Craving for benzodiazepines : the development of the benzodiazepine craving questionnaire

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Chapter 5

Benzodiazepine craving revised: a comparison of two conceptualisations of benzodiazepine craving

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ABSTRACT

Aim - This study aims to advance our understanding of craving for benzodiazepines (BZs) by comparing two conceptualisations of BZ craving: 1) a broad conceptualisation of BZ craving, represented by the Benzodiazepine Craving Questionnaire (BCQ), a 20-item Rasch homogeneous self-report questionnaire with promising psychometric qualities, and 2) a narrow conceptualisation, represented by the Benzodiazepine Desire Scale (BDS), three single-item Likert-type scales assessing frequency, global and peak intensity of the desire for BZs.

Setting and participants - Data were gathered from a sample of 113 long-term and 80 former long-term general practice BZ users participating in a large BZ reduction trial in general practice in the Netherlands.

Measurements - Sum scores of the BCQ and the BDS were entered in a Maximum Likelihood factor analysis together with other (BZ dependence) variables in order to test our hypothesis that both conceptualisations of BZ craving would load on one dependence factor different from other variables.

Findings - BCQ sum scores loaded on a factor representing negative affect, while BDS sum scores loaded on a dependence factor. Low craving intensity, as measured by the BCQ, and the selected time frame of craving measurement (current experience versus over the past week) are the most likely explanations of these findings in our sample of long-term low dose BZ users.

Conclusions - Low craving intensity, as measured with the BCQ, is associated with negative affect and reflects the anticipation of positive outcome of BZ use and of relief from negative affect or withdrawal. Both conceptualisations of BZ craving contribute to our understanding of the potential significance and meaning of craving in BZ use.

INTRODUCTION

In addiction literature some elaborate and thorough surveys have been published on the definitions of craving according to various theoretical models (eg [1-6]). There are still some unsolved definitional issues, among which is the scope of the craving definition.[4,7] While some researchers restrict the craving definition to a (strong) desire for use of an addictive substance, others use definitions with a broader focus. Both approaches have advantages and disadvantages from a theoretical point of view.

Researchers in support of a narrow conceptualisation of craving stick to dictionary definitions and have argued to use the term craving only for strong desires to take addictive substances.[1] However, there is evidence that a substantial percentage of persons with substance use and misuse disorders use the word craving to mean any urge or desire to take a drug, even a weak one (e.g. [8,9]). Furthermore, there is considerable diversity in the specific terms patients use to describe their craving. For example, smokers used significantly more affective descriptors than physiological descriptors to characterise their craving and significantly fewer synonym words (e.g. urge) than affective, behavioural, and cognitive descriptors.[10] Researchers in favour of a broad conceptualisation of craving include not only desires to use, but also behavioural intentions, lack of control over use, and anticipation of positive outcome and of relief from negative affect.

As a consequence of the many different definitions and conceptualisations of craving, craving measurement has been diverse. Sayette and colleagues, among others, evaluated different methodological approaches of the measurement of craving. Single-item measures, such as visual analogue scales, which often rate craving intensity from none to maximum, have face validity.[4] However, reliability of a single-item may be low, and unless administered with other items sampling the same content area, difficult to estimate.[4,11,12] Furthermore, single-item ratings may lack the breath required to capture the various semantic dimensions used by people to describe their craving.[10,13]

A broader range of items is advantageous if we take the position that we do not know which types of items are the purest indicators of craving.[13] When a broad definition of craving is applied, questionnaires designed to assess craving can be categorised as presenting craving as a single 'factor' or as a multi-factorial construct.[14] One of the advantages of the use of composite craving scores over single-item scales is that they might yield a more reliable estimate of the individual's craving report. A scale comprised of several items addressing desire for an addictive substance as well as other urge-relevant categories could provide a substantially more comprehensive representation of the semantic organisation of craving report and might also allow for the identification of its multidimensional aspects.[12] Moreover, reliability and power can be increased with the use of multi-item, relative to single-item, scales. It is also likely that increasing the number of items on the self-report measure would increase the reactivity of the measure.[4] However, the fundamental issue regarding the use of multi-item scales is whether items referring to expectancies about the effects of substance use and to the intention to use an addictive

substance, can be considered to be distinct components of a broad construct of craving.

