CRAVING AND RELAPSE MEASUREMENT IN ALCOHOLISM

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Abstract — This paper attempts to summarize the measurement of craving with four different craving instruments and to relate this to definitions and measurement of relapse. The definitions of relapse may vary between studies and researchers, but are usually well defined. Five commonly used methods to measure relapse are: (1) quantity/frequency of drinking; (2) cumulative duration of abstinence (CDA); (3) post-withdrawal abstinent period; (4) stable recovery period; (5) the time line follow-back method. The definition of craving is much less clear and is mostly described as an emotional-motivational state or as obsessive-compulsive behaviour. Four self-rating instruments are briefly discussed and compared: the Obsessive-Compulsive Drinking Scale, OCDS, the Lübeck Craving Scale, LCRR, the Alcohol Craving Questionnaire, ACQ-Now-SF-R, and ordinal scales (e.g. visual analogue, Likert, or verbal descriptive scales). These instruments measure different aspects or dimensions of craving over different periods. The different dimensions measured suggest that there is still a need to conceptualize a standard interpretation of the word craving. There is a need also to measure an emotional-motivational dimension, a cognitive-behavioural dimension, expectancies, and effects on positive and negative reinforcement with different instruments or with one multidimensional instrument. It is suggested that different patients are expected to have different craving profiles.

INTRODUCTION

Although the existence of the concept of ‘craving’ in alcoholism is now accepted by most researchers and health providers, the exact meaning of the word, the measurement thereof and its scientific utility in understanding relapse behaviour in alcoholism remain controversial (Ludwig and Stark, 1974; Babor et al., 1988; National Institute of Alcohol Abuse and Alcoholism, 1989; O’Connor et al., 1991). Sithartan and McGrath (1992) also published important differences between what patients seeking help to abstain from addictive behaviours and their health providers understood by the word craving. The introduction of non-aversive medications in alcohol dependence, for example Campral® (acamprosate) (Paille et al., 1995; Sass et al., 1996; Whitworth et al., 1996; Poldrugo, 1997; Geerlings et al., 1997) and naltrexone (O’Malley et al., 1992; Volpicelli et al., 1992), accentuated the need to clarify the meaning and measurement of craving as additional outcome criteria in clinical studies in alcohol dependence.

The mechanisms by which craving is thought to contribute to relapse (Jellinek et al., 1955; Ludwig and Stark, 1974) include loss of control (Modell et al., 1992; Anton et al., 1995), intrapersonal temptation (Marlatt, 1978), response to cue exposure (Rankin et al., 1979, 1983; Littleton, 1995) or other theoretical models. Whatever the mechanism, the general expectation is that a positive correlation should exist between craving intensity and relapse severity. This has indeed been demonstrated by certain studies evaluating longitudinal treatment effect in alcohol dependence (O’Malley et al., 1992; Volpicelli et al., 1992; Paille et al., 1995), but many other studies with a clear positive effect on relapse prevention could not confirm corresponding decreases in craving (Sass et al., 1996; Whitworth et al., 1996; Poldrugo, 1997; Geerlings et al., 1997; Pelc et al., 1997). The question arising from this apparent contradiction between different studies and observers is whether differences in interpretation of relapse and craving could have contributed to the discrepancies. This article will attempt to summarize the measurement of craving with four different craving instruments and relate this to definitions and measurement of relapse.

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DEFINITIONS AND MEASUREMENTS

Relapse

Definition. The definition of relapse may vary between studies and researchers, but is usually well defined when treatment results are reported. Two common definitions encountered in the literature are: (1) to consider any drinking by an alcohol-dependent patient as a relapse irrespective of the quantity consumed (Sass et al., 1996; Whitworth et al., 1996; Poldrugo, 1997; Geerlings et al., 1997; Pelc et al., 1997); (2) alternatively to consider drinking in excess of a specific number of drinks/drinking episode or /day as a relapse, for example, >60 g/day for men and >40 g/day for women (Babor et al., 1988) or more than five drinks for men and four drinks for women/drinking occasion (O’Malley et al., 1992).

Measurement. Five commonly used methods to measure relapse are the following.

(1) Quantity/frequency of drinking during drinking episodes: this is usually measured by ordinal scales or by specifying the exact number and frequency of drinks. Measurement at any time point during the study period is possible.

(2) Cumulative duration of abstinence (CDA): this is a mathematical cumulation of abstinent days over a specified period, normally the period of the study, and is expressed as the actual number of dry days or the percentage of dry days for the period. Being similar to assessment of symptom-free periods in other chronic recidivistic psychiatric conditions, the advantage of this method is provision of a single value representing the total study period, which seems to have more clinical relevance than repeated relapse severity measurements.

