Contents:

Moderating effect of emotional intelligence on the role of negative affect in the motivation to drink in alcohol-dependent subjects undergoing protracted withdrawal

Mariana Cordovil de Sousa Uva [a,b,*,2], Philippe de Timary [b,1,2], Marie Cortesi [a], Moïra Mikolajczak [a,1], Paul du Roy de Blicquy [c], Olivier Luminet [a,1]

[a] Research Unit for Emotion, Cognition and Health, Department of Psychology, Université Catholique de Louvain, Louvain-la-Neuve, Belgium
[b] Unité Intégrée d'Hépathologie and Department of Adult Psychiatry, Cliniques Universitaires Saint Luc, Université Catholique de Louvain, Avenue Hippocrate 10, B 1200 Brussels, Belgium
[c] Clinique La Ramée, Brussels, Belgium

ABSTRACT

In order to understand how emotional aspects evolve and are related to craving for alcohol, different emotion-related variables were examined in relationship to craving during a protracted withdrawal. To this end state affectivity (PANAS), emotional intelligence (EI) (TEIQue), and craving (OCDS) were assessed at the onset (T1: day 1 or 2) and at the end (T2: day 14 to 18) of three-week protracted withdrawal among alcohol-dependent inpatients (DSM-IV, $N = 41$). A significant decrease in craving and negative affectivity (NA) was observed from T1 to T2 while EI scores remained low. At both baseline and follow-up, there was a significant moderation effect of EI on the link between NA and craving for alcohol. Negative mood at the onset of the cure was linked to craving at the end of the withdrawal period but only among patients with low trait EI scores. The merits of using psychotherapeutic approaches were discussed in the treatment of alcohol addiction.

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1. Introduction

Alcoholic patients often consume or relapse when exposed to positive or negative emotional life episodes.

A central component for explaining drinking and relapsing in alcohol-dependence syndrome is the subjective experience of "craving". Numerous models of the mechanisms underlying craving have been suggested (i.e., based on conditioning vs. cognitive mechanisms) which all assume that craving is a multifaceted phenomenon that is influenced by a variety of factors (Anton, 1999). The dual-affect model of addiction (Baker, Morse, & Sherman, 1987), proposed that craving is controlled by complex emotion-processing systems that influence physiological responses, self-reports of craving and emotion, and drug-seeking behaviour. The researchers posited that self-reported craving reflects the operation of both a negative and a positive emotional/affective system

and that positive- and negative-affect craving are mutually exclusive. Finally, as assessed by observation among nicotine dependent subjects (Zinzer, Baker, Sherman, & Cannon, 1992), the model predicts that negative affect and stress should trigger craving more effectively in drug-deprived than in non-deprived addicts, attesting to the strong moderating effect of withdrawal on the link between negative affect and craving. The explanation for the latter observation is that the activation of the negative-affect craving system in smokers by nicotine withdrawal would inhibit the positive craving system. In a more recent model (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004), the authors suggested that negative reinforcement is the prepotent motive for addictive drug use. That is, addicted individuals take drugs to escape or avoid aversive states such as withdrawal or stress.

Arguments for negative affect as a causal agent in the motivation to drink are derived from studies that showed a covariance between affective disorders (i.e., depression and anxiety) and drinking (Andersohn & Kiefer, 2004). Some other studies observed that the majority of relapse episodes occur during negative affect states (Hartka et al., 1991; Hasin et al., 1996). Given that these studies suggest a relationship between emotions and alcohol motivation, it is important to evaluate whether and how individual differences in emotion-related personality traits moderate the

* Corresponding author. Address: Université Catholique de Louvain, Department of Adult Psychiatry, Cliniques Universitaires SaintLuc, Avenue Hippocrate 10, B 1200 Brussels, Belgium. Tel.: +32 27642139; fax: +32 27649047.
E-mail address: Mariana.Cordovil@uclouvain.be (M.C. de S. Uva).
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[2] They contributed equally in the conception of the study and writing of this paper.

effect of emotions on self-reported craving. One such emotion trait is emotional intelligence (EI). EI reflects the ability to adaptively perceive, understand, regulate, and utilize one's emotions and those of others (Salovey & Mayer, 1990; Salovey, Mayer, & Caruso, 2002). Previous studies (Austin, Saklofske, & Egan, 2005; Brackett & Mayer, 2003; Riley & Schutte, 2003) revealed that EI was negatively associated with alcohol consumption both among young adolescents (Trinidad & Johnson, 2002) and adults (Riley & Schutte, 2003).

