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Relationship between craving and personality in treatment-seeking women with substance-related disorders

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Abstract

Background: Individual differences may impact susceptibility to addiction. The impact of personality features on drug craving, however, has not been studied, particularly in women.

Methods: Ninety-five treatment-seeking women with substance dependence, abstinent for at least 5 and no more than 21 days, were investigated regarding the correlation between personality factors and craving. Personality was assessed using the Temperament and Character Inventory (TCI), the NEO Personality Inventory Revised (NEO-PI-R), and the Barratt Impulsiveness Scale version 11 (BIS-11). Cravings were assessed through the Pennsylvania Craving Scale (PCS), and the Craving Questionnaire (CQ). Anxiety and depressive symptomatology were also recorded.

Results: Craving scores were positively correlated with depression and negatively correlated with number of days abstinent from substance use. Also, craving scores were positively associated with the novelty-seeking factor from the TCI and the total score on the BIS-11, and negatively associated with the conscientiousness and agreeableness facets of the NEO-PI-R.

Conclusion: Findings suggest that personality features, particularly impulsiveness, can be important predictors of craving in women, which has important implications for treatment planning.

Background

Craving has been acknowledged as a prominent feature of the substance dependence syndrome and has received increasing attention by researchers. Its importance has been underscored in a number of special issues dedicated to the topic by different scientific journals [e.g. *Addiction* 2000; 95 (Suppl 2); *Alcohol Research & Health* 1999; 23(3); *Journal of Addictive Diseases* 2001; 20(3)]. Craving has been related to multiple dimensions including biological, psychological and environmental domains [1]. In the psychological domain, most of the literature has focused on cognitive-behavioral aspects of craving. Although acknowledging that personality styles may also play an im-

portant role in explaining individual differences in craving [2], few studies have examined this issue. Studies of cue-reactivity provide some insight into the relationship between personality and craving with reports of a positive correlation between level of reactivity and neuroticism and introversion in alcoholics [3]. Also, neuroticism and impulsivity have been correlated to craving in opiate addicts [4,5]. Unfortunately these studies had mainly male subjects (65% and 73% respectively) and gender was not taken into consideration in the analysis. Such consideration would be important given recent descriptions of gender differences in neuroticism and impulsivity, with women scoring significantly higher than men in neuroti-

cism [6], and men scoring significantly higher than women in impulsivity [7]. Therefore, it is relevant to investigate how these traits relate to craving in women. Additionally it is possible that different personality traits might impact craving experiences in women. A comprehensive evaluation of personality traits would help clarify these issues. Nevertheless, it is recognized that the expression of personality traits may be influenced by other factors, potentially biasing the results. For instance, comorbid depressive and anxiety symptoms are particularly common in women with substance use disorders, and the presence of these symptoms tend to accentuate the expression of personality traits such as harm avoidance and self-directedness [8]. Additionally, demographic factors may influence personality measurement. Personality is less stable and may be not fully established before age 30 [9]. Education level may also positively impact measures of openness [10]. Thus, age and education of participants should be taken into consideration in personality studies.

Likewise, other factors that might influence measures of craving should be considered, such as recency of drug use (craving is usually higher during early withdrawal, tending to decrease over time with further abstinence) and treatment setting (a controlled environment such as a residential setting usually provides less triggers for cravings, while outpatient treatments are associated with more craving triggers) [11].

A better understanding of the personality dimensions that might render women more vulnerable to experience drug cravings may lead to more specific treatment strategies, particularly relapse prevention techniques. For instance, if craving in women is more related to neuroticism, strategies aimed at stress or mood management would be appropriate, whereas if craving in women is more related to impulsivity, response delay, distraction, or the development of alternative activities should be encouraged.

The aim of this study is to investigate the relationship between craving and personality traits in women with substance dependence, controlling for several potentially relevant mediating variables (depression, anxiety, substance use, age, and education).

