

Dissociation Between Affective and Cognitive Empathy in Alcoholism: A Specific Deficit for the Emotional Dimension

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Background: Emotional impairments constitute a crucial and widely described dimension of alcoholism, but several affective abilities are still to be thoroughly explored among alcohol-dependent patients. This is particularly true for empathy, which constitutes an essential emotional competence for interpersonal relations and has been shown to be highly impaired in various psychiatric states. The present study aimed at exploring empathic abilities in alcoholism, and notably the hypothesis of a differential deficit between emotional and cognitive empathy.

Methods: Empathy abilities were evaluated among 30 recently detoxified inpatients diagnosed with alcohol dependence and 30 paired healthy controls, using highly validated questionnaires (Interpersonal Reactivity Index [*J Pers Soc Psychol* 44:113] and Empathy Quotient [*J Autism Dev Disord* 34:163]). Correlational analyses were performed to evaluate the links between empathy scores and psychopathological measures (i.e., depression, anxiety, interpersonal problems, and alexithymia).

Results: When psychiatric comorbidities are controlled for, alcoholism is not associated with a general empathy deficit, but rather with a dissociated pattern combining impaired emotional empathy and preserved cognitive one. Moreover, this emotional empathy deficit is not associated with depression or anxiety scores, but is negatively correlated with alexithymia and the severity of interpersonal problems.

Conclusions: At the theoretical level, this first observation of a specific deficit for emotional empathy in alcoholism, combined with the exact inverse pattern observed in other psychiatric populations, leads to a double-dissociation, which supports the notion that emotional and cognitive empathy are 2 distinct abilities. At the clinical level, this deficit calls for considering emotional empathy rehabilitation as a crucial concern in psychotherapy.

Key Words: Affective Empathy, Alcoholism, Cognitive Empathy, Emotion.

ALCOHOL DEPENDENCE, ONE of the most important health problems in the world (Harper and Matsumoto, 2005), is known to be associated with major cerebral (e.g., Harper, 2007), cognitive (e.g., Pitel et al., 2007), and emotional impairments (e.g., alexithymia [Taieb et al., 2002]

or emotional facial expressions decoding [e.g., Marinkovic et al., 2009]). As the adapted social communication is largely based on the ability to correctly express and perceive emotions (Feldman et al., 1991), these emotional deficits lead to impaired interpersonal interactions and increase the social problems frequently observed in alcoholism (e.g., Maurage et al., 2009; Uekermann et al., 2007). It thus appears crucial, at clinical as well as theoretical levels, to further explore the extent of these emotional deficits in alcoholism, as several affective abilities have not yet been satisfactorily evaluated.

Empathy is without doubt, one of these emotional competences that should be thoroughly explored in alcoholism, as it stands at the junction between intrapersonal and interpersonal abilities. Indeed, empathy is essential for the creation and preservation of affective bonds between mother and child, partners, and then larger social groups (Singer, 2006). Empathy can be globally defined as the ability to imagine oneself in another's place to understand and respond to other's feelings, ideas, or emotions (e.g., Decety and Jackson, 2006; Krämer et al., 2010).

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It has been repeatedly suggested that empathy should no more be considered as a unitary concept, but rather as a multi-dimensional construct involving at least 2 distinct abilities (Chakrabarti and Baron-Cohen, 2006; Lawrence et al., 2004): On one hand, an emotional (or affective) component linked to the ability of detecting and experiencing the others' emotional states, and on the other hand, a cognitive component (often used as a synonymous with "Theory of mind"), that is, a perspective-taking ability allowing to understand and predict the other's various mental states (e.g., beliefs, desires, ideas, feelings). Many studies have been conducted to evaluate the empathy deficits associated with psychopathological states (e.g., Baron-Cohen, 2009; Benedetti et al., 2009; Russell et al., 2009; Schmidt and Zachariae, 2009), and very recent studies demonstrated that affective and cognitive empathy can be differentially impaired in psychiatric states: autism (Smith, 2009), borderline personality disorder (Harari et al., 2010), and euthymic bipolar disorder (Shamay-Tsoory et al., 2009) lead to a marked cognitive empathy deficit associated with preserved emotional empathy. The inverse pattern has not yet been observed, but these first observations call for abandoning the classical exploration of a "general empathy" level and replacing it by a separate exploration of the 2 aspects of empathy.

