Addiction (1994) 89, 1653–1665

RESEARCH REPORT

Negative alcohol expectancy predicts post-treatment abstinence survivorship: the whether, when and why of relapse to a first drink

BARRY T. JONES & JOHN MCMAHON

Department of Psychology, 62 Hillhead Street, University of Glasgow, Glasgow G12 8QQ, UK

Abstract

Using survival analysis, the association was explored between positive and negative alcohol expectancies measured on admission to a non-residential alcohol dependence treatment unit and post-treatment relapse to a first drink (first slip). A reliable association between negative alcohol expectancy (but not positive) and relapse was found. The active negative alcohol expectancies were distal rather than proximal: proximal expectancies surround consumption ('same day' expectancies) and distal expectancies relate to the 'next-day' following consumption or those longer term expectancies coming from 'continued drinking'. Only the 'next day' component of distal expectancies formed a reliable association with relapse. The use to which negative alcohol expectancy as measured by the Negative Alcohol Expectancy Questionnaire might be put is discussed in terms of (i) a bottom-up representation of motivation for recovery to help treatment match and (ii) a provisor of detailed, client-specific information for structuring motivational interventions.

Introduction

The decision whether to drink alcohol or not is embedded within a complex bio-psycho-social framework. The change in affective state, that an individual *believes* their decision to drink will bring, appears to be an important component of this framework and during the 1980s there was a burgeoning of research relating to positive alcohol reinforcement expectancies demonstrating this (Leigh, 1989a). In particular, it was consistently found that higher levels of positive expectancy were associated with higher levels of consumption and this led to the speculation that positive expectancy might be a focus for treating problem drinking more effectively (Mooney *et al.*, 1987; Brown, Millar & Passman, 1988; Rather & Sherman, 1989; Brown, 1993; Darkes & Goldman, 1993). For example, treatment interventions might be devised that either (i) helped disconfirm unrealistic or mistaken positive expectancies or (ii) helped establish alternative and less harmful ways of achieving the affect that alcohol use would otherwise be expected to bring.

There are two different strands of evidence from the domain of problem drinking treatment that help to nurture this speculation. First, the former treatment strategy (manipulating positive

The results reported in this paper formed part of a presentation at the inaugural sessions of Division 50 (Addictive Behaviors) of the American Psychological Association's Annual Convention at Los Angeles, August 1994.

expectations) is a component part of another notable 1980s alcohol departure, 'motivational interviewing' (Miller & Rollnick, 1991), in which a particularly empathic and non-confrontational style of counselling has been shown to impact post-treatment consumption more successfully than do more traditional, confrontational, styles (Miller, Benenfield & Tonigan, 1993). Secondly, with respect to the latter treatment strategy (establishing new routes to positive affect), Brown *et al.* (1988) have shown during treatment that through improving a client's self-perceptions of their social skills, reductions in related post-treatment positive expectancy can be achieved. Brown *et al.* interpret this as indicating a reduced subsequent need for alcohol although, regretfully, post-treatment consumption tests were not undertaken.

These two 1980s alcohol departures (motivational interviewing and expectancy research) create a curious anomaly, however. While motivational interviewing does, indeed, address putative unrealistic and mistaken expectations of positive consequences of consumption, the much greater component is, in practice, designed to address expected *negative* consequences (Miller & Rollnick, 1991). Yet *mainstream* expectancy research in the 1980s failed to find any secure associations between negative alcohol expectancy and consumption. There are several reasons for this. First, because the *input* to Brown *et al.*'s (1980) factor analytical study that generated the Alcohol Expectancy Questionnaire *explicitly* comprised only positive expectancies, there appears to have been an *a priori* belief that negative expectancies were an unimportant component of drinking decisions. Consequently, information about the relationships between negative expectancy and consumption remained indeterminate whenever the AEQ was used subsequently (the AEQ was, and has remained, the most widely used expectancy assessment instrument). Secondly, although Rohsenow (1983) fully recognized this deficiency and added two dimensions of negative expectancy to the six dimensions of positive expectancy from Brown *et al.*'s study, and although she showed that positive but not negative expectancies formed statistical associations with consumption when the augmented version of the AEQ was used, there is no evidence in her report that the same attention was paid to choosing the negative expectancy component as was paid by Brown *et al.* to choosing the positive. Thirdly, an alternative approach to representing positive and negative expectancies used by Southwick *et al.* (1981) and which also appeared to show that positive not negative expectancies related to consumption, had severe representation problems. Southwick *et al.*'s questionnaire represented negative and positive expectancies as a series of bipolar traits (semantic differentials), yet there are good grounds discussed extensively elsewhere for believing that the range of positive and negative expectancies are not 'equal and opposite' as this representation would require (Leigh, 1989a) and that they are quite independent constructs (Stacy, Widaman & Marlatt, 1990; Leigh & Stacy, 1991, 1993).

Although mainstream expectancy research during the latter half of the 1980s began to recognize that negative expectancy *ought* to form lawful associations with consumption (Connors *et al.*, 1986; Mooney *et al.*, 1987; Adams & McNeil, 1991), Adams & McNeil (1991, p. 11) observe 'To date, the results of negative expectancy research have been confusing and sometimes contradictory'—for example, Leigh (1987, 1989b) finds evidence that negative expectancy is important whereas Stacy *et al.* (1990) and Goldman *et al.* (1991) do not. McMahon & Jones (1993a, 1994a), claim that confusions and contradictions such as these are due primarily to a failure to measure negative expectancy (i) *consistently* and (ii) *appropriately*. Whereas much effort has been directed towards identifying a wide range of positive expectancies for recruitment into assessment tools, disproportionately little effort has been directed towards doing the same for negative expectancies. For example, with respect to consistency, the negative expectancy component of most assessment instruments was not generated from sample surveys but largely from researchers' intuitions (with a little cannibalizing from questionnaires already existing). For this reason, it is hardly surprising that no secure generalizations have emerged. Moreover, McMahon & Jones claim that representations of negative expectancy have usually been restricted to negative situations surrounding consumption itself (proximal expectancies) and, as Adams & McNeil (1991, pp. 11–12) also observe, have rarely been *temporally* extended to those associated with the day following consumption or the longer term (collectively, distal expectancies). In McMahon & Jones's view, an unintoxicated indi-

vidual holds three sorts of belief about the negative consequences alcohol consumption will bring them. First, individuals, 'should they go for a drink *now*', hold expectancies not only about the consequences (i) during the time of consumption (Same-day expectancies) but also (ii) during the following day (Next-day expectancies). Secondly, they view an unintoxicated individual as *also* holding beliefs about the negative consequences that alcohol consumption will bring them, not only should they go for a drink now, but (iii) 'should they *continue* drinking over the next few months/years in whatever is their customary manner' (Continued-drinking expectancies). In negative expectancy research hitherto, both McMahon & Jones and Adams & McNeil argue, expectancies have principally (if not exclusively) been sought from the Same-day context and Next-day and Continued-drinking have been largely ignored.