To our knowledge, EI has never been examined during a withdrawal treatment which is an important initial step of the treatment of alcohol-dependence. During this rehabilitation period depressive symptoms decline dramatically (Andersohn & Kiefer, 2004; de Timary, Luts, Hers, & Luminet, 2008). In addition, a positive association between depressive mood and alcohol-craving has been shown during detoxification (Andersohn & Kiefer, 2004).

This transition period is therefore of interest for studying the relationship between emotion-related personality traits and state-related emotional and motivational dimensions. The first aim of the present study was to evaluate how emotional dimensions such as positive and negative affectivity evolve and are related to craving during a protracted withdrawal and detoxification program among alcohol-dependent patients. A second aim was to test whether emotional competences such as the personality factor EI change during a three-week withdrawal treatment, whether the trait EI is related to craving, and whether it moderates the relationship between affectivity and craving.

2. Methods

2.1. Participants

We tested two groups of participants, a clinical group of 41 patients with a diagnosis of alcohol-dependence as first axis I diagnosis according to DSM-IV criteria (APA, 1994) (clinically evaluated by psychiatrists P.dT., P.dR.) and a control group of 30 alcohol non-abusers. In the clinical group, all patients were recruited during a detoxification and rehabilitation program at the Unité Intégrée d'Hépatologie, Department of Adult Psychiatry at the Cliniques Universitaires St. Luc and at the alcohol-dependence unit of Clinique La Ramée, Brussels. Only the patients that had drunk alcohol on the date of application to the program or the day before were included in the study. Fifty patients were approached but only 41 participated at both times of the testing (i.e., 82% complete participation) (51.2% men; mean age = 50.6 ± 9.4 (SD) years; mean number of years of addiction = 22 ± 15.71). The control subjects (43.3% men, mean age = 49.5 ± 9.2) were recruited from among staff relatives. They did not report any history of alcoholism, and for the most part were only social drinkers. The two groups were equivalent in age, sex and educational level measured by the total number of years of study (See Table 1). The current study was approved by the ethical committee of the hospitals and all patients signed an informed consent form. Data were collected between January and December 2006.

2.2. Measures

Two state-related dimensions (craving and positive and negative affect state) and the emotion-related personality trait emotional intelligence (EI) were evaluated by questionnaires.

The obsessive–compulsive drinking scale (OCDS) measures the cognitive aspects of alcohol-craving during the preceding 7 days (Anton, Moak, & Latham, 1996). The OCDS is a self-report questionnaire that comprises a total (Tot) of 14 items, which can be divided into two subscales, a 6-item 'obsessive' subscale (Ob) (e.g., *How*

Table 1
Socio-demographic data for the clinical and the control groups.

Variable	Alcoholic groups AT1/AT2 N = 41	Control group C N = 30	Significance
Mean age, ±SD	50.65 ± 9.43	49.50 ± 9.17	ns
Gender, N (%)			
Male	21 (51.2)	13 (43.3)	ns
Female	20 (48.8)	17 (56.7)	ns
Mean years of addiction, ±SD	22 ± 15.71	–	–
Mean educational level (years), ±SD	13.44 ± 2.96	14.87 ± 3.81	ns

ns = *p* > 0.10.
Abbreviations: ns = not significant.

much of your time where you're not drinking is occupied by ideas, thoughts, impulses, or images related to drinking?) and an 8-item 'compulsive' subscale (Co) (e.g., *How much of an effort do you make to resist consumption of alcoholic beverages?*). Participants responded to each OCDS item on a Likert scale ranging from 0 to 4. Four compulsive items are related to alcohol consumption (e.g., *How many drinks do you drink each day?*). They are therefore inaccurate indices of compulsion to drink during withdrawal (T2), as consumption is prohibited. These items were thus eliminated and a modified 4-item compulsive subscore (Com) and a modified 10-item total score (Totm) were computed. We used a French version of scale (Ansseau et al., 2000). Good internal consistencies were found for the English validation (Cronbach's alpha: Tot = 0.86; Ob = 0.85; Co = 0.73) (Anton, Moak, & Latham, 1995; Anton et al., 1996) and for the French validation (Cronbach's alpha: Tot = 0.88; Ob = 0.82; Co = 0.79) (Ansseau et al., 2000).

