It was also found that these three variables were related to outcome measures (drinks per drinking day and level of alcohol-related problems) taken at follow-up. For this reason, the effects of these three variables on outcome were controlled for by using them as covariates in the analysis of change from pre-treatment to follow-up. While it is possible that the two treatment groups may have differed on other, unmeasured variables, the fact that they did not differ on a range of socio-demographic and other background variables (see Table 2) increases confidence in the validity of the comparison between them. It should also be noted that the overall follow-rate in this trial was high at 85% and there was no significant difference between follow-up rates in the two treatment groups.

Considered as a whole, the results of the trial provide no evidence for the general superiority of MOCE over BSCT. Although the MOCE group showed slightly higher percentages of clients who were considered “much improved” or better (53% vs. 41%) and “somewhat improved” or better (68% vs. 58%), these differences were not statistically significant (see Table 4). There were also no significant differences between groups in changes on continuous measures of outcome (drinks per drinking day, percentage days abstinent and alcohol-related problems - see Table 5). The main hypothesis of the study was therefore not confirmed.

It might be argued that, given the non-significant tendencies towards superior outcome in the MOCE group, a larger sample with greater statistical power may have discovered significant advantages for MOCE over BSCT. It could also be pointed out that MOCE resulted in a statistically significant greater improvement in global psychopathology than BSCT. However, given that BSCT is a widely-used, standard method in moderation-oriented treatment, an alternative method must be shown by research to yield clearly superior outcomes if it is to replace BSCT in routine treatment provision and such a clear superiority has not been observed. Moreover, while the number of treatment sessions attended by MOCE clients was only slightly and non-significantly greater than in BSCT, the average MOCE session took roughly half as long again to complete as BSCT (i.e., one-and-a-half hours compared with one hour). To this must be added the greater costs of training, equipment and treatment paraphernalia in MOCE. Thus, on this basis, BSCT appears to be a more cost-effective treatment modality than MOCE. In summary, the present trial provides no support for the replacement of BSCT by MOCE in routine treatment delivery.

Significant differences between treatment groups did emerge when interactions between treatment groups and initial levels of alcohol dependence were considered. Thus clients in the high dependence group showed a much larger reduction in drinks per drinking day if they had received BSCT than if they had received MOCE. Clients in the low dependence group appeared to benefit equally from each type of treatment. In addition, clients higher in dependence showed a significantly greater increase in percentage days abstinent if they had received BSCT than if they had received MOCE, while those in the low dependence group showed a larger increase in percentage days abstinent if they had received MOCE than if they had received BSCT. It should be noted, however, that these interactions between treatment and dependence groups on drinking variables were not reflected in differences on alcohol-related problem scores since the reduction

in APQ scores were not significantly different between treatment groups for each of the two dependence groups.

The results in respect of drinking variables are directly contrary to the stated hypothesis (Hypothesis 2a) that clients higher in dependence would do better with MOCE. However, reasons for this finding are far from clear. It can only be speculated that, because of a higher level of cue reactivity, clients high in dependence found the cue exposure procedures in MOCE more difficult to cope with than those entailed in BSCT where avoidance of high-risk drinking situations rather than exposure to them may have occurred. There is some evidence from the smoking cessation field that a deliberate exposure to high-risk situations for smoking leads to a more rapid relapse than the planned avoidance of such situations (cited in Hodgson, 1989, p. 254-5; see also Raw & Russell, 1980). It may be that, following the end of treatment, the cue exposure experience they had received did not sufficiently “insulate” those high dependence drinkers in the MOCE group from the temptation to drink heavily in high-risk situations, whereas those in the BSCT group may have used their training in self-control techniques to avoid or otherwise cope with high-risk situations without relapse.

Another possible explanation for the above finding is that it is simply a chance result due to unusual characteristics of the clients entering the analysis. Although the effect sizes involved here were large, the very small subsample sizes (6 in MOCE/high dependence and 4 in BSCT/high dependence subgroups) clearly limits confidence in the generalisability of the finding.

When interactions between treatment group and level of impaired control were inspected, no significant differences emerged. Thus there was no evidence to support Hypothesis 2b that

clients higher in impaired control would show relatively better outcomes with MOCE than BSCT. However, considering moderation-oriented treatment as a whole, a significantly greater proportion of those showing low impaired control at intake achieved a full recovery (34%) than those showing high impaired control (15%) and higher proportions were also found in the low impaired control group for clients much improved or better and somewhat improved or better, without these differences reaching statistical significance. Furthermore, there was a tendency in the data for clients with low impaired control at intake to show greater reductions in drinks per drinking day and it may be that a larger sample would have found this tendency to be statistically significant. All this evidence raises the possibility that a measure of impaired control would be a better indicator of the advisability of moderation-oriented treatment than a measure of alcohol dependence (see Heather *et al.*, 1998).

In respect of the comparison between MOCE and BSCT, the present results may be compared with those of Sitharthan *et al.* (1997) in a study carried out in Australia and published after the commencement of the present trial. These authors studied a cue exposure method involving a priming dose of alcohol to train clients to stop drinking after two or three drinks. Cue exposure was conducted in six 90-minute group sessions and was combined with directed homework practice. “Nondependent” problem drinkers (n=42) requesting a moderation goal were randomly assigned to the cue exposure condition or to cognitive-behavioural therapy also conducted in a group format. At follow-up six months after pre-treatment assessment, it was found that the cue exposure group reported a significantly lower frequency of drinking and a significantly lower amount consumed per occasion than the group given cognitive-behavioural therapy. Treatment outcome was based solely on self-report.