McMahon, Jones & O'Donnell (1994) have shown that when negative expectancy is temporally and situationally more appropriately assessed, it is at least as closely associated with consumption in social drinkers as is positive expectancy. When other recent research with social drinkers is also taken into account (Young, Oei & Knight, 1990; Stacy *et al.*, 1990; Goldman *et al.*, 1991; Leigh & Stacy, 1993; Fromme, Stroot & Kaplan, 1993), it strongly suggests that the role of expectancy needs to be properly reappraised across the wide spectrum of consumption. This particularly extends to its role in problem drinking, because just as inferences based upon associations between positive expectancy and consumption in social drinkers have been extrapolated by many to the treatment of problem drinking, so does the evidence from social drinkers now suggest that it *might* be productive to extend the process of extrapolation to include negative expectancy. This is perhaps all the more compelling when evidence is heeded from three areas of problem drinking research *outside* mainstream expectancy research, that suggests negative expectancy has a role to play in drinking decisions and especially in relation to recovery. The areas are (i) spontaneous or natural recovery, (ii) help-seeking and (iii) recovery through treatment.

With regard to (i), Tuchfeld (1981), in a survey of natural recoverers, identified a number of categories of attributions made to explain recovery. One included exposure to negative role models who were far down the path of dependence and he quotes *future expectations* from several interviews with respondents, 'that could be me'. In a similar study but with a more quantitative analysis, Ludwig (1985) also identified that for many such individuals 'They conclude that the *future negative consequences* of continued alcohol consumption far outweighed any potential pleasure gained in the present' (our italics). (ii) In a study attempting to discover what prompts help-seeking and treatment entry, Thom (1987) showed that a large proportion of her subjects provided reasons that described *future negative consequences* relating to health and family relationships. In addition, Sobell *et al.* (1993) both provide and review wide-ranging evidence that supports this view—but from an effort to discover why natural recoverers did *not* enter treatment. In a similar vein, McMahon & Jones (1994a) catalogued reasons why alcohol-dependent clients entered a residential treatment programme and found that references to *future negative consequences* far outweighed references to current ones. (iii) Several treatment outcome studies carried out in the 1980s also support the view that expected negative consequences have significant impact. Amodeo & Kurtz (1990), in a replication of Ludwig's study but with treated individuals, found that a frequently used method of dealing with urges and cravings when they arose was to recall the alcohol-related reasons for initiating abstinence. This is tantamount to individuals alerting themselves to the fact that these aversive consequences *can recur should drinking be resumed*—expectations of negative consequences. In an attribution study which identified a range of factors underlying recovery, Edwards *et al.* (1987) identified 'cognitions' (what drinking would do to the family, fear of losing one's mind, fear of losing everything) as the most pervasive one. The items that comprise this factor are expectations of negative consequences *should the current behaviour continue*. In a still earlier study (Eastman & Norris 1982), individuals in treatment had their alcohol expectancies assessed using a repertory grid technique and it was found that three-quarters of clients holding positive alcohol expectancies relapsed subsequently, whereas only one-tenth who held negative expectancies relapsed. Collectively, the foregoing three areas of research suggest that negative alcohol expectancies might be implicated to some degree in drinking decisions of problem drinkers and

provide reasons for studying its potential role more formally.

The reason that it is important to focus belatedly upon problem drinking is that the lack of attention paid to negative expectancy in the early 1980s and its resultant lowly status as a player in drinking decisions, meant that *negative expectancy was excluded from the only study that explored the relationship between problem drinkers' expectancies in treatment and treatment outcome* (Brown, 1985). In Brown's study, higher levels of positive expectancy in treatment were found to predict post-treatment relapse. Although Jones & McMahon (1994) have partially replicated Brown's finding they have also shown that, when measured appropriately, negative expectancy predicts relapse at least as well as does positive expectancy and, in some respects, better. They found that the higher the level of negative expectancy measured on admission to treatment, the greater was the probability of remaining abstinent upon discharge, and they interpret their finding as supporting their view (McMahon & Jones, 1994a, 1993b) that negative alcohol expectancy represents an important component of motivation for recovery (including treatment tenure and use, as well as the more traditional measurements of outcome such as post-treatment consumption).

Although the studies with problem drinkers referred to above indicate that negative expectancy might, indeed, be implicated in the decision-making of problem drinkers, Jones & McMahon's (1994) study is important for two reasons: first, it demonstrates this fact but within the methodological framework of mainstream expectancy research, and secondly, it complements the frequently quoted study (Brown, 1985) from which, even now, the mistaken inference is often drawn that positive but not negative expectancy is an important component in predicting post-treatment outcome (Goldman *et al.*, 1991; Brown, 1993). However, both Brown's study and Jones & McMahon's (1994) had a common unsatisfactory design feature: the major treatment outcome criterion adopted was relapse (or not) to a first drink *during a specified and fixed number of months* (in Brown's study it was 12 months and in Jones & McMahon's, 3 months). A 'slip' in these terms constitutes relapse. Although the use of normal regression analysis with dummy variables (Brown, 1993) and logistic regression analysis (Jones & McMahon, 1994) readily accommodates dichotomous dependent variables such as relapse or not, it is a well-known feature of alcohol treatment that the incidence of post-treatment relapse across time is neither stable nor linear. Consequently, representing a client who relapsed immediately on discharge as equivalent to one who relapsed after 3 months (Jones & McMahon) or 12 months (Brown), might capture some, but ignores most, of the important aspects of treatment outcome. To understand better the associations between positive and negative alcohol expectancy and post-treatment recovery, a design is required which represents not only (i) *whether* a client has relapsed or not, but also (ii) *when*. The following study includes this important time dimension through utilizing survival data analysis.

Method

Subjects

Fifty clients volunteered to take part in the study from an intake of 57 male alcohol abusers to non-residential treatment in Gartnavel Royal Hospital's Alcohol Problems Treatment Unit (Greater Glasgow Health Board). Treatment typically ran for 10–14 days. Approximately 15% of the contemporary intake were female but were excluded from the current study, for many have shown (Mooney *et al.*, 1987; McMahon *et al.*, 1994) that in non-problem drinkers there are significant gender differences in alcohol expectancies which, should they also be present in problem drinkers, would constitute a nuisance variable that could not be controlled with the sample size available for use.

