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## Abstract and concrete repetitive thinking modes in alcohol-dependence

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### ABSTRACT

Emotional and interpersonal deficits play a crucial role in alcohol-related disorders as they predict alcohol consumption and relapse. Recent models of emotion regulation in psychopathology postulate that these deficits are centrally related to increased abstract/analytic repetitive thinking, combined with reduced concrete/experiential repetitive thinking. As this assumption has not been tested in addictions, this study aimed at investigating repetitive thinking modes in a large sample of alcohol-dependent subjects. One hundred recently detoxified alcohol-dependent subjects (29 females; mean age = 49.51-years-old) recruited during the 3rd week of their treatment in a detoxification center were compared to 100 healthy controls (29 females; mean age = 48.51-years-old) recruited in the experimenters' social network, matched at the group level for age, gender, and educational level. All participants completed the Mini Cambridge Exeter Repetitive Thought Scale measuring abstract/analytic and concrete/experiential repetitive thinking modes as well as complementary psychopathological measures (Beck Depression Inventory and State and Trait Anxiety Inventory). Alcohol-dependent individuals have similar levels of concrete repetitive thinking as controls but report significantly higher levels of abstract repetitive thinking ( $p < 0.001$ ;  $d = 1.28$ ). This effect remains significant after controlling for depression and anxiety. Relative to healthy controls, alcohol-dependent patients report more frequent use of abstract/analytic repetitive thinking, with preserved concrete/experiential thinking. Despite the cross-sectional nature of the study, frequent use of abstract repetitive thinking thus appears to constitute a main feature of alcohol-dependence.

### KEYWORDS

Alcohol-dependence; repetitive thinking; abstract thinking mode; concrete thinking mode

### Introduction

Alcohol-dependence is among the most widespread psychiatric disorders worldwide,<sup>1</sup> leading to strongly established cognitive deficits,<sup>2</sup> but also to a wide range of emotional<sup>3</sup> and interpersonal impairments.<sup>4</sup> These impairments should be considered as more than a mere side-effect of alcohol-dependence as they constitute one of the main relapse factors after mid-term abstinence.<sup>5</sup> Moreover, as increased alcohol consumption is conceptualized as a coping strategy to face emotional and interpersonal difficulties,<sup>5,6</sup> these deficits frequently initiate a vicious circle favoring the development and maintenance of alcohol-related disorders.<sup>7</sup> Beyond addiction, recent theoretical and empirical models focusing on emotional and interpersonal deficits in psychopathology have pointed out

that these deficits are frequently related to a high-level construal about self and mood (e.g., why a mood is experienced) and to reduced concreteness of thinking.<sup>8,9</sup> Indeed, two forms of repetitive thinking, respectively named abstract/analytic [AA] and concrete/experiential [CE], have been distinguished:<sup>10</sup> The AA repetitive thinking mode refers to the higher-level causes, meanings and implications of self-experience. When confronted with adversity, this mode is likely to engender negative overgeneralization (e.g., I am always failing), known to increase the vulnerability toward emotional deficits.<sup>11</sup> AA consists in general, superordinate, and cross-situational thoughts which make individuals apprehend a situation in terms of “why” it occurred.<sup>12</sup> Conversely, CE repetitive thinking mode refers to lower-level, specific, contextual,

and concrete moment-by-moment details of self-experience and is likely to reduce emotional disturbance. It consists in focusing on “how” an event happened (i.e., the sequence by which it occurred).<sup>13</sup>

Positive correlations have been found among AA, depression, and trait anxiety while CE is associated with lower depression level.<sup>14</sup> It has also been shown that training individuals with major depression to become more concrete and specific in their thinking significantly reduced depression symptoms, rumination, and overgeneralization.<sup>13</sup> Other direct experimental manipulations of thinking modes have reinforced this proposal, notably showing that: (1) promoting concrete thinking (i.e., focusing attention on the emotions elicited by a social task) strongly improves social problem solving abilities in major depression compared to promoting abstract thinking (i.e., thinking about the causes, meanings, and consequences of task-related issues);<sup>15</sup> (2) promoting self-focused concrete thinking in anxiety has a positive effect on self-esteem compared to abstract thinking.<sup>16</sup> It is now strongly established that these thinking modes have a critical role in the aetiology and maintenance of psychiatric disorders.