This emotional-cognitive distinction appears crucial in alcoholism. Indeed, alcoholic individuals present a differential deficit for emotional stimuli, as they have preserved cognitive and semantic evaluation of emotional stimuli (e.g., Clark et al., 2007; Maurage et al., 2009), but impaired affective evaluation of these stimuli (e.g., Marinkovic et al., 2009; Uekermann et al., 2005). Alcoholism could thus be the first clinical condition to combine preserved cognitive and impaired emotional empathy. Nevertheless, only 1 study explored empathy in alcoholism (Martinotti et al., 2009), suggesting that alcoholics present a "general empathy" deficit. Although constituting a valuable first exploration, this study has 2 shortcomings: First, several confounding variables (e.g., psychiatric comorbidities, psychopathological characteristics) were not controlled for, and the empathy deficit observed may thus be due, at least partly, to these comorbidities and not to alcoholism itself. Second, the evaluation of empathy only relied on the global score of the Empathy Quotient (EQ) questionnaire (Baron-Cohen and Wheelwright, 2004), which do not allow differentiating emotional and cognitive empathy.

A deeper exploration of empathy abilities in alcoholism is thus needed, and the aim of the present study was to offer a precise investigation of empathy abilities in chronic alcoholism, with 2 main aims:

1. Determining whether empathy ability impairments are present among alcoholic individuals or not. More precisely, the strict control of potentially biasing variables will allow specifying whether this potential empathy impairment is indeed due to alcoholism or rather to the presence of alternative variables.
2. Exploring the hypothesis of a differential deficit between affective and cognitive aspects of empathy in alcoholism.

Indeed, alcoholism could be associated with a specific deficit for the affective component of empathy rather than with a general empathy deficit.

MATERIALS AND METHODS

Participants

Thirty inpatients (12 women), diagnosed with alcohol dependence according to Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV) criteria, were recruited during the third week of their treatment in a detoxification center (Brugmann Hospital, Free University of Brussels, Brussels, Belgium). They had all abstained from alcohol for at least 2 weeks (mean: 15.37 days; SD 4.14, the absence of alcohol consumption was checked daily for every patient by means of urine analysis), were free of any other psychiatric diagnosis as assessed by an exhaustive psychiatric examination [i.e., the Mini International Neuropsychiatric Interview (MINI), Sheehan et al., 1998] performed by a trained psychiatrist, comorbidity with any other psychiatric disease constituted an exclusion criteria] and were all right-handed. The mean alcohol consumption among patients just before detoxification was 20.9 alcohol units (an alcohol unit corresponds here to 10 grams of pure ethanol) per day (SD 9.04) and the mean number of previous detoxification treatments was 2.1 (SD 2.4). Patients were matched for age, gender, and education with a control group composed of 30 volunteers who were free of any history of psychiatric disorder (also assessed using the MINI) or drug/substance abuse. Control participants were recruited among the experimenters' acquaintances and the hospital employees (by means of posters placed in the hospital). The mean alcohol consumption in the control group was 4.5 units per week (SD 2.9), and control participants abstained from any alcohol consumption for at least 3 days before testing. Exclusion criteria for both groups included major medical problems, neurological disease (including epilepsy), visual impairment, and polysubstance abuse. Each participant had a normal-to-corrected vision. Education level was assessed according to the number of years of education completed since starting primary school. Although all the control participants were free of any medication, 19 alcoholic individuals still received moderate doses of benzodiazepines (i.e., Diazepam, Lorazepam, or Oxazepam; mean in the alcoholic group: 30.17 mg/d; SD 36.77). Alcohol-dependent participants also took part in an extensive psychotherapeutic program during 3 weeks of detoxification (individual and group therapy). Participants were provided with full details regarding the aims of the study and the procedure to be followed. After receiving this information, all participants gave their informed consent. The study was approved by the Ethical Committee of the Medical School. Participants (alcohol-dependent individuals and controls) were not paid for their participation.