The mean age of subjects was 44.2 years (SD = 9.8); their mean self-reported daily consumption of alcohol for the period prior to admission was 29 units (SD = 11.8); 20% of subjects had not been treated before, 46% had been treated 1–2 times, 20% 3–4 times and 14% more than four times (mode and median = 1 time, semi-interquartile range = 3/2).

Treatment consisted of detoxification with a reducing regime of chlordiazepoxide and then both personal counselling and relaxation therapy was offered, along with an input from social services. The consumption treatment goal was abstinence.

Alcohol expectancy assessment

Positive and negative alcohol expectancies were

assessed using self-administered questionnaires as soon as cognitively possible after admission (mode, second day). Positive expectancy was assessed using the 68 (scored)-item AEQ with its binary endorsement scale (six subscales: Global change, Physical and social pleasure, Sexual enhancement, Social assertiveness, Relaxation and tension reduction, Arousal and aggression—Brown, Christiansen & Goldman, 1987). Negative expectancy was assessed using the 60-item NAEQ with its five-point endorsement scale (three temporally defined subscales: Same-day, Next-day, Continued-drinking—McMahon & Jones, 1993b; Jones & McMahon, 1993; NIAAA, 1994). Proximal (Same-day) negative expectancies are those that accompany consumption; distal negative expectancies are comprised of those relating to the day following the day to which the NAEQ is addressed (Next-day) and those relating to the much longer term, measured in months or years (Continued-drinking). The NAEQ is shown in the Appendix.

Self-reports of consumption prior to admission were collected on admission as well as the name and contact details of a collateral to whom corroboratory requests about client-consumption could be directed during follow-up.

Post-treatment consumption assessment

Follow-ups were conducted 4-weekly after discharge for 26 weeks. The follow-up researcher was not familiar with the outcome of the intreatment expectancy assessment. A simple version of the Timeline Follow-back procedure was employed (Sobell *et al.*, 1988) to assess the drinking status in each of the 4 weeks previous to each follow-up. Time of relapse to a first drink (defined as 'slip') was assessed as the week in which the first drinking day was reported (by clients or collaterals). Clients who relapsed during treatment were said to have relapsed during week 0. Relapsed clients were not followed-up further within this study.

Results

This study was designed to address two quite different questions. First, *whether* and, if so, *when* does the first post-treatment slip occur and, secondly, *why*? Singer & Willett (1991) have argued that in time-based 'clinical trials' such as this, survival analysis is the most appropriate investigative methodology because of the frequent presence of censored (or incomplete) data which, when more traditional methods are used, is unsatisfactorily represented by the analysis strategies that struggle to accommodate it. Censored data is associated with subjects who are either lost to follow-up or who do not relapse before data collection is finished. Survival analysis permits their more valid representation provided that two things are known: (i) the length of time the particular subject has been in contact with follow-up and (ii) their clinical status at the time contact is lost for whatever reason (including the end of data collection).

In this study, 38 (76%) subjects relapsed within the 26 weeks assigned for data collection and 12 (24%) provided censored data. Of these 12, one remained abstinent until withdrawing from the study in week 4, one abstinent until death in week 6 and, finally, 10 abstinent until the end of data collection in week 26. The survival analysis procedures were implemented through the software package, STATISTICA/MAC (Statsoft, 1993).

Basic descriptive statistics

The measures of central tendency and dispersion of the total and subscale scores for PAE and NAE are shown in Table 1. The correlation between NAE and PAE total scores was unreliable (0.220, $p = 0.126$, $n = 50$). The correlations between the NAE subscales were reliable (weakest $r = 0.601$, $p = 0.000$, $n = 50$). Reliable correlations between PAE subscales and between PAE and NAE subscales were few, without any pattern and are not reported.

To help gain insight into the relative internal consistency reliability of the NAEQ and AEQ (althought the sample size was small), Cronbach's alpha was computed using the ANOVA method for the polychotomous and the Kuder–Richardson-20 method for the dichotomous scales (Bartram, 1990). NAE: total (0.879), Same-day (0.889), Next-day (0.951), Continued-drinking (0.944), Distal (0.947). PAE: total (0.823), Global (0.931), Physical/social pleasure (0.812), Sexual enhancement (0.909), Social assertiveness (0.920), Relaxation/tension reduction (0.854) and Arousal/aggression (0.777). Slightly lower measures of internal consistency reliability

Table 1. *Descriptive statistics of total expectancy and expectancy subscale scores*

Expectancy	Items	Range min	Range max	Median	Quartile range	Mean	SD
Negative							
Total	60	118	290	201	63	200	44
Proximal	21	26	99	58	15	60	15
Distal	39	83	193	142	47	140	33
Same-day	21	26	99	58	15	60	15
Next-day	18	30	90	72	31	67	17
Continued	21	36	103	73	31	74	19
Positive							
Total	68	18	66	53	10	50	12
Global	24	6	23	19	6	18	5
Physical/social pleasure	9	1	9	8	2	8	2
Sexual enhancement	7	0	6	4	4	4	5
Social assertiveness	10	1	10	9	1	9	2
Relaxation/tension reduction	9	2	9	8	2	8	2
Arousal/aggression	9	2	8	6	3	6	2

Scores are rounded to the nearest integer using the conventional rules.

were obtained for the AEQ than the NAEQ and it is difficult to know whether this refelects what the AEQ purports to measure or the reduced-point scale with which it measures it.

The occurrence of the first slip

A life table analysis shows that the observed distribution over time of the first slip does not differ significantly from a survival distribution (Weibull, $p > 0.05$ using both unweighted and weighted least squares estimation procedures). A Kaplan–Meier analysis (using continuous rather than grouped relapse times) revealed the following percentile points of the survival curve: 25th (lower quartile), 1.5 weeks; 50th (median) 8 weeks; 75th (upper quartile) 20.5 weeks. The survivorship curve (Fig. 1) represents the cumulative probability that a randomly selected client will remain abstinent versus time and in broad terms displays a progressively decreasing negative slope.

However, as many have observed (Sutton, 1979; Singer & Willett, 1991), the shape of the survivorship curve is roughly maintained regardless of the distribution of risk and it is the hazard function that better identifies *when* relapse is most likely to occur. In the current study, the sample hazard curve (Fig. 2) identifies particularly risky times for relapse as during treatment and the first 3 weeks post-discharge. Thereafter, risk (defined here as the likelihood of relapse during a particular week *once* that week had been reached) progressively declines, although with such a sample size the curve is noisy.