Surprisingly, repetitive thinking modes have been much less explored in psychiatric conditions other than mood disorders, and notably in alcohol-dependence. However, repetitive thinking may be involved in the maintenance of alcohol-related problems as an increased use of AA and reduced use of CE in alcohol-dependent subjects (ADS) might: (1) strongly increase emotional and interpersonal deficits<sup>3,4</sup> which ADS attempt to regulate by alcohol consumption,<sup>7</sup> (2) contribute to their higher rumination levels,<sup>17</sup> and (3) negatively influence self-esteem,<sup>18</sup> all of which are known to predict alcohol use disorders<sup>19</sup> and relapse.<sup>20</sup>

Despite these arguments underlining the importance of thinking modes in alcohol-dependence, only one study has explored this topic (by means of a memory recall task), showing that alcohol-dependence is associated with less frequent recall of specific (i.e., concrete) memories and more frequent recall of general (i.e., abstract) ones.<sup>21</sup> Therefore, to provide a deeper understanding of repetitive thinking modes in alcohol-dependence, the present study aimed to investigate the association between alcohol-dependence and repetitive thinking modes *per se*.

The central proposal is that, relative to control subjects (CS), ADS might report a more frequent use of

AA and less frequent use of CE, even after controlling for confounding factors (depression and anxiety symptoms). Reporting such distinction would have strong implications. At the theoretical level, it would clarify whether differential impairment according to repetitive thinking modes is a main feature of alcohol-dependence. At the clinical level, it would offer new therapeutic avenues by targeting repetitive thinking modes in addition to the standard rehabilitation of cognitive, emotional, and interpersonal deficits.

## Materials and methods

### Participants

One hundred inpatients (29 women), diagnosed with alcohol-dependence according to DSM-IV criteria, were recruited during the third week of their treatment in a detoxification center (St Luc Academic Hospital, Brussels, Belgium). Their demographic characteristics appear in Table 1. They had all abstained from alcohol for at least two weeks ( $M = 15.41$  days;  $SD = 3.76$ ) and were free of any other current psychiatric diagnosis as assessed by the Mini-International Neuropsychiatric Interview. Patients were matched at the group level for age, gender, and education with 100 CS recruited in the experimenters' social network who were free of any current or history of psychiatric disorder assessed by the Mini-International Neuropsychiatric Interview or drug/substance abuse. Each CS had abstained from any alcohol consumption for at least 3 days before testing. Exclusion criteria for both groups included major medical problems, neurological

**Table 1.** Drinking variables, demographic, psychopathological and outcome measures for Alcohol-Dependent (ADS) and Control (CS) Subjects: Mean (SD).

	ADS ( $n = 100$ )	CS ( $n = 100$ )
<b>Drinking variables</b>		
Number of previous detoxification treatments	2.51 (3.10)	—
Duration of alcohol-dependence (in years)	13.5 (10.00)	—
Alcohol consumption per day (in units <sup>‡</sup> ) *	20.95 (13.5)	1.2 (0.96)
<b>Demographic measures</b>		
Age <sup>NS</sup>	49.44 (9.68)	48.51 (11.7)
Gender ratio (female/male) <sup>NS</sup>	29/71	29/71
Educational level <sup>NS</sup>	15.08 (3.04)	15.42 (2.45)
<b>Psychopathological measures</b>		
Beck Depression Inventory (BDI)*	11.42 (8.01)	2.55 (3.76)
State and Trait Anxiety Inventory A (STAI-A)*	40.37 (12.12)	29.35 (7.85)
State and Trait Anxiety Inventory B (STAI-B)*	48.92 (10.41)	34.02 (7.96)
<b>Outcome measures</b>		
Abstract/analytic repetitive thinking (AA)*	2.47 (0.51)	1.89 (0.39)
Concrete/experiential repetitive thinking (CE) <sup>NS</sup>	2.46 (0.49)	2.51 (0.46)

<sup>NS</sup>Non-significant.

