

RESEARCH REPORT

Impaired Control Scale: cross-validation and relationships with treatment outcome

NICK HEATHER,¹ PETER BOOTH² & ANNA LUCE¹

¹Centre for Alcohol and Drug Studies, Newcastle City Health NHS Trust & ²Windsor Clinic, Aintree Hospitals NHS Trust, Newcastle upon Tyne, UK

Abstract

Aims. (1) To cross-validate Australian findings on the Impaired Control Scale (ICS) in an English sample of problem drinkers. (2) To examine a possible improvement to the scoring of the ICS. (3) To explore the relationship of the ICS to treatment outcome. **Design.** In a repeated measures design, questionnaires and interviews were administered by trained staff during treatment and again at 6 months follow-up. **Setting.** Two alcohol and drug treatment services in Newcastle and Liverpool (UK). **Participants.** Two hundred and twenty-nine problem drinkers attending as in- or outpatients, with abstinence or moderation treatment goals. **Measurements.** ICS scores; typical weekly alcohol consumption (units); degree of alcohol-related problems; severity of alcohol dependence; and classification of outcome using consumption levels and current alcohol-related problems, with collateral confirmation of self-reports. **Findings.** The satisfactory reliability and validity of the ICS was confirmed in an English sample of problem drinkers in treatment. An improved "substitution method" of scoring was developed to give a single measure of impaired control for all subjects irrespective of degree of attempted control. ICS scores were significantly correlated with treatment outcome and, among a subgroup of subjects who had aimed at abstinence but failed, predicted outcome status after the effects of degree of dependence had been extracted. **Conclusions.** Impaired control over alcohol consumption can be measured in a reliable and valid fashion by the ICS. The ICS has potential uses in research on impaired control and as a clinical assessment tool.

Introduction

Heather *et al.* (1993) provided a preliminary report of the development of the Impaired Control Scale (ICS), an instrument for measuring the degree of impairment over control of alcohol consumption shown by a problem drinker. Impaired control, or "loss of control", has occupied a key explanatory role in accounts of alcohol dependence since the late 18th century (Levine, 1978). For Jellinek (1952, 1960), it was pathog-

nomic of those forms of alcoholism that could properly be called diseases and, more recently, the alcohol dependence syndrome was defined as "a disability marked by impaired capacity to control alcohol intake" (Edwards *et al.*, 1977, p. 17). Surprisingly, however, until recently no instrument existed directly aimed at measuring this crucial variable, possibly because "loss of control" has traditionally been regarded as an all-or-nothing phenomenon.

Correspondence to: Professor Nick Heather, Centre for Alcohol and Drug Studies, Plummer Court, Carlisle Place, Newcastle upon Tyne, NE1 6UR, UK.

Submitted 13th September 1996; initial review completed 27th January 1997; final version accepted 30th September 1997.

The definition of impaired control used in the development of the ICS was "drinking in a quantity and to a level of intoxication beyond what the drinker had anticipated or intended" (Storm & Cutler, 1975, p. 152), a definition suggesting that, contrary to the traditional view, impaired control is present to a variable degree throughout the population of regular drinkers. Selection of items for potential use in the ICS was not based on any specific, underlying theory of impaired control but on a review of assessment scales in which items on impaired control were included and from discussions of the phenomenon in the literature. Items reflected "inability to stop", "inability to abstain" (Marconi, 1959) and other aspects of impaired control (see Heather *et al.*, 1993).

Because of difficulties reported in the literature in assessing impaired control in a straightforward fashion and, in particular, in deciding whether in a putative instance of impaired control an attempt to control drinking had in fact been made (e.g. Chick, 1980a, 1980b), the ICS is made up of three parts: part 1 (Attempted Control [AC]) measures the degree to which a subject has attempted to exercise control over drinking in the last 6 months; part 2 (Failed Control [FC]) measures the frequency of the subject's failure to control drinking over the last 6 months; and part 3 (Perceived Control [PC]) measures the subject's belief in his or her ability to control consumption if it were to be attempted. It was argued by Heather *et al.* (1993) that each of these parts of the ICS was necessary to an adequate assessment of impaired control in all problem drinkers.

As reported by Heather *et al.*, the ICS was shown to have satisfactory internal consistency, test-retest reliability, discriminant validity and concurrent validity. The aims of the present report are three-fold: (i) to examine psychometric properties of the ICS in a different sample of problem drinkers (English) from that on which the scale was developed (Australian); (ii) to assess the practical value of possible improvements to the administration and scoring of the ICS; and (iii) to explore for the first time the ability of the ICS to predict treatment outcome.