The Positive Affectivity Negative Affectivity Schedule (PANAS) is a 20-item scale which assesses positive and negative mood states (Watson, Clark, & Tellegen, 1988). It consists of 10 positive (e.g., *inspired*) and 10 negative (e.g., *guilty*) adjectives rated along five-point scales raging from 1 (not at all) to 5 (extremely). The PANAS is the most widely used scale for the assessment of current mood states. We used a French translation of the PANAS (Gaudreau, Sanchez, & Blondin, 2006). For each subscale, scores range from 10 to 50 points. Cronbach's coefficients of internal consistency of the PA and NA were adequate in a French (Cronbach's alpha: PA = 0.90; NA = 0.84) (Gaudreau et al., 2006) and an English (Watson et al., 1988) (Cronbach's alpha: PA = 0.90; NA = 0.87) validation.

The Trait Emotional Intelligence Questionnaire (TeiQue-Long Form) consists of 153 items rated on a seven-point scale ranging from 1 (completely disagree) to 7 (completely agree) (Petrides & Furnham, 2003b). It encompasses 15 subscales organized under four factors: well-being, self-control, emotionality and sociability. The study presented in this paper was conducted using a French translation of the TEIQue (Mikolajczak, Luminet, Leroy, & Roy, 2007). Internal consistencies at the factor level are excellent, for both males and females, and this is also the case for the global trait EI whose Cronbach's alpha scores were 0.94 in a French validation (Mikolajczak et al., 2007) and 0.86 in an English validation (Petrides & Furnham, 2003a).

2.3. Statistical analyses

All variables were tested at the onset (T1 = day 1) and end (T2 = day 14 to 18) of the withdrawal period in the same patients. Control participants were only tested once given that no test–retest differences were expected for the measured variables. Student's *t* tests for independent samples were used to compare all variables at T1 and T2 with the scores of controls. For all variables, the evolution between T1 and T2 was tested using paired *t* tests. This

analysis was supplemented by calculating effect sizes (Cohen, 1988) with $d = $ (mean pre – mean post/S.D. pre) to determine the magnitude of changes. Correlations between scores on the emotion-related questionnaires and the level of craving were calculated using Pearson product–moment coefficient. The data were analyzed through two-step hierarchical regressions in which we examined the unique and interactive effects of NA and trait EI (at T1). All predictors were centered on their mean (Aiken & West, 1991) and multivariate outliers deviating more than three standard deviations from the mean were removed (Judd & McClelland, 1989) in order to get the most accurate estimate of population parameters (Barnett & Lewis, 1994). Trait EI was categorized in two groups (below and above the mean), coded −1 and 1 respectively, and entered in Step 1 of the regression. In Step 1, we also introduced the centered NA scores. In Step 2, we entered the two-way interaction between centered NA and trait EI.

The normality of all measures was statistically evaluated using indexes of skewness (i.e., symmetry) and kurtosis (i.e., flat vs. pointy) in order to determine whether the distributions met the normality requirement. Simple and multivariate outliers-scores exceeding three standard deviations from mean were excluded from analysis. Accordingly, the number of participants differs slightly for each variable.

3. Results

3.1. Performance on questionnaires at both times: clinical vs. control groups

3.1.1. Craving

The internal consistencies of OCDS (obsessive and compulsive factors and total score) were good for the three groups as Cronbach's alphas were higher than 0.70 and were comparable to those of English and French validation (Ansseau et al., 2000; Anton et al., 1996). Table 2 shows that craving (obsessive, compulsive and OCDS total scores) decreased significantly from onset to end of withdrawal with a very large effect size, but that it was still higher in alcoholic patients than in controls at the end. This significant partial recovery of craving was observed for both the obsessive and compulsive components of craving.

3.1.2. Positive and negative affect

The internal consistencies of positive and negative affect factors were good for the three groups as Cronbach's alphas were higher

than 0.77 and were comparable to those of English and French validation (Gaudreau et al., 2006; Watson et al., 1988). As shown in Table 2, positive affect (PA) increased significantly from onset to end of withdrawal. In this case, the recovery was total: patients' scores at T2 were not different from those of controls. Regarding negative affect (NA), the scores decreased from onset to the end but remained higher than controls at T2.

3.1.3. Emotional intelligence

The internal consistencies of global trait EI of the TEIQue were excellent for both groups as Cronbach alphas were higher than 0.90 and were comparable to those of the English and French validations (Mikolajczak et al., 2007; Petrides & Furnham, 2003a). As can be seen in Table 2, patients at both times exhibit lower scores than controls. However, only the two subfactors well-being and self-control were lower than controls (data not shown, $p < 0.05$) and not the factors emotionality and sociability.