Procedure

Control Measures. Patients and control participants were assessed using several psychological measures. The following variables were evaluated using validated self-completion questionnaires (mentioned in parentheses): State and trait anxiety (State and Trait Anxiety Inventory, form A and B, Spielberger et al., 1983), depression (Beck Depression Inventory, short version, Beck and Steer, 1987), interpersonal problems (Inventory of Interpersonal Problems, Horowitz et al., 1988), and alexithymia (20-item Toronto Alexithymia Scale, Bagby et al., 1994).

Experimental Measures. The evaluation of empathy abilities was based on 2 self-administered questionnaires:

1. The first questionnaire was the Interpersonal Reactivity Index (IRI, Davis, 1983; Guttman and Laporte, 2000, for the French

translation), a 28-item self-report questionnaire assessing different aspects of empathy on the basis of 4 subscales. Namely, 2 subscales quantify emotional empathy: (i) "Empathic Concern," that is, ability to be emotionally concerned by others' feelings, and (ii) "Personal Distress," that is, tendency to have self-oriented negative feelings in response to others' distress. The other 2 subscales evaluate cognitive empathy: (i) "Perspective Taking," that is, ability to espouse other's point of view at a cognitive level, and (ii) "Fantasy," that is, ability to project oneself into fictional characters. Each subscale had 7 items scored on a 5-point Lickert scale (from 1, "it does not describe me at all" to 5 "it describes me very well"). The IRI has been criticized concerning the validity of its distinction between emotional and cognitive empathy (e.g., Baron-Cohen and Wheelwright, 2004).

- The second questionnaire was the EQ (Baron-Cohen and Wheelwright, 2004; Berthoz et al., 2009, for the French translation). This questionnaire comprises 60 items (40 empathy related, 20 fillers), each scored on a 4-point Lickert scale (from 1, "totally agree" to 4 "totally disagree"). Each item linked to empathy is then associated with a score (0, 1, or 2), and a total score is computed (0–80). Three 5-items subscales (0–10) have been identified (Muncer and Ling, 2006): (i) Factor 1: "Cognitive empathy," that is, cognitive component of empathy, (ii) Factor 2: "Emotional reactivity," that is, emotional empathy, and (iii) Factor 3: "Social skills," that is, ability to correctly interact with others. The EQ shows high validity, good test-retest reliability, and internal consistency (Lawrence et al., 2004).

RESULTS

Control Measures

As shown in Table 1, alcoholics and controls were similar in terms of age, $F(1, 58) = 1.45$, NS, gender, and education, $F(1, 58) = 2.24$, NS, thus confirming the correct matching between groups. Moreover, the 2 groups did differ significantly

for all psychopathological measures: Depression, $F(1, 58) = 12.09$, $p < 0.001$, anxiety trait, $F(1, 58) = 4.79$, $p < 0.05$, anxiety state, $F(1, 58) = 11.41$, $p = 0.001$, and alexithymia, $F(1, 58) = 4.13$, $p < 0.05$, showing higher scores for alcoholics as compared with controls. Finally, alcoholics presented significantly more interpersonal problems than controls, $F(1, 58) = 14.69$, $p < 0.001$.

Experimental Measures

These results are shown in Table 2 and illustrated in Fig. 1. One-way ANOVAs were conducted to test the group differences for the IRI and EQ results and showed a specific deficit for emotional empathy in alcoholism:

- Concerning the IRI questionnaire, alcoholics obtained significantly lower scores than controls for the Empathic Concern, $F(1, 58) = 4.97$, $p < 0.05$, and Personal Distress, $F(1, 58) = 5.35$, $p < 0.05$, scales, whereas the 2 groups did not differ concerning the Perspective Taking, $F(1, 58) = 0.03$, NS, and Fantasy, $F(1, 58) = 1.48$, NS, scales.
- Concerning the EQ questionnaire, no group differences were observed for the Total Score, $F(1, 58) = 0.72$, NS, and for the Cognitive Empathy, $F(1, 58) = 1.83$, NS, and Social Skills, $F(1, 58) = 2.93$, NS, scales, but alcoholism was associated with a lower score for Emotional Reactivity, $F(1, 58) = 5.38$, $p < 0.05$.