Statistical predictors of occurrence of the first slip

The variables age, number of times treated, pre-treatment consumption and alcohol expectancies were regressed upon post-treatment relapse time to a first drink using the model for censored exponential survival data. (The exponentiality assumption is directly checked by plotting the residual survival times against the standard exponentiality order statistic, alpha, and if the assumption is met, the plot is linear (Lawless 1982). This has been done for each regression analysis and reported as the residual/alpha *r*.)

Age, previous treatment and pre-treatment consumption. The fit was unreliable when the three variables age, number of times previously treated and pre-treatment consumption were, *together*, regressed upon relapse time ($\chi^2 = 5.419$, $df = 3$, $p = 0.144$, residual/alpha $r = 0.972$) and also when they were regressed *individually*—age ($\chi^2 = 1.075$, $df = 1$, $p = 0.300$, residual/alpha $r = 0.987$), number of times treated ($\chi^2 = 3.680$, $df = 1$, $p = 0.055$, residual/alpha $r = 0.977$) and consumption ($\chi^2 = 0.001$, $df = 1$, $p = 0.975$, residual/alpha $r = 0.978$).

It appears that none of these three variables

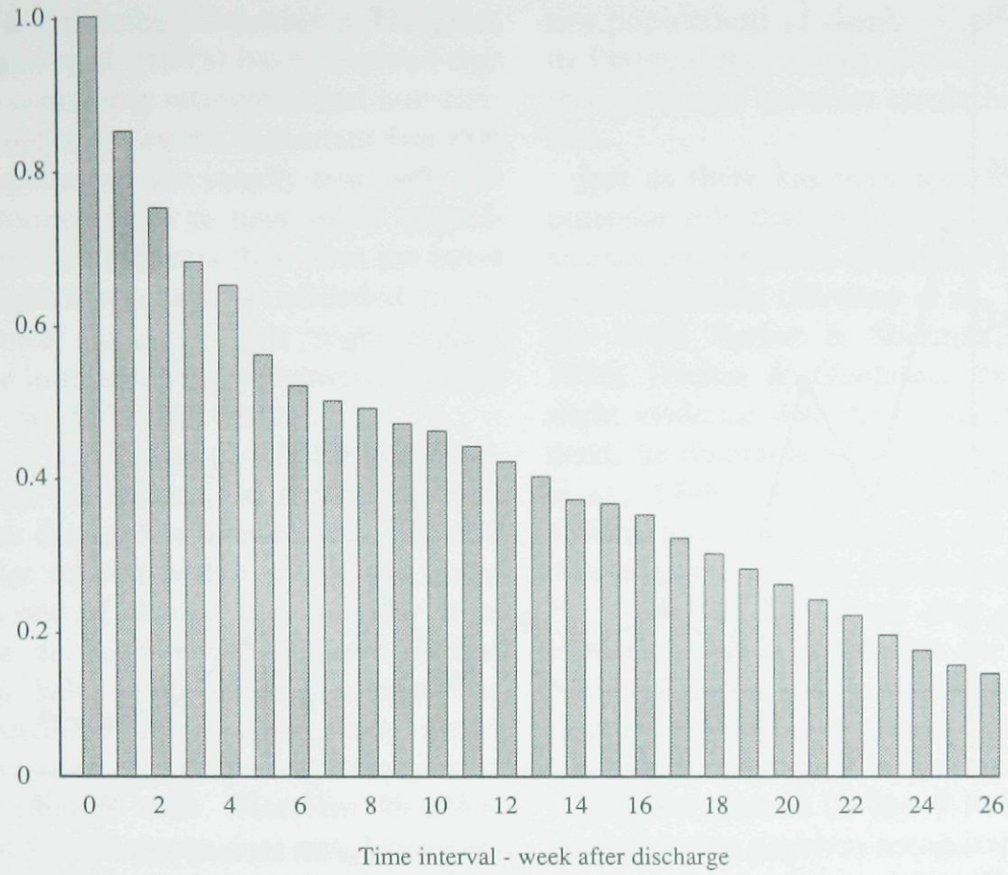

Figure 1. *Sample survivorship: cumulative proportion of clients surviving up to the respective weekly time interval. (Week 0 represents treatment duration).*

statistically predict relapse. The alcohol expectancy variables which are the focus of this study are added in the next section.

Total NAE and PAE. The fit became reliable when total NAE and total PAE were *added* to the model ($\chi^2 = 11.119$, df = 5, $p = 0.048$, residual/alpha $r = 0.952$). Within the model only the variable, total NAE, was reliably related to relapse time ($t = 2.031$, $p < 0.05$). The t statistic for variables is computed as the ratio of the parameter estimates (beta) to their respective standard error and values above 2.0 can be considered reliable at $p < 0.05$ (Statsoft, 1993, p. 16). A similar outcome in favour of total NAE occurred when, subsequently, *only* total NAE and total PAE were, together, regressed upon relapse time ($\chi^2 = 7.61$, df = 2, $p = 0.022$, residual/alpha $r = 0.963$; for total NAE $t = 2.677$, $p < 0.05$). When *only* total PAE was included, the fit was not reliable ($\chi^2 = 0.02$, df = 1, $p = 0.915$) but it was with only total NAE ($\chi^2 = 3.30$, df = 1, $p = 0.006$, residual/alpha $r = 0.912$).

Total NAE appears to statistically predict relapse. In the next section, the regression explores the contribution of the different expectancy subscales. In particular, it explores how the three component subscales of total NAE, themselves, form reliable associations with relapse (and underpin the reliable association found for total NAE).

NAE and PAE subscales. Regressing *only* the three NAE subscales on relapse time gave a reliable fit ($\chi^2 = 9.708$, df = 3, $p = 0.021$, residual/alpha $r = 0.910$) and only the distal subscale Next-day was reliably related to relapse ($t = 2.399$, $p < 0.05$). When the six PAE subscales were *added* to the model, the fit remained reliable ($\chi^2 = 17.806$, df = 9, $p = 0.038$, residual/alpha $r = 0.912$) but still only the distal NAE subscale, Next-day, was reliably related to relapse ($t = 2.271$, $p < 0.05$). The fit was not reliable when, subsequently, only the six PAE subscales on their *own* were fitted ($\chi^2 = 12.415$, df = 6, $p = 0.053$, residual/alpha $r = 0.956$).

It appears that the distal Next-day constituent of total NAE is the one that is responsible for the statistical association of total NAE and relapse.