Method

Subjects

Subjects were recruited from clients attending

for treatment at the Windsor Clinic, Liverpool, UK or the Northern Regional Alcohol and Drug Service, Newcastle upon Tyne, UK between February 1994 and February 1995. Only those subjects whose primary problem concerned alcohol were invited to participate. All subjects had satisfactorily completed detoxification, where necessary, before being invited to take part. The total sample consisted of 229 problem drinkers (Liverpool = 153; Newcastle = 76). At the Windsor Clinic, subjects were drawn from the inpatient and daypatient programmes which provide structured, cognitive-behavioural treatment. The client is encouraged to set goals of abstinence or moderate drinking, with an initial target of three months abstinence being universally recommended. In Newcastle, subjects came from the outpatient and daypatient programmes which are also based on cognitive-behavioural principles and include motivational work with clients prior to interventions aimed at abstinence or moderate drinking.

Procedure

Subjects were contacted during the first week of treatment, or shortly after detoxification had been completed, by a staff member who had received special training for the project (Liverpool) or designated research assistant (Newcastle). The project was introduced to the subject as being concerned with drinking behaviour and possible loss of control over drinking. The usual assurances of complete confidentiality were given. Consent to taking part in the project was obtained.

Initial assessment

All subjects were asked to complete the ICS (Revised version, August 1991). ICS items are shown in Appendix I. Part 1 (AC) consisted of five items relating to limiting or resisting drinking and subjects were asked how often during the last 6 months the item had applied to them. Response categories were: "Never"; "Rarely"; "Sometimes"; "Often"; and "Always". If one item was omitted on AC, the subject's score was pro-rated from the other four items; if more than one item was omitted, the scale was regarded as invalid and the subject's score recorded as missing.

Part 2 (FC) consisted of the same 10 items

referring to experiences of success or failure in limiting or reducing drinking and the same frequency response categories (Never/Rarely/Sometimes/Often/Always/Does not apply) as described by Heather *et al.* (1993). However, instructions to subjects for completing FC were changed from the previous version which had adopted the convention of asking subjects to endorse "Does not apply" as little as possible and only if no other alternative made sense. Experience with the prior administration of the ICS suggested that some subjects may have used the response category "Never" when in fact the item did not apply to them because they had made no attempt to control drinking in that situation. It was therefore decided to modify the relevant instructions to subjects as follows: *If a statement does not apply because you have made no attempt to limit your drinking in the situation described in the last six months, please tick "Does not apply". For example, an item might ask you to say how often in the last six months, you were able to resist drinking when you saw your favourite drink. If you made no attempt to resist drinking in the last six months, you would tick "Does not Apply". You would only tick "Never" if you tried to resist drinking but were never able to succeed. Please use "Does not Apply" as often as you think necessary.* Reports from questionnaire administrators indicated that subjects had little or no difficulty in understanding these instructions when amplified, if necessary, by the administrator.

Instructions to part 3 (PC) referred to "what you think would happen to your drinking now". Items were based on exactly the same situations as used in FC and response categories were: "Strongly disagree"; "Disagree"; "Undecided"; "Agree"; and "Strongly agree". As with FC, the wording of four items was in a reverse direction for an indication of impaired control. Also as for FC, higher scores on PC indicated an increasing degree of impaired control. Both FC and PC scores were pro-rated if one or two items had been omitted; the subject's scale score was recorded as missing if more than two items had been omitted. (Copies of the complete ICS and a User's Manual are available from the first author).

Subjects were also asked to complete the following:

(1) *Alcohol Problems Questionnaire* (APQ) Com-

mon Score: Drummond, 1990; Williams & Drummond, 1994): developed to measure the extent of a subject's alcohol problems across a range of domains, the common score being derived from those domains that potentially apply to all subjects (i.e. physical, emotional, financial, legal and social relationship problems).

- (2) *Severity of Alcohol Dependence Questionnaire* (SADQ: Stockwell *et al.*, 1979): a well-established measure of alcohol dependence emphasizing neuro-adaptation to alcohol.
- (3) *Short Alcohol Dependence Data* questionnaire (SADD: Raistrick, Dunbar & Davidson, 1983): an alternative measure of alcohol dependence focused more on behavioural aspects of dependence.
- (4) *Severity of Alcohol Dependence Questionnaire—Community Version* (SADQ—C: Stockwell *et al.*, 1994): a modification of the original SADQ intended for use mainly in community samples.
- (5) *Impaired Control Questionnaire* (ICQ): a five-item measure of impaired control over drinking given with the SADQ—C (see Stockwell *et al.*, 1994).

Background and other information was collected as part of routine assessment at each treatment centre. In particular, alcohol consumption was recorded using a diary method applying to the previous 7 days or the most recent 7 days in which drinking had been possible. If this week was said to be typical of their drinking, it was used as a weekly measure of consumption; if atypical or the relevant information was incomplete, consumption was measured by a quantity–frequency method taking into account whether subjects said they were regular or bout drinkers. In this way, a measure of weekly consumption was calculated for each subject.