\* $p < 0.001$ .

<sup>‡</sup>A unit corresponding to 10 g of pure ethanol.

disease, visual impairment, and polysubstance abuse (data were obtained from the medical records of the patients and from interviews with control participants). CS were not taking any psychotropic medications and did not present any problematic alcohol consumption (maximum of three units of alcohol per day). The education level was assessed according to the number of years of education completed since starting primary school. Although all CS were free of any medication, 32 ADS still received moderate doses of benzodiazepine ( $M = 26.28$  mg/day;  $SD = 18.22$ ). ADS also took part in an extensive psychotherapeutic program during the 3 weeks of detoxification (individual and group therapy).

### Procedure

ADS and CS gave written informed consent and completed questionnaires related to psychological functioning without financial compensation. The study was approved by the Local Ethics Committee and carried out according to the Declaration of Helsinki.

### Outcome measures

The Mini Cambridge Exeter Repetitive Thought Scale (CERTS)<sup>14</sup> is a short questionnaire assessing AA and CE. Participants rated 15 items exploring the presence of AA (e.g., “I think about why I can’t get started on something;” “My thinking tends to spiral out from one specific event to broader, general aspects of my life”) and CE (e.g., “I seem to be engaged in and directly in touch with what is going on around me;” “I can grasp and respond to changes in the world around me without having to analyze the details”) repetitive thinking mode on a 4-point Likert scale from 1 (*almost never*) to 4 (*almost always*). The score for each subscale is the sum of the score for each item of the subscale divided by the total number of items for this subscale. The French version showed good structural validity and internal consistency for each subscale ( $\alpha = 0.78$  for AA and  $\alpha = 0.72$  for CE).<sup>14</sup>

### Control measures

ADS and CS completed validated self-completion questionnaires to assess depression (Beck Depression Inventory short-version; BDI)<sup>22</sup> and state (State and Trait Anxiety Inventory; STAI-A) and trait anxiety (STAI-B).<sup>23</sup> Alcohol consumption characteristics were also controlled for: the number of previous clinical

detoxification treatments, the duration of alcohol-dependence (in years), and daily alcohol consumption just before detoxification (in units of 10 g of pure ethanol).

### Data analytic plan

Statistical analyses were performed using the SPSS 18 software package. The significance level was set at  $p < 0.05$ . There were no missing values. Before performing the analysis, the skewness and kurtosis of the data were examined. All parameters were between  $-1$  and  $1$  except BDI, indicating that the data were not normally distributed. Therefore, this BDI measure was log transformed in order to normalize its distribution (skewness = 0.32; kurtosis =  $-0.93$ ).

## Results

### Control measures

As shown in Table 1, ADS and CS did not significantly differ in terms of age [ $F_{(1,198)} = 0.37$ ,  $p = 0.54$ ,  $d = 0.09$ ], gender [ $\chi^2_{(1, n = 200)} = 0$ ,  $p = 1.00$ ], and education [ $F_{(1,198)} = 0.76$ ,  $p = 0.39$ ,  $d = 0.13$ ]. Nevertheless, ADS showed higher scores than CS for depression [ $F_{(1,198)} = 100.67$ ,  $p < 0.001$ ,  $d = 1.44$ ], trait anxiety [ $F_{(1,198)} = 129.1$ ,  $p < 0.001$ ,  $d = 1.60$ ], and state anxiety [ $F_{(1,198)} = 58.24$ ,  $p < 0.001$ ,  $d = 1.09$ ].