3.2. Correlation between craving and emotion-related variables

3.2.1. Positive and negative affectivity

To test the relationship between motivation for drinking (craving) and state affectivity, Pearson product–moment correlations were computed between OCDS and PANAS scores. As shown in Table 3, significant positive correlations emerged at both times between both factors of craving (obsession and compulsion) and total score as well as NA. Regarding PA, a negative correlation with total craving and with the compulsive factor emerged at follow-up while no correlations with PA at the onset were significant.

3.2.2. Emotional intelligence

As shown in Table 4, significant negative correlations emerged at both times of withdrawal between craving (both factors and total score) and the total EI scores. These correlations are mainly attributable to well-being and self-control factors. All the correlations at T1 remained significant even after controlling for PA and NA while at T2 the significant relationships disappeared.

3.3. Moderating effect of trait EI on the relationship between NA and craving

As this analysis makes sense only for alcoholic patients it was performed in the treatment group only. In addition, the moderating effect of trait EI was only examined for the longitudinal

Table 2
Motivational and emotional measures in alcoholic patients (AT1 and AT2) vs. control participants (C)[a,b,c].

Tests and parameters	Alcoholic patients		Control participants						
	Time 1	Time 2		Cohen's		Cohen's		Cohen's	
	AT1 (N)	AT2 (N)	C (N)	AT1 vs. C	d[d]	AT2 vs. C	d[e]	AT1 vs. AT2	d[f]
OCDS, mean ± SD									
Obsession	9.90 ± 4.09 (41)	4.21 ± 4.36 (38)	0.41 ± 1.08 (27)	$p < 0.001$	3.06	$p < 0.001$	1.15	$p < 0.001$	0.97
Compulsion	7.12 ± 2.52 (41)	2.94 ± 2.98 (38)	0.34 ± 0.69 (26)	$p < 0.001$	3.51	$p < 0.001$	1.15	$p < 0.001$	1.09
Total	17.02 ± 6.14 (41)	8.49 ± 8.23 (37)	0.37 ± 0.82 (24)	$p < 0.001$	3.59	$p < 0.001$	1.31	$p < 0.001$	0.85
PANAS, mean ± SD									
PA	27.15 ± 7.43 (41)	31.47 ± 8.15 (40)	31.30 ± 7.21 (27)	$p = 0.026$	−0.58	ns	0.02	$p = 0.002$	−0.4
NA	23.12 ± 8.04 (41)	19.27 ± 8.37 (40)	12.85 ± 3.50 (27)	$p < 0.001$	1.6	$p < 0.001$	0.96	$p = 0.009$	0.97
TEIque, mean ± SD									
Total	4.30 ± 0.56 (36)	4.45 ± 0.53 (30)	4.70 ± 0.86 (19)	$p = 0.039$	−0.60	ns	−0.39	ns	−0.02

Abbreviations: PANAS = positive and negative scale, PA = positive affect, NA = negative affect; TEIque = Trait Emotional Intelligence Questionnaire; NS = not significant.
[a] ns = $p > 0.05$.
[b] Only cases (excluding outliers) are included.
[c] AT1–AT2 vs. C in a Student's *t* test for independent samples and AT1 vs. AT2 in a paired *t* test.
[d] Cohen's *d* calculates effect size for AT1 vs. C.
[e] Cohen's *d* calculates effect size for AT2 vs. C.
[f] Cohen's *d* calculates effect size for AT1 vs. AT2.

Table 3
Correlation matrix between craving scores and affectivity among alcoholic patients.

			PANAS Time 1		PANAS Time 2	
			Positive affect	Negative affect	Positive affect	Negative affect
OCDS	Time 1	Ob	−0.133 (41)	0.408** (41)	0.064 (40)	0.305[a] (40)
		Co	−0.124 (41)	0.333* (41)	−0.111 (40)	0.255 (40)
		Tot	−0.136 (41)	0.395** (41)	−0.016 (40)	0.297† (40)
OCDS	Time 2	Ob	−0.068 (38)	0.430** (38)	−0.238 (38)	0.569*** (38)
		Co	−0.112 (38)	0.328* (38)	−0.408** (38)	0.483** (38)
		Tot	−0.090 (38)	0.406** (38)	−0.325* (38)	0.559*** (38)

N, Only cases (excluding outliers) are included.
Abbreviations: PANAS = positive and negative affect scale, OCDS = obsessive and compulsive drinking scale, Ob = obsessive factor, Co = compulsive factor, Tot = total score.
 [a] $0.05 < p < 0.10$.
 * $p < 0.05$.
 ** $p < 0.01$.
 *** $p < 0.001$.

relationship between NA T1 and craving T2 and not for the one between PA T1 and craving, T2 given that this link did not exist in both high and low trait EI groups. Analyses were performed on post-withdrawal craving (at T2). The data were analyzed as described in the Section 2.