Complementary Analyses

As several confounding variables could have influenced the results, Pearson's correlations were computed between control

Table 1. Alcoholic and Control Individuals Characteristics: Mean (SD)

Group	Age ^{NS}	EL ^{NS}	MAC ^{NS}	BDI ^{***}	STAI A*	STAI B**	IIP ^{***}	TAS-20*
Controls ($N = 30$)	43.13 (13.06)	13.60 (2.4)	0.57 (0.91)	4.7 (5.79)	36.1 (12.31)	39.43 (10.83)	0.97 (0.52)	46.4 (9.66)
Alcoholics ($N = 30$)	46.67 (9.37)	12.5 (3.23)	20.9 (9.04)	10.17 (6.37)	43.93 (15.24)	49.67 (12.58)	1.51 (0.54)	51.87 (11.38)

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

NS, nonsignificant; EL, Education Level (in years); MAC, Mean Alcohol Consumption just before detoxification (number of doses per day); BDI, Beck Depression Inventory (Beck and Steer, 1987); STAI, State and Trait Anxiety Inventory (Spielberger et al., 1983); IIP, Inventory of Interpersonal Problems (Horowitz et al., 1988); TAS-20, Twenty-item Toronto Alexithymia Scale—II (Bagby et al., 1994).

Table 2. Alcoholic and Control Individuals' Results for Experimental Measures: Mean (SD)

Group	IRI				EQ			
	EC*	PD*	PT ^{NS}	F ^{NS}	ER*	CE ^{NS}	SS ^{NS}	EQT ^{NS}
Controls ($N = 30$)	28.63 (4.21)	23.27 (4.2)	23.83 (4.12)	21.87 (5.75)	6.43 (2.21)	4.93 (2.33)	6.73 (1.84)	40.1 (9.73)
Alcoholics ($N = 30$)	26.43 (3.39)	20.67 (4.49)	24 (3.99)	23.6 (5.25)	5.17 (2.02)	5.77 (2.43)	5.8 (2.35)	42.23 (9.74)

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

NS, nonsignificant; IRI, Interpersonal Reactivity Index (Davis, 1983; Guttman and Laporte, 2000); EC, Empathic Concern, first emotional empathy factor of the IRI; PD, Personal Distress, second emotional empathy factor of the IRI; PT, Perspective Taking, first cognitive empathy factor of the IRI; F, Fantasy, second cognitive empathy factor of the IRI; EQ, Empathy Quotient (Baron-Cohen and Wheelwright, 2004; Berthoz et al., 2009; Lepage et al., 2009); ER, Emotional Reactivity, emotional empathy factor of the EQ; CE, Cognitive Empathy, cognitive empathy factor of the EQ; SS, Social Skills, third empathy factor of the EQ; EQT, Empathy Quotient Total score.

