

# Sensitivity for Self-Discrepancy Predicts Alcohol Consumption in Alcohol-Dependent Inpatients with High Self-Consciousness

Marie Poncin<sup>a,b,c</sup>, Vincent Dethier<sup>a,b</sup>, Pierre Philippot<sup>a,b</sup>, Nicolas Vermeulen<sup>b</sup> and Philippe de Timary<sup>a,b,c,d\*</sup>

<sup>a</sup>Laboratory for Experimental Psychopathology, Psychological Sciences Research Institute, Université catholique de Louvain, Louvain-la-Neuve, Belgium

<sup>b</sup>Psychological Sciences Research Institute, Université Catholique de Louvain, Louvain-la-Neuve, Belgium

<sup>c</sup>Institute of Neuroscience, Université Catholique de Louvain, Brussels, Belgium

<sup>d</sup>Department of Adult Psychiatry, Saint-Luc University Hospital, Brussels, Belgium

## Abstract

**Background:** A specific sense of self and sensitivity to self-threatening situations among alcohol-dependent (AD) individuals has often been reported by clinicians. Unpleasant self-awareness of situations of personal failure may lead to relapse, especially for AD individuals with high self-consciousness. However, the implication of Higgins' self-discrepancy theory for alcohol-dependence has not yet been empirically investigated. This study tested the relation between self-discrepancies evaluated by the Self-Discrepancy Questionnaire and different self-related dimensions (i.e., self-consciousness, depression, emotional regulations strategies) in alcohol-dependence.

**Methods:** Forty-four AD inpatients (28 men) presenting with an Axis-1 diagnosis of alcohol-dependence (DSM-IV) and recruited during detoxification process completed Self-Discrepancy Questionnaire and others self-related questionnaires.

**Results:** High self-discrepancies and associated distress were related to more negative affect, depression, abstract-analytical ruminations, and to lower adaptive emotion regulation strategies and higher alcohol craving and alcohol intake. Self-discrepancies and associated distress predicted alcohol intake but only in high self-consciousness AD population.

**Conclusion:** Self-discrepancies lead to discomfort and to emotional distress, which may results of more non-adaptive ruminations and less adaptive emotion regulation strategies. This unpleasant awareness of self-discrepancy predicted higher alcohol craving and alcohol intake. Two subpopulations were distinguished by the sensitivity to self-discrepancy according to their level of self-consciousness.

**Keywords:** Alcohol-dependence; Self-discrepancy; Self-consciousness; Self-sensitivity

## Introduction

Clinicians working with alcohol-dependent (AD) individuals are familiar with the fact that their patients present with a specific sensitivity to self-threatening situations and in particular to situations of self-rejection [1]. Furthermore, situations of social distress are known to be a major cause of relapse in abstinent AD subjects [2]. In the early 1980ies, Hull (1981) has proposed a self-awareness theory of drinking, in which alcohol serves as a mean to decrease unpleasant self-awareness induced by experiences of personal failure in AD subjects [3]. Self-consciousness is a tridimensional personality construct composed of private and public dimensions of self-consciousness that refer respectively to the tendency to pay attention to self-related elements and to the sensitivity to the opinion of others and a third dimension, social-anxiety. In a seminal study, Hull and his co-investigators (1986) have observed that after detoxification programs, AD subjects who obtained high scores on a scale of self-consciousness had a tendency to relapse in situations in which they were experiencing personal failure [4]. More recently, de Timary et al. (2013) [4] have shown that in AD subjects who report elevated scores of self-consciousness, alcohol craving was strongly related to depressive symptoms, compared to those scoring low on self-consciousness, suggesting that craving could be an intermediate mechanism to explain relapse tendency in this population [5]. Both private and public dimensions of self-consciousness moderated the relation between craving and depression symptoms [5]. This moderation by self-consciousness was strong (R<sup>2</sup>adj comprised between 0.44 and 0.52, in the prediction of craving scores by depression and self-consciousness in multiple regression

analysis models) and was present irrespective of the drinking status of the individual, as it was observed both at the beginning and end of alcohol-withdrawal [5]. This further supports Hull's hypothesis that a subpopulation of AD subjects (i.e., high Self-conscious individuals) is very sensitive to self-related elements, which moderates the drive for consumption in situations of negative affect.

However, although these studies suggest that self-consciousness plays an important motivational role for drinking and relapsing in alcohol-dependence, the processes underlying the role of self-consciousness and in particular the sensitivity to self-standards has not been investigated thoroughly.