As shown in Table 5, analyses revealed a significant main effect of trait EI, indicating that patients with higher scores experienced a smaller craving at the end of the treatment (beta = −0.52, $p \leqslant 0.001$). There was also a main effect of NA, indicating that participants with greater negative mood at the onset of treatment experienced a greater craving at the end (beta = −0.29, $p = 0.03$). Most importantly, we observed a significant trait EI × NA interaction (beta = −0.41, $p = 0.002$) (see Fig. 1) indicating that NA is asso-

Table 4
Correlation and partial correlations matrix between craving and EI scores among alcoholic patients at T1 and T2.

Alcoholics (*N*)			
OCDS Time 1	TEIque Time 1	OCDS Time 2	TEIque Time 2
Ob	−**0.385*** (36) [−**0.331***] (32)	Ob	−**0.429*** (31) [−0.237] (27)
Co	−**0.457**** (36) [−**0.415***] (32)	Co	−**0.477**** (31) [−0.137] (27)
Tot	−**0.440**** (36) [−**0.393***] (32)	Tot	−**0.474**** (31) [−0.211] (27)

Coefficients in square brackets [ ] refer to Pearson coefficients after controlling for positive and negative affect.
Only cases (excluding outliers) are included.
Abbreviations: TEIque = Trait Emotional Intelligence Questionnaire; OCDS = obsessive and compulsive drinking scale, Ob = obsessive factor, Co = compulsive factor, Tot = total score.
 * $p < 0.05$.
 ** $p < 0.01$.

Table 5
Two-step hierarchical regressions analyses predicting change in negative affect, trait EI and their interaction.

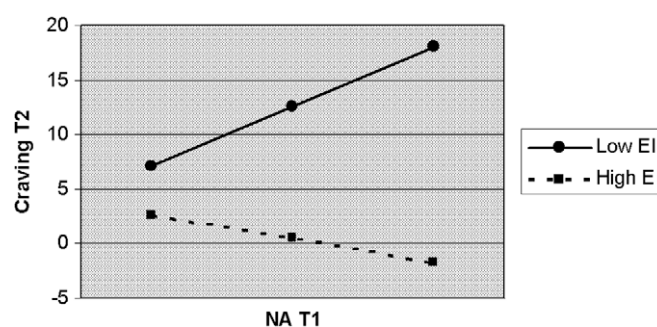|	Predictors	Adjacent R^2	*F* change	Standardized partial coefficients
Step 1	NA centered	0.35	9.76***	0.29
	Trait EI	–	–	−0.52
Step 2	NA centered × trait EI	0.52	10.96**	−0.41

 ** $p < 0.01$.
 *** $p < 0.001$.

Fig. 1. Craving score at the end of treatment as a function of trait EI and NA T1. Note: the parameters of the slopes are as follows: for low trait EI scores the intercept is −3.577, the *B* is 0.611, the Beta is 0.662 and *t* is 3.421, $p \leqslant 0.01$. For high trait EI scores the intercept is 5.711, the *B* is −0.112, the Beta is −0.249 and *t* is −0.963, ns. The three points (from left to right) respectively correspond to mean − 1SD, mean, and mean + 1SD.

ciated with craving only for low trait EI scorers. It is noteworthy that the main and interaction effects involving trait EI were mostly attributable to the factors well-being and sociability.

4. Discussion

The first aim of the study was to investigate the evolution of emotional variables and the relationship between emotional variables and self-reported craving for alcohol during a withdrawal and detoxification program. Contrary to previous studies (Andersohn & Kiefer, 2004; Brady & Sonne, 1995; Brandon, Wetter, & Baker, 1996; Schuckit et al., 1994) where emotions were evaluated by the use of depression and anxiety questionnaires, we used the positive and negative affect scale as the dual-affect model expects distinct relationships between craving and positive or negative affect (Baker et al., 1987).