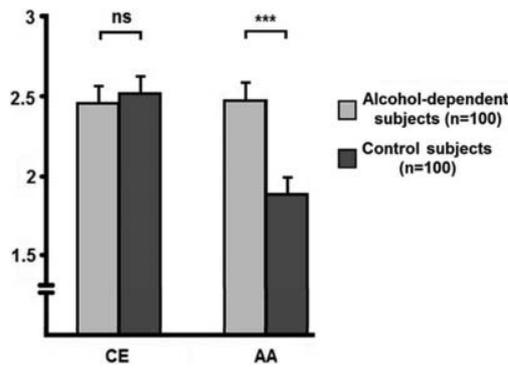
### Outcome measures

A multivariate analysis of variance (MANOVA) revealed that ADS presented significantly higher scores than CS for AA [ $F_{(1,198)} = 82.48$ ,  $p < 0.001$ ,  $d = 1.28$ ], without significant group effect on CE [ $F_{(1,198)} = 0.63$ ,  $p = 0.43$ ,  $d = 0.11$ ], as illustrated in Figure 1.

To control for a potential influence of depression and anxiety on experimental measures, BDI and STAI A-B scores were introduced as covariates in a MANCOVA. The results showed that, even when the influence of anxiety and depression symptoms were jointly taken into account, ADS still reported significantly higher scores than CS for AA [ $F_{(1,195)} = 4.59$ ,  $p = 0.03$ ,  $d = 0.67$ ], without group difference for CE [ $F_{(1,195)} = 3.26$ ,  $p = 0.07$ ,  $d = 0.29$ ].

### Complementary analyses

Pearson’s correlations were performed to test the links among medication levels in ADS, thinking mode, and



**Figure 1.** Scores (mean and standard error) for each subscale (concrete/experiential repetitive thinking [CE] and abstract/analytic repetitive thinking [AA]) and each group (alcohol-dependent and control subjects) for the Mini Cambridge Exeter Repetitive Thought Scale (*ns* = non-significant; \*\*\**p* < 0.001).

alcohol consumption characteristics. As depicted in Table 2, there were no significant correlations among these measurements.

## Discussion

This study aimed at investigating repetitive thinking modes in a large sample of ADS. Results clearly showed that, compared to matched CS, ADS are characterized by a similar level of CE but by more AA. Importantly, although ADS reported higher levels of depression and anxiety than CS, this significant distinction was maintained after taking into account these confounding factors. Therefore, the present results are the first to demonstrate a specific association between alcohol-dependence and frequent use of AA.

Previous studies highlighted that decreasing the use of AA and promoting the use of CE reduced emotional disturbance and improved social problem solving abilities.<sup>15,24</sup> Therefore, this suggests that an abstract and general mode of thinking may play a role

in the maintenance of the emotional and interpersonal difficulties in ADS, beyond the contribution of comorbid depression and anxiety. This proposal is further reinforced by the observation that the association between ADS and AA is not influenced by the duration and intensity of alcohol-dependence and is independent from medication or residual effects of acute alcohol intoxication. Therefore, AA might be a stable characteristic of ADS, not influenced by drinking history or comorbid symptoms.

At the theoretical level, these findings support the existence of two thinking modes by clearly showing a distinction between the more frequent use of AA and the equally frequent use of CE in ADS compared to CS. This theoretical distinction had already been empirically confirmed in mood disorders<sup>10,15</sup> as well as in non-clinical populations.<sup>25,26</sup> However, this study is the first that evidenced this distinction in addictive disorders. Importantly, the present study is in line with previous findings showing that depression and anxiety are positively correlated with AA and negatively correlated with CE.<sup>14</sup>