(3) Post-withdrawal abstinent period: this represents the number of days after acute alcohol withdrawal until the patient experiences his/her first drink or first relapse, depending on the specific definitions of the study. This period could include or exclude the initial period (first few days) of acute withdrawal (Potgieter and Lehert, 1996). It represents the initial stability during the period when the patient is the most likely to relapse.

(4) Stable recovery period: this is the drink-free period between the last relapse and the end of the study period. This measure has recently been described by Ph. Lehert (unpublished) and may in future be evaluated as a measure to predict recovery stability. Like CDA, it could be expressed in number or percentage of days.

(5) The time line follow-back method: this is increasingly reported to be a reliable approach to gathering information on drinking behaviour (Sobell et al., 1982) between assessment periods.

Craving

Definition. The definition of craving is much less clear than that of relapse. It is not the purpose of this paper to give a comprehensive literature review of this controversial issue. The authors have rather decided to mention briefly three descriptions which in our opinion reasonably represent the current understanding of this word in alcoholism. These descriptions are:

(1) NIAAA: in the circular Alcohol Alert of October 1989 (National Institute of Alcohol Abuse and Alcoholism, 1989), craving is described as an emotional–motivational state of ‘appetitive urge, like hunger, characterised by withdrawal-like symptoms. Symptoms are elicited by internal and external cues evoking memory of euphoric effects of alcohol or discomfort from withdrawal’.

(2) Modell et al.: many aspects of craving are considered as similar to thoughts and patterns of behaviour of obsessive–compulsive disease (Modell et al., 1992).

(3) Plinius Maior Society: this European consensus group, which strives towards a comprehensive care concept for the management of alcohol dependence, defined craving as an emotional–motivational state of ‘subjective feelings of desire or need for alcohol consumption’ (Plinius Maior Society, 1994).

Measurement. Only subjective instruments (not physiological changes or other measurements) are reviewed. The following four self-rating instruments are briefly discussed: (1) the Obsessive–Compulsive Drinking Scale (OCDS; Anton et al., 1995); (2) the Lübeck Craving Scale (LCRR; Veltrup, 1994); (3) the Alcohol Craving Questionnaire (ACQ-Now-SF-R, Singleton, 1996); (4) ordinal scales [e.g. visual analogue (VAS), Likert, and verbal descriptive scales]. We have attempted to interpret and classify the type of questions asked in each of the above scales in order to identify some common characteristics/denominators, or describe dimensional differences between them. The classification and/or subdivision of the
questions in types or subtypes given here are therefore the opinion of the present authors, and do not necessarily represent those of the authors who developed these scales. The scales themselves are not reproduced here, but are available from the respective referenced authors/journals.

(1) The OCDS: this questionnaire, based on the YBOCS-hd scale (Modell et al., 1992), was developed and validated by Anton et al. (1995) as a short and easy to administer self-rating scale consisting of 14 items (comparable to the 10 of the YBOCS-hd) to be used for screening and outcome measurement in alcoholism. The questions are retrospective in nature, but the scale does not specify a time period, the data published by Anton et al. (1995), however, used the scale at intervals of 1 to 2 weeks.

Our interpretation of the type of questions in the OCDS is as follows: (a) One question (Q13 — ordinal) is on intensity of desire. (b) Seven questions are on obsessive–compulsive aspects, namely how thoughts (Q1–4), or behaviours (Q9–11) influence life. (c) Four questions are on control of thoughts (Q5, 6) and control of drinking (Q12, 14). (d) Two questions are on quantity of drinking (Q7, 8), and hence on relapse itself.

The scale has a maximum score of 10 (for 6 items a score of 1 each and for 4 pairs of 2 items the highest score of each pair). The scale seems well suited for obsessive–compulsive aspects of craving, and the published data so far suggest that it is a valuable scale for baseline and outcome assessment and is easy to administer.

The scale has been translated into eight languages (German, Spanish, French, Dutch, Swedish, Italian, Hebrew, and Japanese) (R. F. Anton, personal communication). During a study to translate and validate the scale in Dutch (Schippers et al., 1997), eight questions were added, three of which referred to drinking intentions, as potential substitutes for the items on drinking behaviour, and five questions on affective aspects. Schippers et al. (1997) concluded that the affective items did not seem to improve reliability or validity, but suggested further research to evaluate the possibility of replacing items of drinking with items of intention. A study to further test these additional questions in a bigger sample is presently underway.