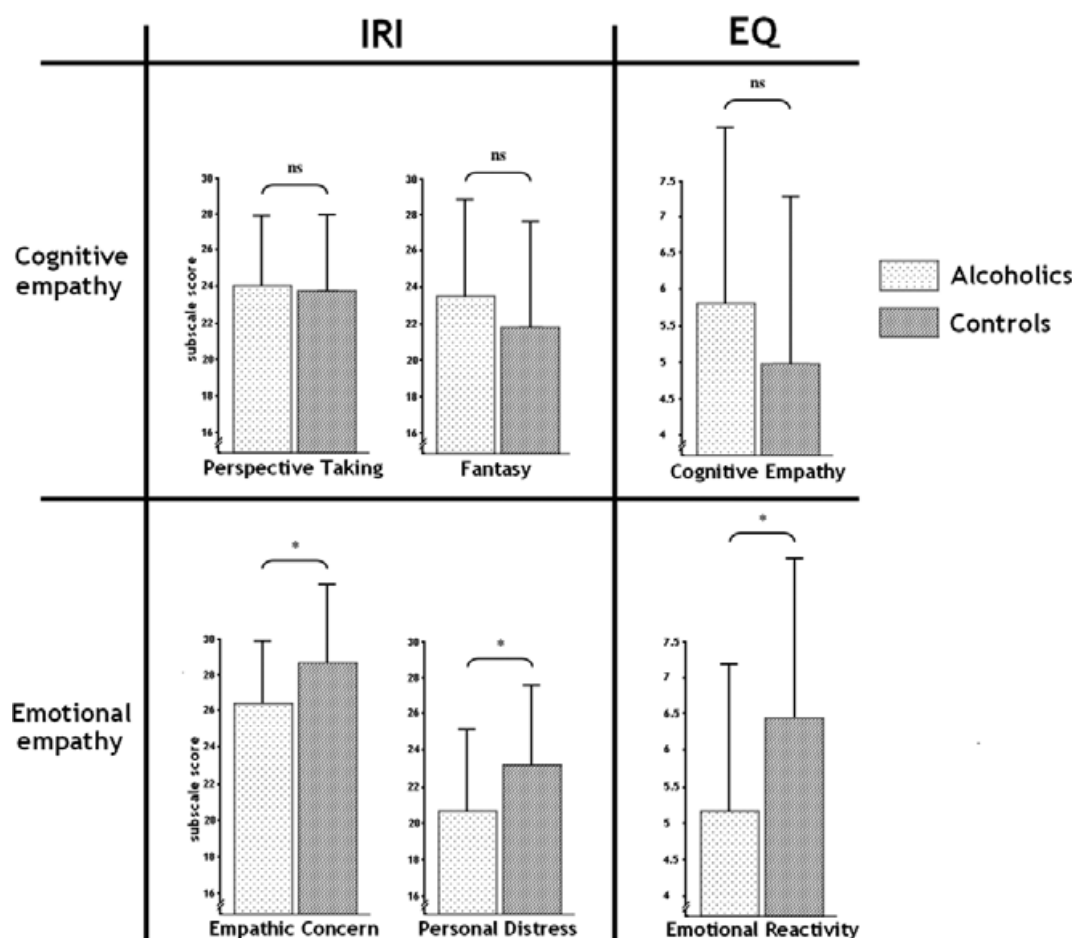


Fig. 1. Alcoholic and control participants' scores on Interpersonal Reactivity Index (IRI) and Empathy Quotient (EQ) subscales. This figure illustrates the specific deficit for emotional empathy in alcoholism: Although no significant group differences are observed for cognitive empathy (upper part, i.e., Perspective Taking and Fantasy for IRI, Cognitive Empathy for EQ), alcoholism leads to an impairment for emotional empathy (lower part, i.e., Empathic Concern and Personal Distress for IRI, Emotional Reactivity for EQ). NS, Nonsignificant; * $p < 0.05$.

measures (group characteristics and psychopathological questionnaires) and experimental results (i.e., empathy questionnaires scores) to test the hypothesis that the emotional empathy deficit observed in alcoholism could be partly due to confounding variables and not to alcoholism in itself:

1. Groups characteristics: In both groups, there was no significant influence of age or educational level on empathy results ($p > 0.05$ for every Pearson's correlation). Moreover, gender did not influence any experimental result (as shown by a comparison between men and women using independent samples t -tests, $t(58) < 0.71$, $p > 0.4$). Finally, in the alcoholic group, no influence of medication, past alcohol consumption, and number of previous detoxification treatments were found ($p > 0.05$ for every correlation).
2. Psychopathological measures: As shown in Table 3, several significant correlations were found between psychopathological measures and EQ results in the alcoholic group. Particularly, the total EQ and Factor 1 (Cognitive Empathy) scores were negatively correlated with depression, anxiety, and interpersonal problems measures, but not with alexithymia. Moreover, Factor 2 (Emotional Reactivity) was

negatively correlated with interpersonal problems and alexithymia, but not with depression and anxiety. Finally, Factor 3 (Social Skills) only showed a significant negative correlation with interpersonal problems.