Methods

Treatment-seeking women with substance dependence according to DSM-IV criteria [12] were invited to participate in this study. They were assessed at entrance to three different treatment programs: a women-only treatment program (both outpatient and residential), a dual diagnosis gender-mixed outpatient program, and a community gender-mixed outpatient program, between April 2001 and February 2002. All ethical requirements for human subject research were followed, and approval from institu-

tional ethics committee was obtained. A trained psychiatrist interviewed patients that achieved between 5 and 21 days of self-reported abstinence from any substance use.

Subjects answered a demographic questionnaire, including age and educational level. Addiction history information was obtained using a timeline follow-back method [13].

Craving was assessed using a self-administered dimensional measure derived from the Pennsylvania Craving Scale (PCS [14]), a 5-item scale, with responses ranging from 0 (= Never, None, Not at all) to 6 (= Nearly all, Strong, All the time), that assess substance craving during the past seven days; and the Craving Questionnaire (CQ [15]), a 5-item measure, with responses ranging from 0 (= No) to 9 (= Extremely), that assess the desire to use, the ability to resist urges, the current craving intensity, the responsiveness to drug-related conditioned stimuli, and the imagined likelihood of use in a setting with access to drugs within the past 24 hours.

Personality was assessed using self-administered measures. The Temperament and Character Inventory (TCI [16]) consists of 240 self-descriptive, true-false items, assessing four temperament dimensions: Novelty Seeking (NS), Harm Avoidance (HA), Reward Dependence (RD) and Persistence (P); and three character dimensions: Self-Directedness (SD), Cooperativeness (Cp), and Self-Transcendence (ST). NS evaluates sensitivity to new experiences, curiosity, impulsiveness, and disorderliness. HA evaluates pessimism, carefulness, and fear of physical and moral injuries. RD evaluates need for social contact, attachment, dependence, and sentimentality. P evaluates the stability of behaviour even in the absence of positive or negative cueing. SD evaluates the ability to set personal goals and keep oneself directed to them; self-acceptance and the perception of oneself as resourceful, and disciplined. Cp evaluates the ability to be tolerant towards people, compassionate, and empathic. ST evaluates a sense of being part of a broader reality, in touch with other beings on a spiritual level. It is also a measure of idealism as opposed to conventionalism.

The NEO Personality Inventory Revised (NEO-PI-R [17]) consists of 240 self-descriptive items, with responses in a five point Likert-type scale ranging from "Strongly Disagree" to "Strongly Agree". It comprises five factors: Neuroticism (N), Extraversion (E), Openness (O), Agreeableness (A), and Conscientiousness (C). N evaluates chronic level of emotional adjustment and instability, identifying proneness to psychological distress. E evaluates intensity of interpersonal interactions, activity level, need for stimulation, and capacity for joy. O evaluates cu-

Table 1: Personality scores of substance-dependent women and normative data according to the TCI and the NEO-PI-R.

Variables	Substance-dependent women [mean (SD)]	Normative data [mean (SD)]
TCI		
NS	23.8 (6.2)	19.2 (6.1)
HA	21.1 (8.5)	13.0 (6.8)
RD	16.1 (3.7)	17.1 (3.4)
P	4.8 (2.2)	5.7 (2.0)
SD	22.4 (9.4)	31.0 (6.4)
Cp	32.5 (7.0)	34.2 (6.3)
ST	17.5 (6.3)	21.1 (5.8)
NEO-PI-R		
N	127.3 (24.8)	83.1 (21.7)
E	104.3 (23.6)	110.3 (18.4)
O	112.3 (17.6)	111.0 (17.2)
A	117.1 (18.8)	128.5 (14.4)
Cc	92.5 (26.6)	122.7 (17.8)
BIS-11		
AI	20.8 (3.6)	Not available
MI	26.1 (5.1)	Not available
NP	30.8 (6.0)	Not available
Total	77.7 (11.7)	Not available

riosity, creativity, and willingness to engage in novel ideas as opposed to conservative and conventional beliefs and attitudes. A evaluates the types of interactions one prefers from compassion to antagonism. Cc evaluates degree of organization, persistence, control and motivation in goal-directed behavior.