The initial assessment package varied to some extent between the two treatment centres involved in the project. Liverpool subjects were not given the APQ. In addition, data from the 50 daypatient subjects at the Liverpool site were collected as part of a separate doctoral thesis and were confined to the ICS, SADQ and background information. For these reasons, there is variation in the numbers of subjects entering different analyses reported here.

Follow-up assessment

A follow-up sample was collected as part of the Windsor Clinic's routine follow-up procedures and was confined to clients completing the full 3-week inpatient programme. Data were available on 72 clients who had completed both the initial research assessment protocol and the cognitive-behavioural programme. Seventy (70) individuals were traced and interviewed, the majority attending for structured follow-up interviews and the remainder visited in their homes. Two clients had died during the follow-up period but data on their progress to that point were available.

The mean length of the interval since discharge from treatment was 36.3 weeks (SD = 9.8, range 26–64). Detailed information was collected on drinking since discharge, including total units of alcohol consumed in the previous week and percentage time since discharge for which the client was abstinent, drinking heavily or drinking in a controlled fashion (defined as drinking no more than 14 units/week for women and 21 units/week for men). Data were also collected on alcohol-related health, family and legal problems, contact with other alcohol treatment agencies, alcohol-related visits to general practitioners and a range of other relevant variables. Nearly all self-reports of alcohol consumption, alcohol-related problems and general adjustment were supported by interviews with collaterals and/or results of liver function tests given on successive occasions throughout the follow-up period. Clients were divided into three outcome categories according to criteria similar to those described by Booth *et al.* (1992): "Total successes"; "Equivocal"; and "Failures".

Statistical analysis

All items on the ICS were scored 0–4 and summed to give total scores for each of the three parts. However, scores for the FC part were calculated in two ways. First, "Does not apply" responses were scored as "0" and regarded as equivalent to "Never" responses (or "Always" for reverse items), as had been done in the data reported by Heather *et al.* (1993). Secondly, the response from the equivalent item on the PC scale was substituted whenever the subject had responded "Does not apply" to the relevant FC item. This will be referred to here as "the substi-

tution method". The mean number of "Does not apply" responses on the FC scale, and hence the mean number of occasions when a substitution was made, was 0.5 (SD = 1.49, range = 0–10). In the remainder of this paper, FC scores calculated by each of these two methods will be referred to as FC_{dna} and FC_{sub}, respectively.

In view of the large number of statistical tests employed in examining relationships among ICS scales and between ICS scales and other variables of interest (see Table 2), the 1% level was taken to indicate statistical significance in interpreting this set of results. The 1% level was also applied to differences between outcome groups on ICS scale scores (see Table 3).

Sample characteristics

Mean age of the sample (male = 73%) was 41.5 (range 19–71). Thirty-one per cent (31%) were single, 30% married or cohabiting and 39% divorced, separated or widowed. Twenty-five per cent (25%) were in full- or part-time employment, with 24% unemployed and 47% on sickness or invalidity benefits (4% students or retired). Socio-economic status was: Professional, managerial and technical = 4%; Skilled non-manual = 15%; Skilled manual = 15%; Partly skilled = 30%; Unskilled = 34%. Mean age at completion of formal education was 15.9 years, with 20% having received some form of further education.

Mean weekly alcohol consumption for the total sample was 161.1 units (SD = 84.8, range = 19–439). Mean weekly consumption for males was 171.1 (SD = 83.9, range = 37–439) and for females 134.7 (SD = 82.1, range = 19–420). Mean SADQ score for the total sample was 33.5 (SD = 13.6, range = 1–60). In the Newcastle sample, mean APQ common score was 28.0 (SD = 9.8, range = 4–44).

Results*Factorial structure*

Each part of the ICS was subjected to a separate principal components analysis (Varimax) to investigate factorial structure. Results for AC showed a single major component accounting for 76% of the variance, with all items loading above 0.79. Analyses of FC_{dna}, of FC_{sub} and PC each revealed a two-component structure, with the first component accounting for, respectively,

Table 1. Means and standard deviations for ICS part scores for total sample and according to drinking goal preference

		Impaired Control Scale parts			
		Part 1 Attempted control (AC)	Part 2 Failed control (FC _{dna})	Part 2 Failed control (FC _{sub})	Part 3 Perceived control (PC)
Max. score		20	40	40	40
Total sample (<i>n</i> = 228)	Mean	9.2	26.3	27.7	23.0
	SD	5.3	8.4	7.5	8.7
		NS	NS	NS	NS
Clients wishing to stop drinking completely (<i>n</i> = 130)	Mean	9.4	26.5	28.2	24.5*
	SD	5.4	8.9	7.8	8.3
		NS	NS	NS	<i>p</i> < 0.01
Clients <i>not</i> wishing to stop drinking completely (<i>n</i> = 91)	Mean	8.7	25.9	26.8	20.7*
	SD	5.2	7.7	7.2	8.7
		NS	NS	NS	<i>p</i> < 0.01

*Significant difference between subgroups.