The residual/alpha correlation coefficients described for the analyses above (all reached at least $r = 0.910$) indicate that the regression

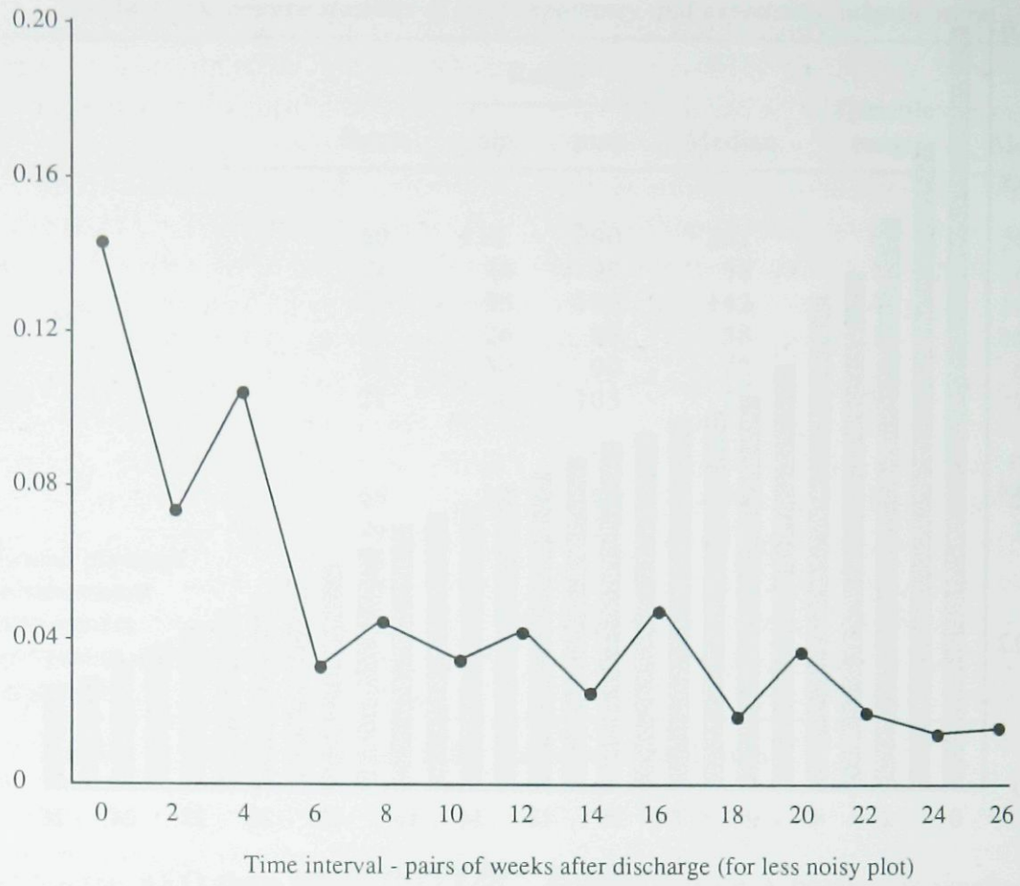

Figure 2. *Sample hazard rate: probability per time interval that a client who has survived to the beginning of the respective time interval will relapse during it. (Week-pair 0 represents treatment duration).*

model assumptions for censored exponential survival data have been met; the conservative 'times 10' rule for regression analyses (that is, minimum sample size should be 10 times the number of independent variables analysed) suggests that the critical analyses reported above have satisfactorily sized samples for the solely NAE subscale analysis, almost for the solely PAE subscale analysis but not necessarily for the combined NAE/PAE subscales analysis, and the multiple analyses carried out within this relatively small sample size increases the chance of Type I error.

Discussion

The first question this study was designed to answer was *whether* and if so *when* after discharge from treatment does the first slip occur. The analysis showed that the sample data does not differ significantly from a theoretically derived survival distribution and survivorship and hazard curves confirm that it is early rather than late weeks that present problems (the latter curve is the most informative). The shape of the survivorship and hazard curves and the fact that there is no reliable difference from a (Weibull) survival distribution confirms the observation that the earlier studies of Brown (1985) and Jones & McMahon (1993a) had treated the time-dependent nature of relapse in too crude a fashion; the conclusions derived from these studies should be treated with commensurate caution.

In the current study approximately 50% of clients relapsed by 2 months and 75% by 5 months whereas in Jones & McMahon's (1994) earlier study in the same treatment centre these relapse statistics were found much earlier, at 1 month and 3 months, even though the treatment offered was the same in both studies. Apart from the crude measure of relapse time in the earlier study, the only difference between the two studies was that the clients in the earlier study were *residential*, whereas those from the current one were not (there were no differences between the clients' mean age, number of previous treatments, pre-treatment consumption and admission positive or negative expectancy—in analyses not reported here, the most reliable difference was $p = 0.606$, $t = -0.518$, $df = 101$). Although there is some slight evidence that non-residential programmes might generate more abstinence than do residential ones when outcome

is measured at 6 months (Chapman & Huygens, 1988), Pettinati *et al.* (1993) have observed that most studies comparing residential and non-residential treatments ignore the important fact that these two populations are usually markedly different—the former tends to have more 'psychiatrically complicated' clients than does the latter (and this might reasonably be extended to include subclinical features). This might explain the difference in relapse profiles between Jones & McMahon's two follow-up studies.

Given that it was known (i) *whether* and, if so, (ii), *when* there was relapse, the second question this study was designed to answer, was (iii) *why*? The particular context within which this query was set was one of alcohol expectancies: what contributions do positive and negative alcohol expectancies, held upon admission, make to treatment outcome? The current study shows that total measures of negative expectancy from reliable associations with treatment outcome whereas positive expectancy does not. Moreover, even when positive expectancy was assessed on its own, a reliable fit was not found. This result is consistent with Jones & McMahon's (1994) study but the failure to find a reliable association with total positive expectancies does not replicate Brown's (1985) finding, neither does the current study replicate Brown's other finding, that some positive expectancy subscales predict relapse. Since the current finding is underpinned by a design including much more information than did Brown's, it is perhaps the one more easily defended. The reliable association of total negative expectancy with relapse is consistent with Jones & McMahon's (1994) earlier finding in which distal rather than proximal negative expectancy appears to be the most important. It is also consistent with the spontaneous remission and orthodox treatment studies reviewed earlier. However, in their earlier study, they found it was the longer term, Continued-drinking, negative expectancies that appeared to be the active distal component of the total expectancy measure, whereas in the current study it was the Next-day expectancies. Although this difference should not obscure the common fact that distal rather than proximal expectancies appear to be predictive of treatment outcome (for in negative expectancy studies thus far, proximal expectancies have been the sole representative of negative expectancy), it is, nevertheless, an inconsistency. Clinical and subclinical differences between the two populations of clients of the sort referred to by Pettinati *et al.* might be the source of this, and this particular question needs further investigation.