3. In the control group, a significant positive correlation was found between the Factors 1 and 2 of the EQ ($\rho = 0.39$, $p < 0.05$). This intra-questionnaire correlation was not found in the alcoholic group ($\rho = 0.19$, NS).

DISCUSSION

The crucial role played by empathy abilities in emotional and interpersonal life has been repeatedly underlined during the last decade, and an abundance of studies have explored these abilities between healthy and psychopathological populations. Nevertheless, knowledge about the empathy processes among alcoholic individuals is still massively lacking. The present study was thus the first to explore (i) the empathy abilities in alcoholism with a strict control of potentially biasing variables, (ii) the possible differential impairment between emotional and cognitive empathy in alcoholism, and (iii) the

Table 3. Pearson's Correlations in the Alcoholic Group Between EQ Results (Total Score and Subscales) and Psychopathological Measures: ρ -value (p -value)

Psychol. measures	EQ Scores			
	Total score	Factor 1: Cognitive empathy	Factor 2: Emotional reactivity	Factor 3: Social skills
BDI	-0.41 ($p < 0.05$)	-0.45 ($p < 0.05$)	-0.26 (NS)	-0.16 (NS)
STAI A	-0.37 ($p < 0.05$)	-0.37 ($p < 0.05$)	-0.26 (NS)	-0.21 (NS)
STAI B	-0.43 ($p < 0.05$)	-0.41 ($p < 0.05$)	-0.21 (NS)	-0.15 (NS)
IIP	-0.41 ($p < 0.05$)	-0.47 ($p < 0.01$)	-0.37 ($p < 0.05$)	-0.55 ($p < 0.01$)
TAS-20	-0.25 (NS)	-0.20 (NS)	-0.51 ($p < 0.01$)	-0.03 (NS)

BDI, Beck Depression Inventory (Beck and Steer, 1987); STAI, State and Trait Anxiety Inventory (Spielberger et al., 1983); IIP, Inventory of Interpersonal Problems (Horowitz et al., 1988); TAS-20, Twenty-item Toronto Alexithymia Scale—II (Bagby et al., 1994).

Significant results are indicated in bold text ($N = 30$).

correlational links between empathy deficit and other psychopathological states frequently observed in alcoholism (e.g., depression, anxiety, and alexithymia).

Absence of General Empathy Deficit in Alcoholism

The first central result is the observation that, when the biasing psychopathological variables are controlled for, there is no general empathy deficit in alcoholism. The strict control of potentially confounding variables conducted here allowed a direct exploration of empathy deficits in alcoholism, and clearly showed that alcoholism per se does not lead to a global empathy abilities deficit (i.e., no group differences for EQ total score).

This result strongly suggests that the general empathy deficit described earlier (Martinotti et al., 2009) might be due to the influence of uncontrolled comorbid psychiatric state (particularly depression and anxiety) rather than to alcoholism itself. This proposition is still reinforced by the fact that the complementary analyses performed here confirmed the link between high subclinical depression—anxiety levels and low general empathy scores in the alcoholic group, by showing a strong negative correlation between Beck and STAI questionnaires scores and EQ Total score.

Specific Deficit for Emotional Empathy

The second main result of the present study follows the separate exploration of the 2 principal facets of empathy: It clearly appears that alcoholism is associated with a specific deficit for emotional empathy (i.e., Empathic Concern and Personal Distress for IRI, Emotional Reactivity for EQ), combined with a preserved cognitive empathy (i.e., Perspective Taking and Fantasy for IRI, Cognitive Empathy for EQ).