Regarding alcohol-dependence, the present results reinforce theoretical models proposing a central role for repetitive thinking (e.g., rumination) in the development and maintenance of alcohol-related disorders.<sup>27</sup> But above all, despite the cross-sectional nature of this study, they refine these models by suggesting that abstract repetitive thinking mode, notably focused on alcohol-related thoughts, could be a specific relapse factor, particularly by maintaining emotional and interpersonal deficits even after detoxification.<sup>15,24</sup> Indeed, high AA and low CE predict later levels of emotional deficits<sup>24</sup> which are significant moderators of alcohol consumption, used as a maladaptive coping strategy to face emotional and interpersonal difficulties.<sup>5,6</sup> The main role of repetitive

**Table 2.** Correlations between drinking variables, psychopathological and outcome measures in alcohol-dependent subjects (lower triangular part) and in healthy control subjects (upper triangular part).

		1	2	3	4	5	6	7	8	9
1	AA	—	.10	.27***	.13	.48***	—	—	-.01	—
2	CE	-.01	—	-.37***	-.27***	-.20*	—	—	-.02	—
3	BDI	.38***	-.13	—	-.50***	.55***	—	—	-.08	—
4	STAI-A	.28**	-.26**	.41***	—	.66***	—	—	-.02	—
5	STAI-B	.52***	-.29**	.47***	.75***	—	—	—	-.05	—
6	Dependence duration	-.11	.13	-.13	-.24*	-.27**	—	—	—	—
7	Number of detoxification	-.07	.06	-.07	-.01	-.06	.18	—	—	—
8	Alcohol consumption <sup>a</sup>	.11	.07	.10	.09	.00	.09	.03	—	—
9	Medication	.03	.04	.03	.20	.10	.02	.15	.04	—

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001.

<sup>a</sup>Before testing in controls and before detoxification in alcohol-dependent subjects

thinking in alcohol-dependence is also supported by evidence from interventions on repetitive thinking modes in clinical populations (e.g., major depression, anxiety) that have shown a reduction of psychopathological characteristics.<sup>15,16,24</sup> Finally, one cannot exclude that repetitive thinking modes may impact alcohol-dependence through interpersonal problems. Indeed, AA has been shown to be linked with reduced social problem-solving abilities.<sup>15</sup> As interpersonal problems are omnipresent in alcohol-dependence,<sup>4</sup> the more frequent use of AA is likely to increase the difficulty to get supportive interpersonal relations, which might lead ADS to social isolation.<sup>7</sup> Further explorations are thus needed to determine: (1) the exact interactions between repetitive thinking modes and emotional-interpersonal impairments and (2) the direction of causality. Indeed, it should be acknowledged that a main limit of the present study is its cross-sectional nature, hampering to determine the causal relation between repetitive thinking and alcohol-dependence. Finally, it is worth mentioning that contrary to the current hypothesis, ADS and CS reported the same frequency of use of CE. This pattern of results, already found in a previous study exploring repetitive thinking in perfectionism,<sup>26</sup> suggests that the abstract and general dimension is specifically related to psychological difficulties.

At a clinical level, this study clearly suggests that repetitive thinking should be taken into account during the therapeutic process. The standard psychotherapeutic approach aims at globally reducing ruminations, but the present results claim for specifically focusing on AA to counter emotional-interpersonal deficits, and negative overgeneralization (e.g., “I think I am no good at all”) frequently observed in ADS. Mindfulness might also be used as it specifically reduces AA, increases CE,<sup>28</sup> and reduces drug use risk.<sup>29</sup> Future studies should, therefore, explore whether the impact of such a program on the AA in ADS may reduce the psychological distress resulting from and maintaining alcohol-dependence.

To conclude, this study was the first to show that ADS have levels of CE similar to healthy participants but report higher frequency of AA even after depression and anxiety were controlled for. Although longitudinal studies should test the causal role of AA on alcohol-dependence and control for other possible confounding factors uncontrolled in the present study (e.g., alexithymia),<sup>25</sup> this study already provides new

insights regarding the association between different repetitive thinking modes and alcohol-dependence, leading to strong fundamental implications but also to concrete clinical recommendations.

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