Just as there has been speculation about the potential role that the manipulation of positive alcohol expectancies might have in treating alcohol problems (Mooney *et al.*, 1987; Brown *et al.*, 1988; Rather & Sherman, 1989; Brown, 1993; Darkes & Goldman, 1993) and some slight evidence that these expectancies can, indeed, be manipulated during treatment (Brown *et al.*, 1988), so McMahon & Jones (1993a, 1994a) have speculated on the treatment role that negative alcohol expectancies might have. As a working hypothesis they equate negative expectancy with motivation for recovery (McMahon & Jones 1993a, c) at least, in so far as (i) negative expectancies closely relate to problem recognition and (ii) it is well-recognized within the clinical domain (Miller & Rollnick, 1991, for example) that problem recognition is at the centre of motivation for recovery. Within this framework, the *total measure* of negative expectancy from the NAEQ is a continuous, quantitative measure representing what Heather, Gold & Rollnick (1991) have called 'readiness for change' and which they assess on a categorical scale. Since many (for example, Stockwell, 1992) view such readiness for change as a continuous variable, the former approach might represent some advantage over the latter. Also within this framework, the *discrete responses* to the individual items of the NAEQ, themselves, represent an important component of the (qualitative) infrastructure of the current *state* (Heather *et al.*, 1991 or *level* (McMahon & Jones, 1993a, c) of readiness to change. Whereas, they claim, (i) the quantitative measure can be used in the process of treatment *match* (those with low measures can be directed towards pre-treatment motivational enhancement and those with higher measures directly towards relapse prevention skill-learning, for example); (ii) the qualitative infrastructure can be used to help identify the precise *nature* of the motivational deficit and, thereby, indicate what the content of the pre-treatment motivational enhancement might be. Even if the motivational deficit as measured by the NAEQ is slight (or assessed as absent), such a qualitative analysis is of value because it provides direct information to help *reinforce* the conclusions to which the client has already come

and which is recognized as a valuable component of motivationally orientated therapies (Miller & Rollnick, 1991). Indeed, with the growing concern in the addiction field that with the type of input currently used, a service goal of treatment match might represent an unrealistic oversimplification (Ball, 1994), focus on the latter use rather than the former might be indicated (although the clinical utility of the RCQ in treatment match has been demonstrated; Heather, 1993).

Jones & McMahon's use of admission rather than discharge measures of negative expectancy to predict post-treatment outcome recognizes that motivation for treatment *tenure* is as important a component of motivation for recovery as is motivation to keep to the treatment *consumption* goal once discharged (abstinence, in the current study) and, in support of this, Heather (1993) has reported that when using the RCQ, admission measures are more predictive of outcome than are discharge measures. Nevertheless, if treatment is designed (among other things) to address and increase negative expectancy, then a more reliable prediction of post-treatment consumption should come from some 'composite' measure of admission and discharge negative expectancy assessment and different methods of representing this (as intra-treatment negative expectancy *change*) are currently being explored.

The use of the NAEQ to represent motivation for recovery differs from the use of the RCQ in that the latter represents a 'top-down' approach to assessment whereas the former is 'bottom-up'. In 8/12 items of the RCQ, individuals are directly asked to come to *conclusions* about their current consumption—on a five-point agree/disagree scale they address such items as 'my drinking is a problem sometimes' and 'I don't think I drink too much'. The information from memory that individuals recruit to come to these conclusions, however, remains *indeterminate*: for example, do they conclude that their drinking is sometimes a problem because they sometimes get into fights through drink, or get hangovers, or are late for work or keep losing their job? The bottom-up approach that underpins the use of the NAEQ does not seek from individuals such conclusions; rather, it seeks to *determine* what they have learned are the usual outcomes of their consumption of alcohol (their negative expectations). A simple-minded view might be that the information derived from the NAEQ might be the very information that remains indeterminate when an RCQ assessment is made and, in partial support of this, McMahon & Jones (1994b) have shown that when the RCQ and NAEQ are used with the same clients on treatment entry, both assessments give good and broadly equivalent predictions of post-treatment outcome. From one point of view, this equivalence might be thought surprising, for implicitly incorporated within an individual's response to the RCQ items (at least, 8/12 of them) must be not only (i) some representation of the *expected* negative consequences of alcohol consumption but also (ii) some measure of the extent to which the individual is '*bothered*' by them. Many have expressed the view that value judgements need to be attached to alcohol expectancies before their proper impact upon behaviour can be predicted (Leigh, 1989a) and although these speculations have been with respect to positive expectancy, they apply equally to negative expectancy. Consequently, to represent motivation for recovery more closely through the agency of the NAEQ, items would need to have at least two components: a measure of the extent to which an individual 'would *expect* to be late for work' and a measure of the extent to which they 'would be *bothered* by it' and these would need to be combined in an appropriate way (expectancy/value models within this particular research area are discussed by Leigh, 1989a; Stacy *et al.*, 1990; Goldman *et al.*, 1991; Leigh & Stacy, 1993). It is tempting to speculate that a follow-up study incorporating such a combined measure should bring an improvement in the predictive utility of the NAEQ through what might be a more valid representation of motivation for recovery than the one used in the current study.

This study confirms Jones & McMahon's (1994) earlier finding that when measured appropriately, negative alcohol expectancies form reliable associations with consumption in post-treatment problem drinkers and extends McMahon *et al.*'s (1994) other finding of reliable associations found with consumption in social drinkers. Although the series of experiments carried out by the current authors have provided little evidence for associations between positive expectancy and consumption when positive and negative expectancies are put 'head to head', these conclusions only derive from positive expectancy as measured by the AEQ—the assessment tool most frequently used during the 13

years of expectancy research. It is important to note, however, that as measured by Cronbach's alpha, there is little to choose in the current experiment between the internal consistency reliability of the NAEQ and AEQ—only their predictive validity. The extent to which recent developments in measuring positive expectancy and recent developments in measuring positive and negative expectancies using composite questionnaires (for example, Fromme *et al.*, 1993; Leigh & Stacy, 1993), impact this research into the drinking decisions and treatment of problem drinkers remains to be seen.