42%, 41% and 49% of the variance and the second component accounting for 15% of the variance in each case. All other factors were negligible and uninterpretable. Loadings of individual items on the first component in all three analyses were all positively and fell between 0.5 and 0.8 (see Appendix I). Inspection of loadings for the second components extracted in all three analyses revealed that they reflected the distinction between positive- and negatively worded impaired control statements (i.e. negative loadings were all for negatively worded items). It is therefore likely that these minor components were produced by some subjects inadvertently failing to notice that a different direction of response was required to indicate impaired control. Rather than take this factor into account by weighting items in the calculation of part scores, it was decided to ignore it and continue simply to sum items. It was hoped that the measurement error caused by this artefact could be reduced in future by a better layout of the questionnaire.

ICS scores

Means and standard deviations for ICS parts are given in Table 1. These values are very similar to those previously reported by Heather *et al.* (1993, p. 706) from their clinical sample. It will be seen from Table 1 that, compared with the previous method of calculation represented by

FC_{dna}, the substitution method used to calculate FC_{sub} scores resulted in a slight increase in the mean and a slight reduction in dispersion of failed control scores. Subjects used the entire range of scores on each part.

Also shown in Table 1 are means and standard deviations for ICS parts according to whether or not the subject expressed a wish to stop drinking completely (non-missing data = 221). Although scores for subjects preferring abstinence are higher on all four ICS measures, it is only for PC that a significant difference emerges. This is identical to the finding reported by Heather *et al.* (1993).

Internal consistency

Cronbach's alphas for ICS parts were as follows: AC = 0.92; FC_{dna} = 0.84; FC_{sub} = 0.83; PC = 0.88. These values are comparable with those previously reported from a clinical sample (see Heather *et al.*, p. 705) and indicate high internal consistency. In no case did the deletion of an individual item substantially increase alpha for the relevant ICS part.

Relationships among ICS parts

Table 2 shows correlations among the three parts of the ICS, including the two methods for calculating failed control scores. It will be seen from Table 2 that AC scores have low, negative

Table 2. Correlations among ICS part scores and other variables of interest

	AC	FC _{dna}	FC _{sub}	PC	APQ	SADD	SADQ	SADQ—C	ICQ	Alcohol consumption
AC	—	-0.14*	-0.32	-0.24	-0.11*	-0.31	-0.27	-0.26	-0.26	-0.25
FC _{dna}		—	0.85	0.39	0.40	0.50	0.45	0.49	0.38	0.10*
FC _{sub}			—	0.55	0.48	0.66	0.58	0.63	0.55	0.25
PC				—	0.58	0.47	0.42	0.46	0.45	0.24
APQ					—	0.70	0.71	0.72	0.54	0.29*
SADD						—	0.81	0.85	0.57	0.41
SADQ							—	0.94	0.48	0.38
SADQ—C								—	0.54	0.43
ICQ									—	0.30

*Not significant, all other correlations. $p < 0.01$.

but statistically significant relationships with FC_{sub} and PC, indicating that subjects who had reported making greater attempts to control drinking over the past 6 months tended to report less difficulty in controlling consumption and more optimistic beliefs about the likely success of control if it were attempted. The correlation between AC and FC_{sub} is significantly higher than that between AC and FC_{dna} ($t = 5.4$, $p < 0.01$).

As would be expected, Table 2 shows a high, positive and significant correlation between FC_{dna} and FC_{sub}. However, the correlations between each of these measures and PC are, although statistically significant, noticeably lower. The correlation between FC_{sub} and PC is significantly higher than that between FC_{dna} and PC ($t = 5.2$, $p < 0.01$) but this may be partly because some of the same PC items were used to calculate both scores. Details of other analyses relevant to the internal logic of the ICS are available from the first author on request.

Concurrent validity of the ICS

Table 2 shows correlations between ICS parts and other variables that can be seen as sources of concurrent validity. AC scores show modest but significant negative relationships with alcohol consumption, degree of impaired control as measured by the ICQ and three measures of alcohol dependence (SADQ, SADQ—C, SADD). This indicates that subjects who reported attempting more control over drinking in the past 6 months drank less and had lower levels of alcohol dependence than subjects who attempted less control. These findings are again similar to those reported by Heather *et al.* (1993). The negative correlation between AC and ICQ confirms the

findings reported above regarding the relationship between the extent of attempted control and impaired control as measured by ICS failed control and perceived control scores.