Tiffany and colleagues have set the marker for the development of multi-item scales that aim to capture a broad range of conceptualisations of craving for different substances, by developing the Questionnaire on Smoking Urges (QSU) and the Cocaine Craving Questionnaire (CCQ), covering current craving theories as widely as possible.[9,13] Numerous questionnaires to assess craving for other substances have been adapted from these questionnaires, but most researchers found inconsistent results in terms of number and content of factors retained from factor analyses (e.g. Alcohol Craving Questionnaire,[15] Questionnaire of Alcohol Urges and Alcohol Urge Questionnaire,[16] Tobacco Craving Questionnaire,[17] Marihuana Craving Questionnaire,[18] Questionnaire of Cocaine Use,[19] and recently the Benzodiazepine Craving Questionnaire.[20])

Little research has focussed on craving for benzodiazepines (BZs), although these drugs have a high prevalence of use in the Western world and there have been many reports on their dependence liability.[21-23] A psychometrically sound instrument to measure BZ craving was lacking until recently. Mol and colleagues have developed the Benzodiazepine Craving Questionnaire (BCQ), a unidimensional multi-item questionnaire with promising reliability and validity, to measure the construct of craving in long-term BZ users.[20]

In this paper the issue concerning the scope of craving is addressed empirically by comparing a broad conceptualisation of BZ craving, as represented by the BCQ, and a narrow conceptualisation, as represented by the Benzodiazepine Desire Scale (BDS), consisting of three one-item Likert-type scales assessing the frequency, global intensity and peak intensity of desire for BZs when not using (derived from Schippers and colleagues[24]). To assess the effect of these two distinct conceptualisations, data on their associations with other (BZ dependence) related variables were gathered. We hypothesise that in a factor analysis the BCQ, the BDS and BZ dependence related variables load on a single factor, different from psychopathology, personality factors, quality of life and mood variables.

METHODS

Setting and design

Patients from a large study on the efficacy of a two-part treatment intervention that aimed to reduce long-term BZ use in general practice in the Netherlands received a number of questionnaires.[25,26] Patients' baseline responses to the Benzodiazepine Craving Questionnaire (BCQ) formed the basis of the present study.[20] The study received ethical approval from the Radboud University Nijmegen Medical Centre and took place from 1998 to 2001.

Subjects and procedure

We identified long-term BZ users by means of a computerised search for BZ prescriptions at 30 general practices. Patients were regarded as long-term users when they were using BZs for at least three months with a prescribed amount sufficient for at least 60 days of

consumption according to the prescription rules. Exclusion criteria and procedures, and participation rates are described elsewhere.[20] For a graphic representation of the patient flow and dropout of the whole study we refer to Oude Voshaar and colleagues and to Gorgels and colleagues. [25,26]

Two hundred and eighty-nine patients participated in the baseline interview. About 42% had quit their use since receiving a discontinuation letter from their GP (i.e. first intervention). The BCQ was developed shortly after the study had started. Due to this developmental delay, 193 patients (of 289) filled in the BCQ at baseline. There were no significant differences in background and BZ use characteristics between patients who had received the BCQ at baseline and patients who had not or had missing BCQ values.[20]

Measurement

The baseline assessment was carried out after receiving informed consent. It took place approximately three months after the start of the first intervention (discontinuation letter).