Individuals generally regulate their behaviors in order to match to self-standards. In adaptive situations, self-regulation processes are hence principally driven by the achievement of "ideals" and "oughts" [6,7]. When individuals do not manage to achieve their own standards, a tension between the actual-self and self-standards, named Self-

**\*Corresponding author:** Philippe de Timary, Department of Adult Psychiatry, Cliniques Universitaires St. Luc, Avenue Hippocrate 10, B-1200 Brussels, Belgium, Tel.: +3227642160; Fax: +322764892; E-mail: [philippe.detimary@uclouvain.be](mailto:philippe.detimary@uclouvain.be)

**Received:** July 30, 2015; **Accepted:** August 19, 2015; **Published:** August 24, 2015

**Citation:** Poncin M, Dethier V, Philippot P, Vermeulen N, de Timary P (2015) Sensitivity for Self-Discrepancy Predicts Alcohol Consumption in Alcohol-Dependent Inpatients with High Self-Consciousness. J Alcohol Drug Depend 3: 218. doi:10.4172/23296488.1000218

**Copyright** © 2015 Poncin M, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

discrepancy, emerges. In the Self-discrepancy theory, Higgins identified three domains of the Self: 1. The actual self is the representation of the characteristics that someone believes that he or she actually has; 2. The ideal self is the representation of characteristics that someone would like to ideally possess; 3. The Ought Self is the representation of characteristics that someone believes that significant others are expecting him or her to have (e.g., obligations, responsibilities, etc.). Higgins's theory postulates that discomfort may be provoked by Self-discrepancy [6]. More specifically, actual/ideal discrepancies would be associated with dejection-related emotions (e.g., disappointment, sadness, etc.) and actual/ought discrepancies would be associated with agitation-related emotions (e.g., threat, fear, constant vigilance, etc.) [6]. Key, Mannella, Thomas and Gilroy (2000) [8] have found a relation between self-discrepancies and associated emotional discomfort but not with specific emotions as postulated by Strauman and Higgins (1987) [9].

Philippot et al. [10] developed the Self-Discrepancy Questionnaire, a structured self-report questionnaire dedicated to evaluate actual/own vs ideal/own discrepancies and actual/own vs ideal/other discrepancies as well as the distresses elicited by both discrepancies. This questionnaire, which has been validated concerning test-retest reliability [10], has never been thoroughly tested in AD subjects, who present with specifically elevated social-self standards [11] and for whom the question of the self is central to the problematic, as developed above. The relation between non-adaptive behaviors and self-discrepancy may not be specific to alcohol-dependence. Baumeister 2007 indeed suggested that risky behaviors may serve of self-regulation strategies to decrease this unpleasant awareness of self-discrepancy [7].

The objective of this study was to test the relation between self-discrepancies evaluated by the Self-Discrepancy Questionnaire and different self-related dimensions: 1- self-consciousness, to evaluate whether the self-discrepancies are related to higher attention to private or public dimensions of the self; 2- affects evaluated both by the positive and negative affect scale [12] and by the Beck Depression Inventory [13], that should be related to higher self-discrepancies; 3- emotional regulations strategies, as assessed by the CERTS [14], that evaluates repetitive thinking and the CERQ [15], that evaluates more complex modes of emotion regulation, as the development high levels of self-discrepancies is expected to be related to the emergence of non-adaptive self-regulation strategies as suggested by Baumeister [7]; 4- Alcohol craving and alcohol intake that may express a specific mode of non-adaptive regulation strategy and especially in individuals with high self-consciousness.

We expect, by this approach to increase our understanding of self-related processes in AD subjects and to validate Philippot et al's Self-Discrepancy Questionnaire [10] in an AD population.

## Method

### Participants

Forty-four AD inpatients (28 men) presenting with an Axis-1 diagnosis of alcohol-dependence (DSM-IV) and recruited during detoxification process took part in this study. Exclusion criteria were the existence of other types of substance dependence (excepted tobacco) or any other DSM-IV Axis-1 disorder. Their ages ranged from 30 to 69 years with a mean of  $50.32 \pm 10.72$  years. All participants were provided explanations concerning the aims and the procedure of the study and gave their written informed consent. The protocol of this

study was approved by the Ethical Committee of the Hospital and the Medical Faculty.

### Measures

**Self-discrepancy questionnaire:** The Self-discrepancy questionnaire [10] evaluates two types of self-discrepancy (i.e., actual/own vs ideal/own and actual/own vs ideal/others) and the subsequent distress. First, participants are instructed to produce different characteristics that they would like to possess or not. Then, for each characteristic, they indicate a percentage that represents the extent to which they believe to match with the characteristic. Participants also indicate on a 7-point Likert scale the extent to which they experience actual/ideal discrepancy [[1] no discrepancy or very slight discrepancy to [7] extreme discrepancy]. Finally, they evaluate the distress caused by this discrepancy on a 7-point Likert [1] not at all to [7] extremely]. Secondly, they fill in the questionnaire again in the same fashion for characteristics that others would like that they have or not. Altogether, this questionnaire allows to obtain 4 scores: 1. actual/own vs ideal/own discrepancy, 2. distress caused by actual/own vs ideal/own discrepancy, 3. actual/own vs ideal/others discrepancy, 4. distress caused by actual/own vs ideal/others discrepancy. This questionnaire has currently only been validated in a normal population and showed good score of test-retest reliability.