Table 2 also shows statistically significant correlations between ICS FC_{dna}, FC_{sub} and PC scores and a range of other relevant measures, including level of alcohol consumption (except for FC_{dna}), number of alcohol-related problems (APQ), three measures of alcohol dependence (SADQ, SADQ—C, SADD) and an alternative measure of impaired control (ICQ). (For the purposes of this analysis, items in the SADD referring specifically to impaired control [items 6, 8 and 9] were removed before calculating SADD totals). These findings are in broad agreement with those reported by Heather *et al.* (1993).

It should also be noted from Table 2 that FC_{dna} scores do not correlate significantly with level of alcohol consumption but that FC_{sub} and PC do show significant, positive relationships with consumption. More generally, FC_{sub} yields significantly higher correlations with other variables than FC_{dna} (with SADQ, $t = 4.4$, $p < 0.01$; SADQ—C, $t = 4.2$, $p < 0.01$; SADD, $t = 5.5$, $p < 0.01$; and alcohol consumption, $t = 4.2$, $p < 0.01$.) The only exceptions here were the correlations with ICQ ($t = 2.4$) and APQ score ($t = 1.4$) which were not significantly different between FC_{dna} and FC_{sub}. Nevertheless, these relationships suggest that the substitution method for calculating FC scores (see above) results in a more valid measure of impaired control than the conventional method reported on previously by Heather *et al.* (1993). Finally, FC_{sub} is more highly correlated with measures of dependence (SADQ, SADQ—C, SADD) than is the ICQ, although differences between the rel-

Table 3. Means and standard deviations of impaired control scores (FC_{sub} for three outcome categories at follow-up

		Total successes	Equivocal	Failed
Total sample ($n = 72$)	Mean	23.2	27.1	28.8
	SD	9.3	5.3	4.8
	$n =$	24	14	34
Clients who drank during the follow up period ($n = 59$)	Mean	22.5	27.1	29.0
	SD	8.2	5.3	4.8
	$n =$	13	14	32
Clients wishing to stop drinking completely ($n = 42$)	Mean	20.3	26.0	30.2
	SD	9.2	6.6	3.6
	$n =$	14	7	21
Clients <i>not</i> wishing to stop drinking ($n = 29$)	Mean	27.2	28.1	26.7
	SD	8.3	3.7	5.7
	$n =$	10	7	12
Clients wishing to stop drinking, but who drank during the follow-up period ($n = 33$)	Mean	19.0	26.0	30.6
	SD	7.0	6.6	3.3
	$n =$	6	7	20

evant pairs of correlations failed to reach the pre-set level for statistical significance ($p < 0.1 > 0.01$).

Relationships with treatment outcome

The follow-up sample comprised 70% of the initial Windsor Clinic inpatient subsample. There were no statistically significant differences on socio-demographic characteristics between this follow-up sample and the total initial sample. The follow-up sample scored significantly lower at initial assessment on a range of questionnaire measures (PC, SADD, ICQ) than the total sample.

Of the 72 subjects followed up, 24 (33.3%) were classified as "Total successes", 14 (19.4%) as "Equivocal" and 34 (47.2%) as "Treatment failures". Mean consumption in the week before interview was 37.4 units (SD = 67.9, range 0–315), with 44% of the sample being totally abstinent during that week. Mean time to first violation of stated treatment goal (i.e. whether abstinence or controlled drinking) was 16.4 weeks (SD = 11.6).

Table 3 shows means and standard deviations for FC_{sub} scores according to the three-way classification of treatment outcome among the

complete follow-up sample. There was a significant difference between groups on FC_{sub} scores ($F = 4.94$, $p < 0.01$). In particular, it will be seen from Table 3 that subjects who were total successes had lower scores on FC_{sub} than those who were equivocal or treatment failures ($t = 3.05$, $p < 0.01$). Outcome groups also showed significant differences on FC_{dna} , PC, SADD, SADQ, SADQ—C, ICQ and previous week's consumption, with more successful outcome being associated with lower scores on all these measures.

The relationship between outcome and FC_{sub} was also examined in the subsample of followed-up clients who had returned to drinking and this is also shown in Table 3. There were significant differences between outcome groups ($F = 5.88$, $p < 0.01$), with a clear distinction between successful versus equivocal plus failed outcomes ($t = -3.27$, $p < 0.01$). Table 3 also shows means and standard deviations of FC_{sub} scores for clients wishing to stop drinking completely and separately for those who did not wish to stop drinking. The abstinence subsample showed a significant difference between outcome groups ($F = 9.97$, $p < 0.01$), with the main difference occurring between successful failed outcomes and those that were equivocal or failed ($t = -3.18$,

$p < 0.01$). However, there were no significant differences between outcome groups among clients who did not wish to stop drinking and no clear trend among outcome groups on this variable (see Table 3). Finally, Table 3 shows means and standard deviations of FC_{sub} scores for three outcome groups among the subsample of clients who wished to abstain from alcohol but who drank during the follow-up period. Differences between outcome groups were significant ($F = 13.46, p < 0.01$), with significant differences between both outcome dichotomies (successful vs. equivocal/failure and successful/equivocal vs. failure).