Measures
Benzodiazepine Craving Questionnaire

The Benzodiazepine Craving Questionnaire (BCQ) was developed by our research group and was based on items from the Questionnaire on Smoking Urges (QSU) and the Cocaine Craving Questionnaire (CCQ) by Tiffany and colleagues.[9,13] Items reflect five distinct conceptualisations of craving: 1) desire to use, 2) anticipation of positive outcome from BZ use, 3) anticipation of relief from withdrawal or withdrawal associated negative affect, 4) intention to use, and 5) lack of control over use. Patients indicated the extent to which they agreed or disagreed with each item on a seven-point Likert-type scale according to their current experience. The endpoints of the scale were labelled 'strongly disagree' (1) and 'strongly agree' (7). For analysis, items of the BCQ were dichotomised between response options four and five of the Likert-type scale. The BCQ proved to be a 20-item Rasch homogeneous self-report questionnaire to assess craving for BZs with promising reliability and validity.[20]

The BCQ was considered to be a good operationalisation of BZ craving since it consisted of items reflecting most common craving theories (cognitive, affective and behavioural aspects) and it allowed for the measurement of the subjective experience of BZ craving independent of the BZ using experience itself. Previous research has shown that the BCQ is able to discriminate between patients who have quit their BZ use recently and continuous BZ users.[20] Furthermore, the BCQ is able to monitor and quantify self-reported craving longitudinally.[27] Patients completed the original 32-item version of the questionnaire.

The surplus of Rasch modelling to the 'classical test theory' is the justification of the use of the sum score as a sufficient statistic for the underlying construct (i.e. the latent trait: craving). Although in factor analysis sum scores are often used, different information is contained in the item scores, thereby obscuring the associations under investigation (e.g. population characteristics are well known confounders of factor structures).[28] Furthermore,

in questionnaire research continuous single peaked item characteristic curves (ICC's) may occasionally occur, which do not justify the use of sum scores.[29]

Although the use of questionnaire sum scores is generally accepted in research, this is only justified if the Rasch model holds true, as reflected by the goodness of fit statistics R1 and R2.[30] Rasch homogeneity implies that the items can be rank ordered according to craving intensity or severity on a unidimensional scale, which presents another advantage over questionnaire development by means of factor analysis. This means that people who admit to an item indicating serious craving problems will also admit to the preceding 'less serious' items. The extent to which patients crave BZs is reflected by the total score on the instrument.

For more detailed information on the assumptions from which the Rasch model can be derived, we refer to e.g. Fisher,[31] Kan and colleagues[32] and Van der Ven and Ellis.[33]

Benzodiazepine Desire Scale

Patients also completed three one-item Likert-type scales assessing the frequency, global intensity and peak intensity of desire for BZs, respectively, by checking the box of their choice. 1) Frequency scale: 'How often during the last week did you experience a desire for BZs? (That is the desire for a BZ, while you were not using.)' Response options ranged from 1 (never) to 10 (constantly); 2) Global intensity scale: 'In general, how intense was your desire for BZs during the last week? (That is the desire for a BZ, while you were not using.)' Response options ranged from 1 (hardly any desire to none) to 10 (very strong desire); 3) Peak intensity scale: 'Please try to remember the moment during the last week that your desire for BZs was most intense. (That is the desire for a BZ, while you were not using.) How strong was the desire you felt by then?' Response options ranged from 1 (hardly any desire or none) to 10 (irresistible desire). This scale has been adopted from Schippers and colleagues who used the items for further development of their Obsessive Compulsive Drinking Scale.[24]

Other measures

During the baseline interview data were gathered on BZ use and sociodemographic characteristics. Severity of BZ dependence was assessed by means of the 20-item Benzodiazepine Dependence Self-Report Questionnaire (Bendep-SRQ). This questionnaire consists of four Rasch homogeneous scales with good reliability and validity, namely, Problematic use, Preoccupation, Lack of compliance and Withdrawal.[32,34] Presence and severity of psychopathology were assessed with the General Health Questionnaire 12-item version (GHQ-12), a measure of psychological wellbeing.[35] To assess personality traits we used the Dutch Shortened MMPI (NVM) consisting of the sub scales Negativism, Somatisation, Shyness, Psychopathology and Extraversion,[36] and mood variables were assessed by means of the Profile of Mood States Dutch shortened version (POMS), a questionnaire to measure five short-term changeable mood states (Depression, Anger, Fatigue, Vigour and Tension).[37] We also added a measure of health related quality of life,

the Medical Outcome Study Short-Form 36-item version (MOS SF-36). It consists of eight domains (physical functioning, social functioning, role limitation due to physical problems, role limitation due to emotional problems, mental health, vitality, pain, and general health perception) that all have been related to BZ use in the general population. The Dutch version of the SF-36 was previously tested and validated.[38,39] All questionnaires show satisfactory reliability and validity for the Dutch population. Specially trained interviewers interviewed the patients at their homes.