The present results strongly reinforce the general proposition of a specific “affect processing system” impairment in alcoholism (e.g., Kornreich et al., 2002; Marinkovic et al., 2009) by generalizing this proposition to emotional empathy and showing a dissociation between impaired emotional empathy and preserved cognitive empathy. This proposition of a strong dissociation is further supported by the absence of

correlation found here between cognitive (Factor 1) and emotional (Factor 2) empathy scores in the alcoholic group: These 2 facets of empathy appear independent in alcoholism, although they are positively correlated in our control group and in earlier studies (e.g., Muncer and Ling, 2006).

It is worth noting that this specific emotional empathy impairment seems to constitute a stable and core deficit in alcoholism, as (i) depression and anxiety levels were not correlated with emotional empathy results, thus excluding that this deficit could be explained by subclinical comorbidities, (ii) this deficit is observed here independently from acute or recent alcohol consumption, as all the alcoholic participants were abstinent for at least 14 days, and (iii) the impairment is not modulated by demographic characteristics like age, gender, or educational level nor by alcohol dependence characteristics and medication.

Role of Psychopathological Factors and Comorbidities

The correlational analyses performed here gave further insights concerning the links between empathy and psychopathological measures in alcoholism.

First, they showed 2 significant negative correlations confirming the dissociation between emotional and cognitive empathy in alcoholism. These correlations were between: (i) EQ Factor 1 (Cognitive Empathy)—Total score and depression—anxiety scores (but not alexithymia one), and (ii) EQ Factor 2 (Emotional Reactivity) and alexithymia (but not depression—anxiety ones). On one hand, high depression and anxiety scores are associated with reduced cognitive empathy, but not with emotional empathy. On the other hand, alexithymia is negatively associated with emotional empathy, which had been observed earlier (e.g., Williams and Wood, 2010) and makes sense in a clinical perspective: the inability to correctly feel and express one's own emotion (i.e., alexithymia, frequently observed in alcoholism, e.g., Taieb et al., 2002) is associated with difficulties to develop emotional empathy for other people.

Second, significant negative correlations were found in the alcoholic group between interpersonal problems and every EQ score, which underlines the links between empathy deficits and poor interpersonal interactions. Specifically concerning

emotional empathy, this correlation reinforces the proposition (e.g., Kornreich et al., 2002; Uekermann et al., 2007) of a vicious circle in alcoholism: Emotional empathy impairment could increase the difficulty to develop and maintain satisfactory interpersonal relations, leading to a social isolation in which excessive alcohol consumption could be used as a coping strategy to face loneliness. Nevertheless, our results do not allow concluding about the causal link between emotional empathy impairment and development of alcohol-related problems, and further longitudinal studies are thus needed.

Implications and Conclusion

The main result of this study is that alcoholism in itself is not associated with a general empathy abilities deficit, but rather with a specific emotional empathy impairment. This leads to several clinical and theoretical implications.

At the clinical level, this new result showing a specific deficit for emotion-related processing adds further to the many recent results showing emotional deficits in alcoholism. This underlines the urgency to take into account this affect processing deficit in the evaluation and therapy of alcohol-related impairments, notably by developing therapeutic interventions specifically dedicated to the rehabilitation of emotional abilities that includes empathy.

At the theoretical level, the dissociation observed here in alcoholism between preserved cognitive empathy and impaired emotional one strengthens the proposition of a double-system model of empathy (e.g., Decety and Jackson, 2004; Singer, 2006): Emotional and cognitive empathy, although sharing several common aspects, are to be considered as distinct dimensions. More precisely, although a specific deficit for cognitive empathy (with a preserved emotional one) had already been described in several psychopathological states (e.g., Harari et al., 2010; Shamay-Tsoory et al., 2009), the present study is to our knowledge the first to show the inverse dissociation pattern, thus leading to a double dissociation pattern, classically considered as proving the distinct nature of 2 processes. Nevertheless, it should be noted that the group size was rather small (30 participants per group), which constitutes an important limitation of the present study. These results should thus be confirmed on larger populations and extended to other psychopathological states (particularly other addicted and neurological patients), but it can already be assumed that future studies between healthy and pathological populations should definitely discard the exploration of a general empathy deficit and rather focus on the multidimensional aspects of empathy.

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