Acknowledgements

This research was supported by Scottish Office Home and Health Department Grant K/OPR/2/3/82, SOHHD Clinical Biomedical Research Grant K/MRS/50/C2071 and Alcohol Education and Research Council Grant R6/92.

References

ADAMS, S. L. & MCNEIL, D. W. (1991) Negative alcohol expectancies reconsidered, *Psychology of Addictive Behaviors*, 5, pp. 9–14.

AMODEO, M. & KURTZ, N. (1990) Cognitive processes and abstinence in a treated alcoholic population, *The International Journal of the Addictions*, 25, pp. 983–1009.

BALL, J. C. (1994) Why has it proved so difficult to match drug abuse patients to appropriate treatment, *Addiction*, 89, pp. 263–265.

BARTRAM, D. (1990) Reliability and validity, in: BEECH, J. R. & HARDING, L. (Eds) *Testing people*, pp. 57–86 (Windsor UK, NFER-Nelson).

BROWN, S. A. (1985) Reinforcement expectancies and alcoholism treatment outcome after a one-year follow-up, *Journal of Studies on Alcohol*, 46, pp. 304–308.

BROWN, S. A. (1993) Drug effect expectancies in motivating and maintaining change, *Presentation at The Sixth International Conference on Treatment of Addictive Behaviors ICTAB-6, Santa Fe, USA.*

BROWN, S. A., CHRISTIANSEN, B. A. & GOLDMAN, M. S. (1987) The alcohol expectancy questionnaire: an instrument for the assessment of adolescent and adult alcohol expectancies, *Journal of Studies on Alcohol*, 48, pp. 483–491.

BROWN, S. A., GOLDMAN, M. S., INN, A. & ANDERSON, I. R. (1980) Expectations of reinforcement from alcohol: their domain and relation to drinking patterns, *Journal of Consulting and Clinical Psychology*, 48, pp. 419–426.

BROWN, S. A., MILLAR, A. & PASSMAN, L. (1988) Utilizing expectancies in alcoholism treatment, *Psychology of Addictive Behavior*, 2, pp. 59–65.

CHAPMAN, P. L. H. & HUYGENS, I. (1988) An evaluation of three treatment programmes for alcoholism: an experimental study with 6- and 18-month follow-ups, *British Journal of Addiction*, 83, pp. 67–81.

CONNORS, G. J., O'FARRELL, T. J., CUTTER, S. G. & THOMPSON, D. L. (1986) Alcohol expectancies among male alcoholics, problem drinkers and non-problem drinkers, *Alcoholism: Clinical and Experimental Research*, 10, pp. 667–671.

DARKES, J. & GOLDMAN, M. S. Expectancy challenge and drinking reduction: experimental evidence for a mediational process, *Journal of Consulting and Clinical Psychology*, 61, pp. 344–353.

EASTMAN, C. & NORRIS, H. (1982) Alcohol dependence, relapse and self-identity, *Journal of Studies on Alcohol*, 43, pp. 1214–1231.

EDWARDS, G., BROWN, D., DUCKITT, A., OPPENHEIMER, E., SHEEHAN, M. & TAYLOR, C. (1987) Outcome of alcoholism: the structure of patient attributions as to what causes change, *British Journal of Addiction*, 82, pp. 533–545.

FROMME, K., STROOT, E. & KAPLAN, D. (1993) Comprehensive effects of alcohol: development and psychometric assessment of a new expectancy questionnaire, *Psychological Assessment*, 5, pp. 19–26.

GOLDMAN, M. S., BROWN, S. A., CHRISTIANSEN, B. A. & SMITH, G. T. (1991) Alcoholism and memory: broadening the scope of alcohol-expectancy research, *Psychological Bulletin*, 110, pp. 137–146.

HEATHER, N. (1993) Measuring readiness for change, *Presentation at The Sixth International Conference on Treatment of Addictive Behaviors ICTAB-6, Santa Fe, USA.*

HEATHER, N., GOLD, R. & ROLLNICK, S. (1991) *Readiness to change questionnaire: User's Manual*, National Drug and Alcohol Research Centre, University of New South Wales.

JONES, B. T. & MCMAHON, J. (1993) The reliability of the Negative Alcohol Expectancy Questionnaire and its use, *Journal of the Association of Nurses in Substance Abuse*, 12, pp. 14–16.

JONES, B. T. & MCMAHON, J. (1994) Negative and positive alcohol expectancies as predictors of abstinence after discharge from a residential treatment programme: a one- and three-month follow-up study in males, *Journal of Studies on Alcohol*, in press.

LAWLESS, J. F. (1982) *Statistical Models and Methods for Lifetime Data* (New York, Wiley).

LEIGH, B. C. (1987) Beliefs about the effects of alcohol on self and others, *Journal of Studies on Alcohol*, 48, pp. 467–475.

LEIGH, B. C. (1989a) In search of the seven dwarves: issues of measurement and meaning in alcohol expectancy research, *Psychological Bulletin*, 105, pp. 361–373.

LEIGH, B. C. (1989b) Attitudes and expectancies as predictors of drinking habits: a comparison of three scales, *Journal of Studies on Alcohol*, 50, pp. 432–440.

LEIGH, B. C. & STACY, A. W. (1991) On the scope of alcohol expectancy research: remaining issues of measurement and meaning, *Psychological Bulletin*, 110, pp. 147–154.

LEIGH, B. C. & STACY, A. W. (1993) Alcohol outcome expectancies: scale construction and predictive utility in higher order confirmatory models, *Psychological Assessment*, 5, pp. 216–229.

LUDWIG, A. M. (1985) Cognitive processes associated with "spontaneous" recovery from alcoholism, *Journal of Studies on Alcohol*, 46, pp. 53–58.

MCMAHON, J. & JONES, B. T. (1993a) Negative expectancy and motivation, *Addiction Research*, 1, pp. 145–155.

MCMAHON, J. & JONES, B. T. (1993b) The Negative Alcohol Expectancy Questionnaire, *Journal of the Association of Nurses in Substance Abuse*, 12, p. 17.

MCMAHON, J. & JONES, B. T. (1993c) The NAEQ: an instrument to measure motivation for recovery from problem drinking, *Presentation at The Sixth International Conference on Treatment of Addictive Behaviors ICTAB-6, Santa Fe, USA.*

MCMAHON, J. & JONES, B. T. (1994a) The Negative Alcohol Expectancy Questionnaire (NAEQ) as an instrument to measure motivation to inhibit drinking and evaluating methods of treating problem drinkers, in: TONGUE, E. (Ed.) *Proceedings of the 6th International Congress on Alcohol and Drug Dependence*, pp. 228–241 (Lausanne, ICAA).