Statistical analysis

All data analyses were conducted using SPSS 12.0.1 for windows. To assess the correlation between BCQ sum scores and BDS sub scale scores we performed crosstabs procedures (Kendall's tau-c, with correction for nodes). Maximum Likelihood factor analysis, which includes a Goodness of fit test for the factor structure found, with Varimax rotation was performed on our data. To normalise the skewness of the BCQ data we performed logarithmic transformation on the sum scores. Separate Maximum Likelihood analyses were performed on data from patients who had quit and had not quit their use, respectively. Correlations between the factors found were assessed using crosstabs procedures (Kendall's tau-c, with correction for nodes). To assess the possibility of confounding by the purpose of use status (anxiolytic and/or hypnotic) we performed posthoc univariate analyses of variance on our data.

RESULTS

Table 1 shows the baseline characteristics of our study sample. At the time of the interview, 41.5% of the total BCQ group (80/193) had quit their use in the three months after receiving the discontinuation letter from their GP. The average craving severity as measured with the BCQ was low. Concerning BZ dependence, based on the Bendep-SRQ sub scale scores, the overall average severity of BZ dependence in our population was low. Average scores on the BDS sub scales were also relatively low. Psychopathological dysfunction was relatively mild. Based on a cut-off point of 2/3 on the General Health Questionnaire 12-item version, 26% of the patients were classified as 'psychiatric case'. Sample characteristics have been described in more detail elsewhere.[20,40]

Table 1 Baseline characteristics of the total BCQ sample

	Total sample	(n = 193)
	n/mean	%/SD
Demographic variables		
Age (years)	62.9	12.0
Gender (female)	131	67.9%
Marital status		
Steady relationship (incl. married)	127	65.8%
Living alone	61	31.6%
Highest level of education		
Secondary level	123	63.7%
Financial income		
Pension	90	46.6%
Profession	27	14.0%
Benzodiazepine usage		
Quit after letter with advice to quit benzodiazepine use	80	41.5%
Duration of benzodiazepine use (months)[a]	129.9	108.2
Quartiles	48.0 – 96.0 – 186.0	
Daily dose (mg diazepam equivalents) (n = 113)[b]	6.9	8.1
Quartiles	2.9 – 5.0 – 7.8	
Daily dose 3 months previous to first intervention (mg diazepam equivalents) (n = 190)[c]	6.7	6.9
Quartiles	3.0 – 4.5 – 9.0	
Benzodiazepine Craving Questionnaire		
Craving severity (BCQ sum score) (range 0 - 20)	1.2	3.2
Quartiles	0.0 – 0.0 – 1.0	
Benzodiazepine Desire Scale		
Frequency (n = 190) (range 1 - 10)	3.7	2.9
Quartiles	1.0 – 3.0 – 6.0	
Global intensity (n = 191) (range 1 - 10)	3.5	3.0
Quartiles	1.0 – 2.0 – 6.0	
Peak intensity (n = 191) (range 1 - 10)	3.7	3.0
Quartiles	1.0 – 2.0 – 6.0	
BDS sum score (n = 190) (range 0 - 30)	10.9	8.4
Quartiles	3.0 – 8.5 – 17.0	
Bendep–SRQ		
Problematic use (n = 191) (range 0 - 5)	1.2	1.2
Quartiles	0.0 – 1.0 – 2.0	
Preoccupation (n = 192) (range 0 - 5)	1.4	1.6
Quartiles	0.0 – 1.0 – 3.0	
Lack of compliance (n = 192) (range 0 - 5)	0.3	0.7
Quartiles	0.0 – 0.0 – 0.0	
Withdrawal (n = 178) (range 0 - 5)	1.1	1.6
Quartiles	0.0 – 0.0 – 2.0	
Dutch shortened MMPI		
Negativism	12.2	7.5
Somatisation	14.0	7.8
Shyness	10.5	7.1
Psychopathology	2.9	3.1
Extraversion	13.2	5.6
Profile Of Mood State		
Depression	12.8	6.2
Anger	11.0	5.1