(2) The LCRR: this questionnaire was developed and validated by Veltrup as a self-rating scale consisting of 10 questions, of which several have multiple subitems, resulting in not less than 98 answers required of the patient (Veltrup, 1994). As in the case of OCDS, the LCRR scale questions are also retrospective in nature, but the period is considerably different and much longer, referring to the previous 30 days for some questions, 1 year for others and 3 years for yet others. Our interpretation of the type of questions is as follows: (a) Two questions (2 items, 1 VAS and 1 ordinal scale) over the previous 30 days are on the intensity/frequency of the desire. (b) Four questions (94 items) over the previous 12 months are on the intensity of desire under different circumstances, and whether the desire resulted in drinking. The circumstances proposed relate to: time of day (14 items/answers); place (12 items/answers); circumstances of no desire ever (2 items/answers); and mood/situation (66 items/answers). (c) Two questions (2 items) over the previous 12 months are on control. (d) Two questions (0 to 28 responses) over the previous 3 years are on relapse (when).

From the above analysis of the types of questions, it seems as if more than 90% of the answers given by the patients are related to the intensity of craving under different daily circumstances over the last 12 months, and whether this resulted in drinking. This appears to be the main focus of the scale. The scoring of the scale is not explained by the author, other than for the items on the circumstances related to mood or situation. Veltrup (1994) describes four factors identified by factor analysis: depression, euphoria, distress/tension, and relaxation/contentment. The long duration covered by some questions suggests that the scale is probably more suited as an instrument to determine prognostic and therapeutic modalities at the start of treatment, than as an outcome measure during treatment. The variation in the length of the periods covered by the different questions (between 30 days and 3 years) could complicate interpretation and would need additional research to establish implications for treatment and prognosis. The detailed questions on the time and duration of relapse episodes over the last 3 years might be difficult to complete for some patients, and the possibility of using a time line follow-back method may have to be considered (Sobell et al., 1982).

(3) The ACQ-Now-SF-R: this is a shortened
(SF) and revised (R) 12 question version presently under development, based on the original 47 question ACQ-Now, which was an adaptation from the Cocaine Craving Questionnaire (Tiffany et al., 1993). The approach of the majority of the questions is to place the patient within an imaginative cue exposure situation by stating ‘Right now, if you had a drink, would you feel/ react . . . ?’ and recording 12 responses on VASs. It therefore assesses the craving at the time of measurement.

We classified the type of questions as follows: (a) two questions are on intensity of craving (Q2, 5); (b) seven questions are on expectations (mainly of mood) if the patient were to drink now (Q 6–12); (c) three questions are on aspects of control over drinking (Q 1, 3, 4).

We are unaware of published data on the validation of this scale or its application in clinical settings, but one particularly interesting aspect seems to be the fact that it attempts to measure the actual, immediate situation the patient would experience as a result of an imaginative drink (an imaginative cue or temptation) during the time he/she fills out the questionnaire, hence not relying on retrospective projection by the patient. However, this might also be the limitation of the scale, in not recording craving experiences, thoughts or behaviours other than during the moment of measurement.

(4) Ordinal craving scales: since detailed questionnaires for craving are fairly recent developments, ordinal scales simply measuring intensity of ‘craving’ or ‘desire’, whether visual analogue or verbal descriptive in nature, are probably the most used or best known craving scales for many researchers in alcoholism. However, the major criticism against these is that they do not attempt to answer or interpret the fundamental question of what exactly craving means, and essentially leave it to the patient to decide that for him/herself. The uncertainty of what it actually measures is therefore considerable, and might be one of the reasons why inconsistent results can be expected with this kind of scale.

Nevertheless, some good correlations between drinking behaviour and craving as measured by analogue scales have been published, for example by O’Malley et al. (1992) in a 3-month study with naltrexone and by Paille et al. (1995) in a 12-month study with acamprosate. However, many studies which showed clear treatment effect to reduce drinking could not show a similar decline in craving by ordinal measurement. One example is the study by Whitworth et al. (1996), in which patients on acamprosate had significantly fewer relapses than patients on placebo over a 1-year treatment duration, but the corresponding craving measure did not confirm statistically significant differences at the same intervals.

**COMPARISON OF CRAVING SCALES**

From this discussion of four craving instruments, it is clear that different aspects or dimensions are measured by the different scales. These include, desire, thoughts, expectations, resolutions, feelings/moods, reactions/behaviours, imaginative cues, interference with life/work activities, attempts to control thoughts or actions, self-interpretation, drinking severity, and previous attempts to stop. It is therefore not surprising that comparison between the scales is virtually impossible, and that conclusions on the meaning and the implications on understanding the influences on relapse and treatment remain elusive. To illustrate the differences between the three main instruments, we compiled Table 1 according to the type of information we think they record.