As expected from previous studies (Andersohn & Kiefer, 2004; de Timary et al., 2008), we first observed a large decrease of negative affect although values at end of withdrawal remained largely higher than those of controls. Contrary to this partial decrease of negative affect, we observed a significant improvement in the experience of positive affect: although lower at the beginning, PA scores were equal to those of controls at the end of withdrawal. These results suggest a more dramatic effect of alcoholism on negative than positive affectivity.

Links between negative affect and craving emerged from the study. In fact, the partial decrease of negative affect observed among alcoholic subjects during a three-week protracted withdrawal and detoxification program was mirrored by a partial

decrease of self-reported craving (on both obsessive and compulsive factors). In addition, significant correlations between negative affect and craving occurred at both times of the cure. These findings are consistent with findings from a previous study (Andersohn & Kiefer, 2004) in which depressive mood was correlated with craving. Furthermore, the correlations were stronger at T2 than T1, which suggests the existence of a moderator. However, future research, with additional variables, will be necessary to identify potential moderating factors. Conversely there was no correlation between craving and positive affectivity. This strongly suggests that the current work about alcohol-dependent inpatients investigates negative-affect craving (Baker et al., 1987).

As far as emotional competencies are concerned, the low EI scores observed among alcohol-dependent patients both in the early withdrawal period and in the abstinence period seem mainly due to a difficulty in regulating emotions and stress (the self-control factor of EI) and in experiencing self-confidence and satisfaction with their lives (the well-being factor of EI). The absence of evolution of emotional dispositions from baseline to follow-up is not surprising since the TEIQue aims at capturing relatively stable emotional dispositions and has been found to be fairly stable over a one-year period among a non addicted population (test–retest coefficient over one-year period is 0.78 for the whole scale, 0.74 for the factor 'self-control' and 0.79 for the factor 'well-being') (Petrides & Furnham, 2003b).

Another aim of the present study was to examine the influence of an emotion-related personality trait such as EI on craving. EI was negatively correlated with both the obsessive and compulsive craving subscores at both time periods. The EI factors "self-control" and "well-being" contributed particularly to this effect. Of even more importance was the observation that trait EI moderates the influence of negative mood on self-reported craving. Indeed, patients with high negative affectivity at the onset of the program are more likely to suffer from a greater craving at the end of the three-week treatment if they have a low EI score. In other words, the lower the EI score, the stronger the relationship between NA and craving. Altogether, the results support the view that EI is a protective factor against negative affect-related craving. All the alcoholic subjects probably evidence maladaptive coping strategies when exposed to negative emotions. However, among the low scorers of our subset of patients, who are very low EI individuals, the tight coupling between negative affect and craving is probably due to the fact that alcohol use is the only strategy that remains in their emotion coping/regulation repertoire. Conversely, the higher EI subset of patients likely also evidence maladaptive emotion regulation strategies, such as drinking alcohol, but they probably also possess at least some other strategies such as situation selection, situation modification, cognitive change, etc. (Mikolajczak & Gross., submitted for publication). They can then call upon these strategies when exposed to situations that evoke negative affect.

Although EI scores did not evolve during this three-week protracted withdrawal and detoxification program, this does not mean that EI scores cannot change during or after withdrawal. Emotional dispositions are fairly stable and thus need specific interventions to be modified. Given the relationship between these emotional dispositions and craving, we believe that specific interventions aimed at reinforcing emotion-related dispositions such as emotion/stress regulation (self-control factor) and trait positive affectivity (well-being factor) might help to reduce craving during early alcohol abstinence (i.e., at the end and after a detoxification program) and also reduce the probability of relapse.

Future research would greatly benefit from going deeper into the investigation of the relationship between emotional dispositions and the various facets of alcoholism (i.e., craving, withdrawal and relapse) and into the understanding of emotion-related variables as moderators of affect/facets relationships in alcoholics.

For example, other moderator studies (Armeli et al., 2003; Carney, Armeli, Tennen, Affleck, & O'Neil, 2000) revealed that neuroticism moderates the affect/alcohol use relationship. Such research may facilitate the choice of alcohol treatment, and improve the fit between the treatment chosen and the emotional profile of the patient.

In conclusion, this study suggests that patients with low EI might benefit from specific interventions dedicated to improve their abilities in emotion regulation. Interventions which provide patients with more adaptive strategies to cope with adverse situations and regulate unwanted emotions would be especially welcome.

Acknowledgements

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