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Table 1 continued	n/mean	%/SD
Fatigue	12.2	5.9
Vigour	15.0	4.7
Tension	11.8	5.5
Short-Form 36 (range 0–100)		
Physical functioning	68.3	26.0
Role functioning – physical problem	59.6	40.5
Pain	64.1	25.1
General health perception	57.9	21.7
Vitality	57.6	22.9
Social functioning	65.5	20.8
Role functioning – emotional problem	68.9	39.6
Mental health	68.4	19.4
General Health Questionnaire-12		
Sum score (*n* = 192)	2.0	3.1

[a] Based on patients who discontinued and did not discontinue their BZ use in the previous three months.

[b] BZ users only.

[c] Based on recorded consumption extracted from the GP's clinical database.

Correlations between BCQ sum score and the BDS sub scales were low (Kendall's tau-c = .17, p = .000 for the Frequency scale; Kendall's tau-c = .14, p = .002 for the Global intensity scale; Kendall's tau-c = .13, p = .004 for the Peak intensity scale, respectively). Analysis of the internal consistency of the BDS showed a very high reliability coefficient (Cronbach's alpha = .93), suggesting that all three single-item sub scales are measuring the same construct, most obviously, desire for BZs. Given this finding, it seemed justified to combine the three separate rating scale sum scores into one overall BDS sum score in further analyses. The correlation between the BCQ sum score and this BDS sum score was also low (Kendall's tau-c = .15, p = .001).

Subsequently, we performed Maximum Likelihood factor analysis with Varimax rotation on the BCQ sum scores, BDS sum score, Bendep-SRQ sub scale scores, Dutch Shortened MMPI sub scale scores, GHQ-12 sum scores, SF-36 sub scale scores and POMS sub scale scores. Bendep-SRQ sub scale Withdrawal was left out of the analyses due to missing data (patients only had to fill in this section if they had attempted to quit their BZ use in the past half year). The scree plot recommended a five factor solution with eigen values of greater than one, which accounted for 64.5% of the explained variance. However, no variables were allocated to the fifth factor. Additional Maximum Likelihood factor analysis with the model set to extract four factors with eigen values of greater than one accounted for 59.9% of the explained variance. The results of the Goodness of fit Test were satisfactory, with Chi-square/df ratio < 2 (χ^2 = 352.5, df = 186, p = .000).

The BCQ sum score loaded on the first factor together with POMS sub scales Depression, Anger and Tension, GHQ-12 sum score, SF-36 sub scale Mental health, and Dutch Shortened MMPI sub scale Negativism (see table 2). This factor was named the 'negative affect-factor'. The second factor consisted of the SF-36 sub scales (except for sub scales Mental health and Role functioning – emotional problem) and was named the '(physical) quality of life-factor'. Bendep-SRQ sub scales Preoccupation and Problematic use, and the

BDS sum score made up the third factor, the 'dependence-factor'. Factor four ('extraversion-factor') consisted solely of Dutch Shortened MMPI sub scale Extraversion.

Table 2 Rotated factor matrix of Maximum Likelihood factor analysis with Varimax rotation on a matrix consisting of scale scores (n = 185)[a]

Factor:	1	2	3	4
BCQ sum score	.34			
BDS sum score			.58	
Bendep–SRQ				
Problematic use			.64	
Preoccupation			.93	
Lack of compliance[b]	(.41)		(.40)	
Dutch shortened MMPI				
Negativism	.61			(.38)
Somatisation[b]	(.44)	(-.51)		
Shyness[b]				
Psychopathology[b]	(.43)			(.39)
Extraversion				.50
GHQ–12 sum score (Goldberg)	.71		(.31)	
SF–36				
Physical functioning		.63		
Role functioning – physical problem		.79		
Pain		.62		
General health perception		.64		
Vitality		.79		(.36)
Social functioning	(-.32)	.64		
Role functioning – emotional problem[b]	(-.38)	(.56)		
Mental health	**-.69**	(.34)		
POMS				
Depression	.86			
Anger	.81			
Fatigue[b]	(.54)	(-.55)		
Vigour[b]		(.36)		(.45)
Tension	.79			