**PATIENT PERSPECTIVE**

Since the ordinal scales rely completely on the patients’ interpretation of craving, and because the more specific questionnaires as mentioned above depend heavily on the patients’ judgement of severity of desires or craving, it is important to understand what the patients themselves understand by the word craving. Ludwig and Stark (1974) reported that the majority of their patients considered craving as a need or a desire, whereas Sithartan and McGrath (1992) reported some opposing trends between patients and their health providers as to what craving meant. For patients seeking treatment for abstinence from either smoking or alcohol, the majority (56%) considered craving as a weak or any urge, 31% as a strong urge, and 13% as neither. For their health providers, only 22% considered craving as a weak or any urge, 65% considered it as a strong urge, and 13% as neither. If patients are asked to quantify craving and express themselves on the
role it might have in relapse, it is imperative that we should start to develop some common language to describe this term.

**GENERAL CONCLUSIONS AND COMMENTS**

The definition and measurement of relapse may vary between studies and researchers, but are usually well defined, this facilitates comparison of data from different sources. Measurement includes relapse rates at different time points, the cumulative periods of abstinence, the duration of the abstinence period after acute withdrawal from alcohol and the stable recovery period from the last relapse to the end of the observation period.

Although considerable progress has been made, the definition and measurement of craving are still controversial. Important differences between the four self-rating measuring instruments reviewed were discussed. It seems that the instruments measure different aspects or dimensions of craving, and measure these over different time periods.

The different dimensions measured suggest that there is still a need to define a standard concept of the meaning of the word craving. It is suggested that the dimensions identified in the three questionnaires could be taken as the base to develop a model for craving. It is also suggested that two dimensions/aspects might be under-represented in the scales reviewed, these being (1) the measurement of craving components specifically associated with negative reinforcement and (2) a more targeted approach to measure cue-related craving. One example of the need to measure the effect and extent of negative reinforcement on craving and relapse is during treatment with acamprosate. Acamprosate is expected to reduce negative reinforcement by reducing glutamate-induced hyperexcitation through normalization of altered NMDA receptors (Spanagel et al., 1996).

Although the relapse-prevention effect of acamprosate has been repeatedly documented (Sass et al., 1996; Whittworth et al., 1996; Poldrugo, 1997; Geerlings et al., 1997; Pelt et al., 1997), a clear correlation between this relapse-prevention effect and any effect on craving has not yet been convincingly documented.

We suggest the need to measure an emotional—motivational dimension, a cognitive—behavioural dimension (obsessive—compulsive, impulsivity, loss of control, thoughts), expectancies from restricted or unrestricted alcohol consumption.

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**Table 1. Comparison of four craving scales**

<table>
<thead>
<tr>
<th>Aspect or dimension</th>
<th>OCDS 1–2 weeks</th>
<th>ACQ-Now-SF-R Now</th>
<th>LCRR 30 days–3 years</th>
<th>VAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desires</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intensity</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Situations of desire related to desires</td>
<td>(+)</td>
<td>+</td>
<td>+ +++++</td>
<td>*</td>
</tr>
<tr>
<td>Affective disturbance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cues</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Thoughts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>About alcohol</td>
<td>+ ++</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>About control/prevention</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Expectations</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Drinking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severity</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>As result of desire</td>
<td></td>
<td></td>
<td></td>
<td>+ +</td>
</tr>
<tr>
<td>Interfere with life</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Efforts to stop/control</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

The four scales compared are the OCDS (Obsessive—Compulsive Drinking Scale of Anton et al., 1995), the ACQ-Now-SF-R (Alcohol Craving Questionnaire, shortened version, revised, of Singleton, 1996), the LCRR (Lübeck Craving Scale of Veltrup, 1994) and the VAS (Visual Analog Scale). +++++ Represents an arbitrary grading indicating the extent to which we believe the reviewed scales are representative of the dimensions discussed; with + equaling presence; (+) possible presence; +++++ implying that the scale measures predominantly this dimension. The VAS* is unidimensional, mostly used for intensity of desire, but may be designed to measure any dimension.
and effects on positive and negative reinforcement. Different instruments or one multidimensional instrument may be necessary. Once dimensions are defined, it might also be easier to define whether questions should be retrospective or refer to immediate situations of craving. We also suggest that different patients should be expected to have different craving profiles. A simple screening may be attempted to identify a predominant craving dimension to match the corresponding measurement.

REFERENCES


Veltrup, C. (1984) Erfassung des ‘Craving’ bei Alkohol-