The Barratt Impulsiveness Scale version 11 (BIS-11 [18]) consists of 30 self-descriptive items, with responses in a four point Likert-type scale ranging from "Rarely/Never" to "Almost Always/Always". It comprises three domains: Attentional impulsiveness (AI), Motor impulsiveness (MI), and Non-planning impulsiveness (NP). AI evaluates actions precipitated by lack of attention; it can be exacerbated in anxious situations. MI evaluates hyperactivity due to need of movement, which is exacerbated by stress. NP evaluates attitudes and conclusions precipitated by lack of reflection.

Depression was assessed by the Beck Depression Inventory (BDI [19]), a self-administered 21-item measure, with responses ranging from 0 (= least) to 3 (= most), that assesses depressive symptoms in the past seven days. Likewise, anxiety was assessed by the Beck Anxiety Inventory (BAI [20]), a self-administered 21-item measure, with responses ranging from "Not at all" to "Severely", that assess anxiety symptoms in the past seven days.

Statistical analysis

Three multiple regression models were assembled for each personality model. Model 1 was based on the TCI factors, model 2 on the NEO-PI-R factors. Alternatively, model 3 was based on the BIS-11 in order to provide a narrow focus on impulsive traits of personality. Potential modulators of craving other than personality factors were investigated through Analysis of Variance (ANOVA) and Pearson's correlation test. Variables confirmed as craving modulators were added to the regression models.

The SPSS software package was used for statistical analysis.

Results

Ninety-five treatment-seeking women with substance dependence, ages 37.2 (SD = 10.0) years and averaging 12.6 (SD = 2.3) years of education were successfully recruited for this study. The main problem drug according to the subjects were alcohol (63.1%), cocaine (24.2%), cannabis (7.4%), opiates (3.2%), and benzodiazepines (2.1%). They were abstinent from psychoactive substances for 12.1 (SD = 4.7) days (range: 5–21). Fifty-four percent entered residential, and the remaining (46%) outpatient treatment. ANOVA did not uncover significant differences regarding demographics, craving and other variables between patients undergoing residential and outpatient care.

Mean craving scores were 14.6 (SD = 8.2) on the PCS (range: 0–30) and 17.9 (SD = 13.5) on the CQ (range: 0–45). Anxiety and depressive scores on the BAI and the BDI were 20.4 (SD = 13.8) and 23.1 (SD = 11.2) respectively (range: 0–63). Table 1 shows personality scores according to the TCI, the NEO-PI-R and the BIS-11 for this sample. Normative data for women are given for reference (not available for the BIS-11).

Pearson's correlation showed that the scores on PCS and CQ were highly correlated ($r = .84$; $p < .001$). The original value range on the PCS (0–30) was adjusted to the CQ range (0–45) by multiplying the PCS values by 1.5 (standardized PCS score). A combined craving score was obtained by the sum of the standardized PCS score and the CQ score. This new single craving measure was named Craving Score (CS). Pearson's test showed a significant correlation between CS and depression (as measured by the BDI; $r = .513$; $p < .001$), anxiety (as measured by the BAI; $r = .425$; $p < .001$) and days of abstinence ($r = -.303$, $p = .003$). There was no significant correlation of craving with age and education. The scores on both BDI and BAI co-varied up to a considerable extent ($r = .654$; $p < .001$), and a further stepwise multiple regression procedure showed that depression and days of abstinence combined was the best model accounting for modulators of craving other than personality factors.

Model 1 – TCI factors

Each TCI factor was separately correlated with craving, having CS as the dependent variable and depression and days of abstinence as covariates. Two factors presented a significant correlation to craving: NS (standardized $\beta = .315$; $p < .001$), and P (standardized $\beta = -.221$; $p = .013$). A further multiple regression was then performed: CS entered as the dependent variable, depression and days of abstinence were introduced as a block, and NS and P were introduced on a stepwise fashion. The final regression model significantly correlated craving ($R^2 = .424$; $F [3, 93] = 22.1$; $p < .001$) to NS (standardized $\beta = .315$; $p < .001$), depression (standardized $\beta = .448$; $p < .001$), and days of abstinence (standardized $\beta = -.204$; $p = .014$).