Accepting these findings as valid, it needs to be explained why the Sitharthan *et al.* study found a

superiority for cue exposure treatment when ours did not. Although described as “non-dependent”, the Australian sample showed a very similar mean level of dependence (SADQ-C= 18.8) as the sample described here (SADQ-C = 18.7). However, all clients in the Australian sample scored under 30 on the SADQ-C since scores above this were used as an exclusion criterion. As has been pointed out several times, the present sample included individuals with SADQ-C scores of 30 or over. It has also been noted that clients scoring below SADQ-C 30 in our study showed greater improvements in terms of percentage days abstinence if they had received MOCE than if they had received BSCT, a finding similar to the Sitharthan *et al.* finding of lower drinking frequency in the cue exposure group at follow-up. Thus it may be that, for unknown reasons, cue exposure treatment aimed at a moderation goal is especially suited to clients with relatively low levels of dependence.

It should be stressed, however, that direct comparisons between the two studies are difficult to make because of the different forms of cue exposure studied, particularly the use of a group format for the delivery of cue exposure in the Australian study.

Comparisons between self- and other-referrals

As noted above, an important aspect of the composition of the treatment sample was that nearly two-thirds (64%) were self-referrals via newspaper advertisements. Several significant differences between these clients and those referred from general practitioners and other agencies were observed. When treatment outcomes were compared between the two types of referral, there was tendency for the “other” referrals to show a better outcome in terms of drinks per drinking day, although this difference did not quite reach the conventional 5% level of statistical significance. This suggestion of an overall superiority in outcome among “other” referrals may

be a statistical artefact because the difference concerning drinks per drinking day was not reflected in differences in other outcome measures (percentage days abstinence, alcohol-related problems or the categorical outcome measure).

There was, however, a statistically significant outcome interaction between treatment modality and referral source, such that self-referred clients showed better outcomes in terms of drinks per drinking day if they had received MOCE than if they had received BSCT, whereas the reverse was true for the other-referrals (see Figure 4). This could be due to the fact that, as noted above, MOCE may be especially effective with clients with lower levels of alcohol dependence and low dependence clients were more prevalent among the self-referrals than the other-referrals.

Validity of client self-reports

The validity of clients' self-reports of drinking behaviour is an issue that is frequently raised in discussions of the results of trials of treatment for alcohol problems, especially when some form of continued drinking can be considered to be a good outcome. In this trial, the validity of self-reports was examined by comparing them with levels of gamma-glutamyltransferase (GGT), a liver enzyme that is sensitive to recent alcohol consumption, and collateral information provided by "significant other" persons known to the client. Unfortunately, collateral reports were available for only 43% of the follow-up sample and greater weight should therefore be placed in these results on GGT readings, which were available at both initial assessment and follow-up for 68% of the follow-up sample.

The validity of self-reports of drinking at follow-up was supported by a statistically significant correlation between GGT levels and both drinks per drinking day and scores on the Alcohol

Problems Questionnaire. Despite the low number of collateral reports, there was a highly significant correlation between the significant other's and the client's reports of the extent of the client's drinking problems at follow-up. Both these sources of data (i.e., GGT readings and collateral reports) strongly suggest that self-reports of drinking behaviour at follow-up were generally valid and appropriate for outcome analysis. In particular, the significant changes observed in self-reported drinks per drinking day and percentage days abstinent from baseline to follow-up were validated by a significant decrease in GGT readings over the same time period. A curious anomaly in the present results is the lack of correlation between GGT readings and self-reports of drinking at baseline. The most likely explanation for this curious finding is as follows. It would be expected that a proportion of clients either abstained from drinking or cut down after being referred to the project by, for example, their general practitioner; the same may also have applied to clients who referred themselves. Inspection of detailed data from the Form 60 instrument confirms that this did occur. The interval between a referral being made and the screening interview at which the measurement of GGT was made was typically one week. Thus for a proportion of clients GGT would be low because of abstinence or reduced drinking over the previous few days. The DDD and PDA measures, on the other hand, were based on the full 60 period before assessment and would therefore mainly reflect the client's heavy drinking before referral to the project was made. This reasoning is further supported by the fact that there was a statistically significant correlation between drinks per drinking day and alanine transferase (ALT), the other liver enzyme recorded in the study which was used to detect liver damage and reflects longer-term patterns of drinking than GGT.

If the above reasoning is correct and the levels of GGT recorded at baseline were underestimates of their values during the client's heavy drinking periods, this makes it less likely that decreases in GGT from before to after treatment would be found among those who succeeded in cutting

down drinking or abstaining after treatment. The fact that the mean difference in GGT from baseline to follow-up was nevertheless significant increases confidence that real reductions in drinking took place in the sample as a whole. The possible underestimation of GGT at baseline is also relevant to a consideration of the validity of outcomes among the 14 high dependence individuals discussed above. This may have prevented self-reports of improvement from being confirmed by changes in GGT and, in any event, increases confidence in the confirmatory strength of those reductions in GGT that were recorded.

Despite the validity support given to self-reports of drinking behaviour in the present study, it should be noted that a recent analysis based on a very large amount of data from Project MATCH (Babor *et al.*, in press) yielded the conclusion that biochemical tests (e.g., GGT) and collateral informant reports do not add sufficiently to self-report measurement accuracy to warrant their routine use in research. The authors conclude that resources devoted to collecting the alternative sources of outcome data might be better invested in interview procedures designed to increase the validity of self-report information.

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