[a] n = 185 due to missing values in questionnaires other than the BCQ.
Note. The model was set to extract four factors. A variable was assigned to a factor if it loaded .30 or greater on a given factor and there was at least .20 difference with another factor. Factor loadings in parenthesis indicate that a variable loaded .30 or greater on a factor, but was not allocated to that specific factor.
[b] Variable could not be allocated to a single factor. Factor loadings of smaller than .30 are not noted in the table.

Correlations between the four factors were rather low (Kendall's tau-c ranging from -0.22 through 0.27), suggesting that the factors represent distinct domains, indicating good factor analysis quality. The negative correlation between the 'negative affect-factor' and the '(physical) quality of life-factor' was modest (Kendall's tau-c = -0.22, $p < 0.001$). The correlation between the 'negative affect-factor' and 'dependence-factor' was also modest (Kendall's tau-c = 0.27, $p < 0.001$). There was a very modest correlation between the

'(physical) quality of life-factor' and the 'extraversion-factor' (Kendall's tau-c = 0.14, p = 0.005), and a marginally significant negative correlation between the '(physical) quality of life-factor' and the 'dependence-factor' (Kendall's tau-c = -0.12, p = 0.02). All other correlations were non-significant.

Since patients who were still using BZs had significantly higher craving scores than patients who had quit their use recently,[20] we repeated the factor analyses on the sub sample of non-quitters (n = 113) and quitters (n = 80), separately. Due to the small sub sample size of quitters and the large number of variables in the factor analysis, no stable factor solution was found. Therefore, no interpretation of the factor structure will be presented here. The analyses in non-quitters yielded a similar factor structure to the one found for the sample as a whole, and accounted for 64.9% of the explained variance. The results of the Goodness of fit Test were satisfactory, with Chi-square/df ratio < 2 (χ^2 = 212.3, df = 166, p = .009). Associations between the factors were also similar to the ones found above.

Since BCQ assessment took place at daytime and our population included both individuals who were using the BZs as an anxiolytic drug and/or as a hypnotic drug, we performed a posthoc univariate analysis of variance with purpose of use status as independent variable and BCQ sum score as dependent variable. Results showed that BCQ sum scores did not differ significantly between the three groups (sedative, hypnotic or both) ($F_{2,123}$ = .925, p = .399). Entering current use status (i.e. quit or still using BZs) as a second independent variable did not change these results, nor did correcting for the time span between last BZ intake and moment of filling in the BCQ.

DISCUSSION

This study has focussed on the scope of the craving definition, by comparing two distinct conceptualisations of craving for BZs, a broad one versus a narrow one. The Benzodiazepine Craving Questionnaire (BCQ), a 20-item Rasch homogeneous scale, represented a broad craving conceptualisation, with items covering current craving theories as best as possible. Three one-item Likert-type scales, comprising the Benzodiazepine Desire Scale (BDS), represented a narrow conceptualisation of craving, assessing the frequency, global intensity and peak intensity of desire for BZs over a one-week period when not using.

Factor analysis revealed that the structure of our data was best represented by four factors, which represent negative affect, (physical) quality of life, dependence and extraversion. The BDS together with the sub scales Preoccupation and Problematic use of the Bendep-SRQ loaded on the 'dependence factor'. Although BCQ factor loadings indicated some relationship with this factor, the BCQ was designated to the 'negative affect factor', which refuted our hypothesis. Apparently, in our general practice population of (former) long-term, low dose, low dependence BZ users the chosen conceptualisation of craving is of importance.