Model 2 – NEO-PI-R factors

The same procedure adopted for model 1 was repeated. CS significantly correlated with two factors from the NEO-PI-R: Cc (standardized $\beta = -.285$; $p = .005$), and A (standardized $\beta = -.215$; $p = .017$). The final model had CS as the dependent variable, depression and days of abstinence entered again as a block, Cc and A were introduced on a stepwise procedure. The final regression model significantly correlated craving ($R^2 = .446$; $F [4, 79] = 15.9$; $p < .001$) to Cc (standardized $\beta = -.268$; $p = .006$), A (standardized $\beta = -.197$; $p = .023$), depression (standardized $\beta = .391$; $p <$

$.001$), and days of abstinence (standardized $\beta = -.217$; $p = .013$).

Model 3 – BIS-11

All subfactors on the BIS-11 significantly correlated to the CS. Nonetheless, because they were highly co-linear there was a tendency for mutual annulment in the stepwise procedure. Therefore the CS was compared to the total score on the BIS-11, which represented the sum of all subfactors. The final regression model significantly correlated craving ($R^2 = .405$; $F [3, 91] = 20.7$; $p < .001$) to the BIS-11 total score (standardized $\beta = .308$; $p = .001$), depression (standardized $\beta = .351$; $p < .001$), and days of abstinence (standardized $\beta = -.225$; $p = .007$).

Two further analyses were conducted. In one all personality factors from TCI, NEO-PI-R and BIS-11 were correlated to craving on a stepwise procedure. The final model was similar to model 1, i.e. along with depression and days of abstinence, NS was the best personality predictor of craving. In the second procedure, we established the BIS-11 total score as the reference variable for impulsivity and correlated it with all other personality variables that had significantly correlated with craving. All personality variables significantly correlated with the BIS-11 total score on the Pearson's test (NS: $r = .644$; P: $r = -.290$; Cc: $r = -.644$; A: $r = -.326$; $p \leq .005$).

Discussion

This exploratory study suggests that craving in women is associated with a personality style that combines high novelty seeking, low persistence, low agreeableness and low conscientiousness – all personality features that related to the broader concept of impulsivity. We failed to find a significant correlation between craving and introversion, as in McCusker and Brown's study. We also did not find a correlation with neuroticism, contrary to what both McCusker and Brown [3] and Powell et al. [4,5] suggest. This differential result may be due in part to the fact that distinct personality measures were used. Another possibility is that these associations were obscured by the addition of controlling variables in our analysis. For instance, depression and anxiety may mediate the relationship between craving and personality traits such as neuroticism and introversion. On the other hand, regardless of different personality factors used in each model, depression and days of abstinence remained as significant predictors of craving, underscoring the importance of controlling for such factors when exploring potential modulators of craving. Congruent with the notion that craving is related to novelty seeking, Gendall et al. [22] documented that female food cravers tended to have higher novelty seeking scores, similar to our findings in substance-dependent women.

This study used two craving measures (the PCS and the CQ). Since there is considerable debate around the precise meaning of the term "craving" [21], and how well craving measures correlate between each other, the finding that PCS and CQ are well correlated is relevant to enhance validity of subsequent findings.

Conclusions

These findings, though preliminary, may have important treatment planning implications. They suggest that impulsive substance-dependent women may experience higher cravings, requiring more intensive interventions (including pharmacologic and/or relapse prevention approaches). The use of these self-rated measures may help clinicians distinguish those clients in need for additional support controlling substance craving among their caseload.

Clearly, more studies are needed to confirm these findings and future research should focus on gender differences in craving and personality.

Competing interests

None declared.

Authors' contributions

MZ carried out data collection and drafted the manuscript. HT conceived of the study and performed the statistical analysis. NE participated in the design of the study and its coordination.

All authors read and approved the final manuscript.