The relative efficiency of impaired control and dependence measures in predicting outcome was further explored in a series of logistic regression analyses. In the total follow-up sample, when a dependence measure was entered as a first step in the regression equation, ICS measures ceased to be significant predictors of outcome. This applied using both possible outcome dichotomies as the dependent variable, to each of three relevant ICS measures (FC_{dna} , FC_{sub} and PC) and to each of three dependence measures (SADQ, SADQ—C and SADD). However, when attention was restricted to the subsample of clients who had returned to drinking in the follow-up period and were aiming at an abstinence goal, FC_{sub} continued to predict outcome after the effects of alcohol dependence (SADQ) had been extracted. In this analysis, the outcome dichotomy that was successfully predicted was successful plus equivocal versus failed.

Discussion

This discussion will proceed initially according to the three aims listed in the Introduction to the paper.

Cross-validation of the ICS

The results reported provide confirmation of the reliability and validity of the ICS. Most of the findings described earlier by Heather *et al.* (1993) were replicated. In particular, the internal consistency of each of the three parts of the ICS was again found to be satisfactory. Examination of the factorial structure of the three ICS parts once more demonstrated general components on which all items loaded positively at a high level. In more general terms, the striking similarity in

means and standard deviations of ICS part scores between the Australian and the English study increases confidence in the reliability of the instrument. It should be borne in mind, however, that cultural similarities between Australia and Britain, including similarities in the understanding of alcohol dependence and its treatment, limit the generalizability of these findings. It would be of interest to attempt a validation of the ICS in a country outside the Anglo-Saxon cultural tradition.

In terms of concurrent validity, relationships with other measures were again similar to those found in the Australian study and once more showed significant correlations with measures of alcohol consumption, dependence and alcohol-related problems. On this occasion, a significant correlation with an alternative measure of impaired control (published after the Australian study had been completed [ICQ]) was found. Although correlations between ICS parts and measures of dependence were highly statistically significant, they were not so large as to suggest the redundancy of the attempt to measure impaired control as a construct in its own right. It was also found that ICS failed control and perceived control scores were more highly correlated with measures of alcohol dependence than the ICQ, although the relevant differences between correlation coefficients failed to reach the pre-set 1% level of significance.

Improvements to the administration and scoring of the ICS

A novel finding of the present study is that the "substitution method" for measuring failed control in part 2 of the ICS (FC_{sub}) represents a clear improvement in the scoring of the instrument. This was shown by the fact that correlations between FC_{sub} and other variables were almost uniformly higher than those involving FC_{dna} (i.e. the older method of scoring), with many of the relevant differences in correlation coefficients being statistically significant. These findings also suggest that the revised instructions to part 2 (Failed control), in which clients are urged to use the "Does not apply" category as often as necessary, is an improvement to the administrative procedures of the ICS. (Further details of these improvements in administration and scoring are contained in a User's Manual available from the first author.)

These findings also provide a strong justification for the structure of the ICS, i.e. the provision of separate measures of actual impaired control over the previous 6 months and of the client's belief in the likelihood of impaired control if it should be attempted. The substitution method utilizing items from both these parts of the ICS results in a variable which applies whether or not the client has attempted to control drinking in any specific situation. It therefore solves the problem described by Chick (1980a, 1980b) of how to measure impaired control when it is possible that the client has not consistently attempted it, while at the same time basing the measure largely on actual, self-reported behaviour.

On this basis, it might be reasoned that the measurement of attempted control in part 1 of the ICS becomes unnecessary since the degree of the client's attempted control over drinking is incorporated in the substitution method. Yet it would probably be wise to retain the measurement of attempted control, at least for the time being, because it may provide information of theoretical or practical value and, in any event, adds little to the administration time of the complete instrument.

Prediction of treatment outcome

A number of studies of abstinence-oriented treatment (Polich, Armor & Braiker, 1980; Skinner & Allen, 1982; Vaillant, 1983; Helzer *et al.*, 1985; Babor, Cooney & Lauerma, 1987) have found that severity of alcohol dependence, defined in various ways, is related to treatment outcome. The present study, in which both abstinence and moderation goals were included, has shown that degree of impaired control is also related to treatment outcome, particularly with regard to the distinction between those clients judged at 6-month follow-up to be totally successful and those who are judged either equivocal or treatment failures. Clients who presented with higher levels of impaired control on the ICS were less likely to have a successful outcome to treatment. Degree of impaired control also predicted outcome among clients who had returned to drinking at some point during the follow-up period and among those aiming at an abstinence goal. Surprisingly perhaps, degree of impaired control did not predict outcome among clients

aiming at a controlled drinking goal and the reasons for this are unclear.