MCMAHON, J. & JONES, B. T. (1994b) Post-treatment alcohol abstinence survivorship and motivation for recovery: a comparison of the predictive validity of the Readiness For Change (RCQ) and Negative Alcohol Expectancy (NAEQ) Questionnaires, *Addiction Research*, submitted for publication.

MCMAHON, J., JONES, B. T. & O'DONNELL, P. (1994) Comparing positive and negative alcohol expectancies in male and female social drinkers, *Addiction Research*, 1, pp. 349–365.

MILLER, W. R. & ROLLNICK, S. (1991) *Motivational Interviewing: Preparing People to Change Addictive Behavior* (New York, Guilford).

MILLER, W. R., BENEFIELD, R. G. & TONIGAN, J. S. (1993) Enhancing motivation for change in problem drinking: a controlled comparison of two therapist styles, *Journal of Consulting and Clinical Psychology*, 61, pp. 445–461.

MOONEY, D. K., FROMME, K., KIVLAHAN, D. R. & MARLATT, G. A. (1987) Correlates of alcohol consumption: sex, age and expectancies relate differentially to quantity and frequency, *Addictive Behaviors*, 12, pp. 235–240.

NIAAA (1995) Negative Alcohol Expectancy Questionnaire, in: *NIAAA Handbook of Alcoholism Treatment Assessment Instruments* (Rockville US, NIAAA) in press.

PETTINATI, H. M., MEYERS, K., JENSEN, J. M., KAPLAN, F. & EVANS, B. D. (1993) Inpatients vs outpatients treatment for substance dependence revisted, *Psychiatric Quarterly*, 64, pp. 173–182.

RATHER, B. C. & SHERMAN, M. F. (1989) Relationship between alcohol expectancies and length of abstinence among Alcoholics Anonymous members, *Addictive Behaviors*, 14, pp. 531–536.

ROHSENOW, D. J. (1983) Drinking habits and expectancies about alcohol's effects for self versus others, *Journal of Consulting and Clinical Psychology*, 51, pp. 752–756.

SINGER, J. D. & WILLETT, J. B. (1991) Modeling the days of our lives: using survival analysis when designing and analysing longitudinal studies of duration and the timing of events, *Psychological Bulletin*, 110, pp. 268–290.

SOBELL, L. C., SOBELL, M. B., LEO, G. I. & CANCILLA, A. (1988) Reliability of a Timeline Method: assessing normal drinker's reports of recent drinking and a comparative evaluation across several populations, *British Journal of Addiction*, 83, pp. 393–402.

SOBELL, L. C., SOBELL, M. B., TONEATO, T. & LEO, G. I. (1993) What triggers the resolution of alcohol problems without treatment? *Alcoholism: Clinical and Experimental Research*, 17, pp. 217–214.

SOUTHWICK, L., STEELE, C., MARLATT, A. & LINDELL, M. (1981) Alcohol-related expectancies: defined by phase of drinking and drinking experience, *Journal of Consulting and Clinical Psychology*, 49, pp. 713–721.

STACY, A. W., WIDAMAN, K. F. & MARLATT, G. A. (1990) Expectancy models of alcohol use, *Journal of Personality and Social Psychology*, 58, pp. 918–928.

STATSOFT (1993) Survival analysis and censored regression, in: *STATISTICA/MAC™, Addendum: New features in release 3 (Part II)*, pp. 1–32 (Tulsa US, Statsoft).

STOCKWELL, T. (1992) Models of change, heavenly bodies and *weltanschauugs*, *British Journal of Addiction*, 87, pp. 830–831.

SUTTON, S. R. (1979) Interpreting relapse curves, *Journal of Consulting and Clinical Psychology*, 47, pp. 96–98.

THOM, B. (1987) Sex differences in help-seeking for alcohol problems—2. Entry into treatment, *British Journal of Addiction*, 82, pp. 989–997.

TUCHFELD, B. S. (1981) Spontaneous remission in alcoholics: empirical observations and theoretical implications, *Journal of Studies on Alcohol*, 42, pp. 626–641.

YOUNG, R. MCD., OEI, T. P. S. & KNIGHT, R. G. The tension reduction hypothesis revisited: an alcohol expectancy perspective, *British Journal of Addiction*, 85, pp. 31–46.

APPENDIX

Negative Alcohol Expectancy Questionnaire, NAEQ

A. IF I WENT FOR A DRINK *NOW*, ...
1 I would become argumentative
2 I would become aggressive
3 I would become violent
4 I would become anxious
5 I would have an accident
6 I would become depressed
7 I would get drunk
8 I would get in a fight
9 I would have memory lapses
10 I would lie about how much I had to drink
11 I would end up in jail
12 I would argue with my spouse
13 I would have difficulty sleeping
14 I would wet the bed
15 I would become boastful
16 I would borrow money
17 I would consider taking other drugs
18 I would take other drugs
19 I would lose my driving licence
20 I would drink more than the others in my company
21 I would have difficulty in stopping drinking

B. IF I WENT FOR A DRINK NOW, THEN *TOMORROW*, ...
22 I would miss work
23 I would have 'the shakes'
24 I would have 'the sweats'
25 I would have a hangover
26 I would feel depressed
27 I would have low self-esteem
28 I would crave a drink
29 I would have difficulty sleeping
30 I would feel generally ill
31 I would feel frightened
32 I would feel guilty
33 I would feel remorseful
34 I would feel anxious
35 I would be shy of meeting people
36 I would feel restless
37 I would be sick
38 I would be unable to eat
39 I would go on a binge

C. IF I WERE TO *CONTINUE* DRINKING AT MY CURRENT CUSTOMARY RATE, ...
40 I would lose my wife/husband
41 I would lose my house
42 I would lose my job
43 I would have the DTs
44 I would have convulsions
45 I would lose my friends
46 I would get into debt
47 I would end up in hospital
48 I would end up sleeping rough
49 I would consider suicide
50 I would attempt suicide
51 I would feel frightened
52 I would feel depressed
53 I would feel self-loathing
54 I would feel self pity
55 I would lose all respect for myself
56 I would end up in jail
57 I would damage my liver
58 I would feel I was going mad
59 I would choke on my own vomit
60 I would die

Subscales
A. Same-day
B. Next-day
C. Continued-drinking
Same-day = proximal
Next-day + Continued-drinking = distal

Scoring key
(5-point Likert scale)
1 = highly unlikely
2 = unlikely
3 = possible
4 = likely
5 = highly likely