References

- Abrams DB **Transdisciplinary concepts and measures of craving: commentary and future directions.** *Addiction* 2000, **95**(Suppl 2):S237-S246
- Verheul R, Brink WVD and Geerlings P **A three-pathway psychological model of craving for alcohol.** *Alcohol Alcohol* 1999, **34**:197-222
- McCusker CG and Brown K **The cue-responsivity phenomenon in dependent drinkers: 'personality' vulnerability and anxiety as intervening variables.** *Brit J Addiction* 1991, **86**:905-912
- Powell J, Gray JA, Bradley BP, Kasvikis Y, Strang J, Barratt L and Marks I **The effects of exposure to drug-related cues in detoxified opiate addicts: a theoretical perspective and some new data.** *Addict Behav* 1990, **15**:339-354
- Powell J, Bradley BP and Gray JA **Classical conditioning and cognitive determinants of subjective craving for opiates: an investigation of their relative contributions.** *Brit J Addiction* 1992, **87**:1133-1144
- Costa PT Jr, Terracciano A and McCrae RR **Gender differences in personality traits across cultures: robust and surprising findings.** *J Pers Soc Psychol* 2001, **81**:322-331
- Petry NM, Kirby KN and Kranzler HR **Effects of gender and family history of alcohol dependence on a behavioral task of impulsivity in healthy subjects.** *J Stud Alcohol* 2002, **63**:83-90
- Hirano S, Sato T, Narita T, Kusunoki K, Ozaki N, Kimura S, Takahashi T, Sakado K and Uehara T **Evaluating the state dependency of the Temperament and Character Inventory dimensions in patients with major depression: a methodological contribution.** *J Affect Disord* 2002, **69**:31-38
- Tickle JJ, Heatherton TF and Wittenberg LG **Can personality change?** In: *Handbook of Personality Disorders. Theory, Research and Treatment* New York NY The Guilford Press 2001, 242-258
- Costa PT Jr and McCrae RR **Normal personality assessment in clinical practice: The NEO Personality Inventory.** *Psychol Assess* 1992, **4**:5-13
- Sayette MA, Shiffman S, Tiffany ST, Niaura RS, Martin CS and Shadel WG **The measurement of drug craving.** *Addiction* 2000, **95** Suppl 2:S189-210
- American Psychiatric Association (APA) **Diagnostic and Statistical Manual of Mental Disorders.** Washington DC, American Psychiatric Association 1994,
- Sobell LC, Sobell MB, Leo GI and Cancilla A **Reliability of a timeline method: assessing normal drinkers' reports of recent drinking and a comparative evaluation across several populations.** *Brit J Psychiatry* 1988, **83**:393-402
- Flannery BA, Volpicelli JR and Pettinati HM **Psychometric properties of the Penn Alcohol Craving Scale.** *Alcohol Clin Exp Res* 1999, **25**:1289-1295
- Weiss RD, Griffin ML and Hufford C **Craving in hospitalized cocaine abusers as a predictor of outcome.** *Am J Drug Alcohol Abuse* 1995, **21**:289-301
- Cloninger CR, Svrakic DM and Przybeck PR **A psychobiological model of temperament and character.** *Arch Gen Psychiatry* 1993, **50**:975-990
- Costa PT Jr and McCrae RR **Personality disorders and the five-factor model of personality.** *J Personal Disord* 1990, **4**:362-371
- Patton JH, Stanford MS and Barratt ES **Factor structure of the Barratt Impulsiveness Scale.** *J Clin Psychol* 1995, **51**:768-774
- Beck AT, Steer RA and Garbing MG **Psychometric properties of the Beck Depression Inventory: twenty-five years of evaluation.** *Clin Psychol Rev* 1988, **8**:77-100
- Beck AT, Epstein N, Brown G and Steer RA **An inventory for measuring clinical anxiety: psychometric properties.** *J Consult Clin Psychol* 1988, **56**:893-897
- Flannery BA, Roberts AJ, Cooney N, Swift RM, Anton RF and Rohsenow DJ **The role of craving in alcohol use, dependence, and treatment.** *Alcohol Clin Exp Res* 2001, **25**:299-308
- Gendall KA, Sullivan PF, Joyce PR, Fear JL and Bulik CM **Psychopathology and personality of young women who experience food cravings.** *Addict Behav* 1997, **22**:545-555

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