When in logistic regression analyses impaired control was compared with alcohol dependence as a predictor of outcome, it was found that degree of impaired control ceased to be an independent predictor. This suggests that the simple relationship with outcome occurred only in virtue of the correlation between measures of impaired control and dependence. However, this conclusion applied only to the total sample of those followed-up. When attention was restricted to the subsample of those clients who wished to stop drinking but had returned to drinking in some form and at some point during the follow-up period, degree of impaired control predicted outcome even when the effects of dependence had been taken into account. Clearly, impaired control over drinking in the sense of "inability to stop", which is the main emphasis of items in the ICS, becomes much more relevant to outcome once drinking has taken place. It is curious, however, that impaired control should influence outcome only among those who initially wished to stop drinking and not among those wishing to moderate their consumption. Further investigation of this interesting finding is warranted.

Research and clinical uses of the ICS

The present study adds further support to the contention that impaired control can be measured in a reliable and valid fashion by the Impaired Control Scale. The instrument can therefore be used to clarify a range of research issues, including the determinants of impaired control, the relationship among impaired control, alcohol dependence and alcohol-related problems, and the effectiveness of treatment or naturally occurring attempts to re-instate control over drinking.

With regard to clinical uses of the ICS, inspection and comparison of scores from the three parts of the instrument may provide valuable information about the nature of impaired control in the individual case, namely the extent to which control has been attempted in the recent past, the degree to which these attempts have not been successful and what the client believes about his or her potential for control over drinking. Means and standard deviations of ICS part scores reported here may be seen as first approximations of norms for a treatment population,

although it is clear that the clients included in this study had exceptionally high levels of alcohol consumption and severe alcohol-related problems. Although inspection of part scores may be clinically useful, an advance made here in the scoring of the instrument (the substitution method) enables a single score to be arrived at which may be regarded as a measure of the degree of impaired control shown by any client in treatment.

The finding that the ICS predicts treatment outcome, and that the construct of impaired control therefore has prognostic significance, encourages the view that more specific clinical uses for the ICS will be found. At the very least, special attention should be paid to clients with high impaired control scores since the evidence shows that such clients are at special risk of relapse. Degree of impaired control appears particularly relevant to outcome, beyond the effects of alcohol dependence as such, among clients who are aiming at a goal of total abstinence but who drink during the follow-up period. It seems that level of impaired control makes a unique contribution to the risk of relapse among such clients.

An obvious potential use of the ICS is in the selection of treatment goals, i.e. total abstinence or controlled drinking. Unfortunately, the implications of the data presented here for choice of treatment goal are far from clear. It is certainly not the case, as might be expected, that clients who are successful with a controlled drinking goal have lower impaired control scores initially than those who achieve success with abstinence. It may be, however, that the high level of alcohol-related damage shown in the sample under study prevented such a relationship from emerging. A sample with lower average consumption, problems and levels of impaired control may yet show that the ICS can be used to indicate choice of treatment goal. The same reasoning applies to the finding that, among clients aiming at controlled drinking, the ICS showed no relationship with treatment outcome; clients who succeeded at this goal showed impaired control scores just as high as those who failed, suggesting that other variables were more important determinants of outcome among this subgroup. The relationships between impaired control and outcome among clients who drink following treatment is clearly an area in need of further research.

Acknowledgements

The authors are extremely grateful to Dr Angela Mallen for permission to use her data in this report. Thanks for assistance with data collection are also due to the following: Ben Clark, Rupert Heather and Diedre Murphy. The authors are also grateful to the Mental Health Foundation for financial support for the project.