One possible explanation for our findings is the low intensity of craving in our study

population, as measured with the BCQ. The items located at the lower end of the Rasch rank order of the BCQ reflect anticipation of positive outcome and anticipation of relief from withdrawal or negative affect, whereas items at the higher end of the Rasch rank order reflect intention to use, desire to use and lack of control.[20] This means that in case of low craving, as measured with the BCQ, the emphasis is on (cognitive aspects of) affect regulation, as one can deduct from the contents of the BCQ items that are confirmed first in case of craving.

Preoccupation, Problematic use and the BDS seem to refer to more obvious dependence dynamics. This has been amply demonstrated for the Preoccupation and Problematic use sub scales of the Bendep-SRQ.[32,34] Apparently Peak intensity, Global intensity and Frequency of BZ desire are better linked to BZ dependence than to BZ craving as measured with the BCQ. As mentioned, items referring to the desire to use BZs are also present in the BCQ, yet in the higher regions of the Rasch rank order, indicating higher craving intensity. Patients in our population hardly confirmed these BCQ items. Results of the sub sample of patients who were still using BZs (non-quitters) were very similar to the results described above, whereas an insufficient amount of quitters was included for separate analyses in that group.

Associations between craving and negative affect have been found in numerous other studies for different substances. Childress and colleagues, for example, found that hypnotically induced depression produced significant increases in drug craving for opiates in 10 male opiate abuse patients.[41] They also found a trend for induced anxiety to increase self-rated craving. Robbins and colleagues found significant pre- and post-cue correlations between craving and POMS sub scales Anger, Confusion, Depression, Fatigue, Tension and Vigour (the latter was negatively correlated), with the highest correlation found for Depression in a sample of 81 cocaine-dependent outpatients.[42] Rabois and Haaga found that in their sample of 89 regular light smokers who were not necessarily trying to quit or interested in quitting, sad mood predicted higher temptation to smoke.[43] Singleton and colleagues also found that the subjective experience of craving in nicotine users had a negative emotional valence.[44] They found a pattern of increased negative mood, decreased positive mood and increased craving under different craving conditions, as realised through imagery scripts. Based on results from other craving studies one can hypothesise that negative mood states can become conditioned stimuli capable of triggering craving (see also[41]). Based on the importance of cognitive aspects of craving in our study, one can also hypothesise that patients might have attributed the negative affect to craving (e.g. I feel miserable because I have no BZs).

The fact that our patients experience some 'desire' for BZs as indicated on the BDS, but not on the BCQ, might be explained by the differences in the inquired time frame of the craving experience: patients had to indicate their current feelings on the BCQ, whereas for the BDS patients had to evaluate their feelings over the past week when not using. Questions referring to prior craving experience are subject to recall bias, potentially leading to overestimation of the amount of craving.[45,46] This might account for the discrepancies found between the BCQ and BDS in current study.

In addition to the difference in time frame of craving measurement between both craving measures, some methodological issues must be addressed. Patients used BZs for different purposes: anxiolytic, hypnotic or both. Although purpose of use status could have confounded BZ craving severity, post-hoc analyses on the BCQ did not show differences in craving between hypnotic users and anxiolytic users. Furthermore, our results are representative for the majority of long-term BZ users, i.e. general practice patients of older age and female sex with low-dose use and low dependence (cf [21]). Consequently, in other populations, such as multiple drug users and BZ dependent psychiatric patients, the outcome might be significantly different in terms of factor structure. We hypothesise that these patients would confirm the items in the higher regions of the Rasch rank ordering and thus experience more severe craving in a sense of desire, intention to use and possible lack of control.

The measurement of craving has received considerable research attention over the years. Unfortunately, only a few studies have assessed the psychometric properties of self-report instruments. In view of the importance of anticipated outcomes in almost all theoretical accounts of craving, it may be preferable for research purposes to use instruments that provide measures of anticipated outcomes for use, such as the BCQ, in addition to the pure measure of desire to use.[47] Nonetheless, our study clearly shows that using multiple measures of craving contributes to our understanding of the significance and meaning of this construct in BZ use. Based on findings from the present study, future research should be directed at achieving a more precise understanding of negative affect (both as state and trait manifestations) as a possible cue for BZ craving. If certain mood states are modulators of BZ craving they demand treatment attention.

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