References

- BABOR, T. F., COONEY, N. L. & LAUERMAN, R. J. (1987) The drug dependence syndrome as a psychological theory of relapse behaviour: an empirical evaluation, *British Journal of Addiction*, 82, 393-405.
- BOOTH, P. G., DALE, B., SLADE, P. D. & DEWEY, M. E. (1992) A follow-up study of problem drinkers offered a goal choice option, *Journal of Studies on Alcohol*, 53, 594-600.
- CHICK, J. (1980a) Alcohol dependence: methodological issues in its measurement: reliability of the criteria, *British Journal of Addiction*, 75, 175-186.
- CHICK, J. (1980b) Is there a unidimensional alcohol dependence syndrome? *British Journal of Addiction*, 75, 265-280.
- DRUMMOND, D. C. (1990) The relationship between alcohol dependence and alcohol-related problems in a clinical population, *British Journal of Addiction*, 85, 357-366.
- EDWARDS, G., GROSS, M. M., KELLER, M., MOSER, J. & ROOM, R. (Eds) (1977) *Alcohol-Related Disabilities*, WHO Offset Publication No. 32 (Geneva, World Health Organization).
- HEATHER, N., TEBBUTT, J. S., MATTICK, R. P. & ZAMIR, R. (1993) Development of a scale for measuring impaired control over alcohol consumption: a preliminary report, *Journal of Studies on Alcohol*, 54, 700-709.
- HELZER, J. E., ROBINS, L. N., TAYLOR, J. R. *et al.* (1985) The extent of long-term moderate drinking among alcoholics discharged from medical and psychiatric treatment facilities, *New England Journal of Medicine*, 312, 5-8.
- JELLINEK, E. M. (1952) Phases of alcohol addiction, *Quarterly Journal of Studies on Alcohol*, 13, 673-684.
- JELLINEK, E. M. (1960) *The Disease Concept of Alcoholism* (New Brunswick NJ, Rutgers Center of Alcohol Studies).
- LEVINE, H. G. (1978) The discovery of addiction: changing conceptions of habitual drunkenness in America, *Journal of Studies on Alcohol*, 39, 143-174.
- MARCONI, J. T. (1959) The concept of alcoholism, *Quarterly Journal of Studies on Alcohol*, 20, 216-235.
- POLICH, A. M., ARMOR, D. J. & BRAIKER, H. B. (1980) *The Course of Alcoholism Four Years After Treatment* (Santa Monica CA, RAND Corporation).
- RAISTRICK, D. S., DUNBAR, G. & DAVIDSON, R. J. (1983) Development of a questionnaire to measure alcohol dependence, *British Journal of Addiction*, 78, 89-95.
- SKINNER, H. A. & ALLEN, B. A. (1982) Alcohol dependence syndrome: measurement and validation, *Journal of Abnormal Psychology*, 91, 199-209.

- STOCKWELL, T., HODGSON, R., EDWARDS, G., TAYLOR, C. & RANKIN, H. (1979) The development of a questionnaire to measure severity of alcohol dependence, *British Journal of Addiction*, 74, 79–87.
- STOCKWELL, T., SITHARTHAN, T., MCGRATH, D. & LANG, E. (1994) The measurement of alcohol dependence and impaired control in community samples, *Addiction*, 70, 151–155.
- STORM, T. & CUTLER, R. (1975) Notes on the analysis of loss of control in normal and pathological drinkers, *British Journal of Addiction*, 70, 151–155.
- VAILLANT, G. E. (1983) *The Natural History of Alcoholism: causes, patterns and paths of recovery* (Cambridge, Mass, Harvard University Press).
- WILLIAMS, B. & DRUMMOND, D. C. (1994) Alcohol Problems Questionnaire: reliability and validity, *Drug and Alcohol Dependence*, 35, 239–243.

Appendix I

ICS items	Factor loadings	
<i>PART 1: Attempted Control</i>	AC	
"During the last 6 months...		
(1) ...I tried to limit the amount I drank"	0.90	
(2) ...I tried to resist the opportunity to start drinking"	0.86	
(3) ...I tried to slow down my drinking"	0.91	
(4) ...I tried to cut down my drinking (i.e. drink less)"	0.91	
(5) ...I tried to stop drinking for a period of time"	0.79	
<i>PART 2: Failed Control</i>	FC _{dna}	FC _{sub}
"During the last 6 months...		
(1) ...I found it difficult to limit the amount I drank"	0.57	0.49
(2) ...I started drinking even after deciding not to"	0.60	0.53
(3) ...even when I intended having only one or two drinks, I ended up having many more"	0.65	0.64
(4) ...I was able to cut down my drinking (i.e. drink less) when I wanted to"	0.74	0.71
(5) ...I started drinking at times when I knew it would cause me problems (e.g. problems at work, with family/friends or with the police, etc.)"	0.51	0.52
(6) ...I was able to stop drinking easily after one or two drinks"	0.79	0.79
(7) ...I was able to stop drinking before becoming completely drunk"	0.60	0.63
(8) ...I had an irresistible urge to continue drinking once I started"	0.66	0.66
(9) ...I found it difficult to resist drinking, even for a single day"	0.58	0.57
(10) ...I was able to slow down my drinking when I wanted to"	0.71	0.74
<i>PART 3: Perceived Control</i>	PC	
What do you think would happen now?		
(1) "I would find it difficult to limit the amount I drink"	0.75	
(2) "I would start to drink, even after deciding not to"	0.66	
(3) "Even if I intended having only one or two drinks, I would end up having many more"	0.79	
(4) "I could cut down my drinking (i.e. drink less) if I wanted to"	0.70	
(5) "I would start drinking at times when I knew it would cause me problems (e.g. problems at work, with family/friends or with the police, etc.)"	0.57	
(6) "I could stop drinking easily after one or two drinks"	0.70	
(7) "I could stop drinking before becoming completely drunk"	0.65	
(8) "I would have an irresistible urge to continue drinking once I started"	0.77	
(9) "I would find it difficult to resist drinking, even for a single day"	0.65	
(10) "I could slow down my drinking if I wanted to"	0.71	