**The revised self-consciousness scale (RSCS):** The SC trait was assessed using Fenigstein et al.'s RSCS [16] that includes 22-items rated on a 4-point Likert scale [0 = extremely uncharacteristic to 3 = extremely characteristic]. This measure is comprised of three subscales of private SC (i.e., attention to one's inner feeling and thoughts), public SC (i.e., consciousness of self as social object), social anxiety (i.e., discomfort in the presence of others).

**Beck depression inventory (BDI):** BDI-II (short version) was used to evaluate specific attitudes and symptoms observed in cases of depression. This measure consists of 13-items rated on a 4-point Likert scale referring to 4 statements which express the severity of depression degree [13].

**Positive and negative affect schedule (PANAS):** PANAS is 20-item mood scale which comprises two 10-item subscales: positive and negative affect. Each item is rated on 5-point Likert scale ranging from [1] very slightly or not at all to [5] extremely [12,17].

**Cognitive emotion regulation questionnaire (CERQ):** The CERQ measures cognitive aspects of emotion regulation and consists of 36-items, each of which rated on a 5-point Likert scale ranging from [1] almost never to [5] almost always. This measure comprises 9 subscales: Self-blame, Blaming others, Rumination, Catastrophizing, Putting into Perspective, Positive Refocusing, Positive Reappraisal, Acceptance and Refocus on planning. The first four subscales refer to less adaptive emotion regulation strategies, while the last five one refer to more adaptive strategies [15].

**Cambridge-exeter repetitive thought scale (The mini-CERTS):** The short version of CERTS was used to measure repetitive thinking. It consists of 16-items evaluating two dimensions of rumination: 1. Abstract, analytical thinking, an unconstructive form of rumination and 2. Concrete, experiential thinking, a constructive form of rumination. Each item is rated on 4-point Likert scale ranging from [1] almost never to [5] almost always [14].

**The obsessive and compulsive drinking scale (OCDS):** OCDS measures aspects of alcohol craving during the preceding 7days. This

self-report questionnaire comprises 14 items rated on a 5-point Likert scale (0 = least, 4 = most), which can be divided in two subscales: Obsessive subscale (6 items) and Compulsive subscale (8 items). Four compulsive items that are related to alcohol consumption (e.g., How many drinks do you drink each day?) are irrelevant indices of compulsion during withdrawal, as drinking is prohibited. These items were eliminated and a 10-item total score was computed which included a modified 4-item compulsive subscale [18,19].

**Alcohol consumption:** To evaluate the amount of alcohol intake, we used the Timeline Followback approach of Sobell and Sobell [20] which was adapted to AD patients. In this approach, the interviewer used a 7-day calendar to assess alcohol consumption during the week preceding the admission to detox process. First, it was asked to the patient what was drunk regularly in a normal week and then patients were questioned on specific occasions of drinking. The number of grams of ethanol drunk per week was calculated from the quantity of each drink and the number of drinks per week, in a specific way that took into account the exact ethanol amount of each specific drink (more details on the procedure may be obtained in de Timary et al, 2012 [21])

### Statistical analyses

We conducted preliminary Pearson correlations analysis to determine the relation between self-discrepancy and associated distress. We calculated Pearson correlations between Self-discrepancy and Self-consciousness, affective dimensions, emotional regulation strategies, alcohol craving and alcohol intake during the week preceding the admission to the hospital. Moderation analyses were conducted using a classical multiple linear regression model in which we examined the interactive effects of depression and Self-discrepancy on alcohol intake during the week preceding the admission. Following Aiken and West's (1991) recommendations, all continuous predictors (namely depression and Self-discrepancy) were centered around the mean [22]. Finally, we repeated this moderation analyses after splitting the AD population according to median scores at private and public SC questionnaires as it has been realized in de Timary et al's study on self-consciousness in AD subjects [5].

## Results

### Self-discrepancy questionnaire

Actual/own vs ideal/own discrepancy was significantly and positively correlated to distress associated with this discrepancy [ $r = .69$ ,  $p < .001$ ]. Similarly, we observed a positive and significant correlation between actual/own vs ideal/other discrepancy and associated distress [ $r = .50$ ,  $p < .001$ ].

### Self-discrepancy and self-consciousness

Correlations between self-discrepancies and self-consciousness are displayed in Table 1. No significant correlations between SC and "actual/own vs ideal/own" discrepancy or "actual/own vs ideal/others" discrepancy emerged in our analyses. The subfactors of SC, Private SC and Public SC were not correlated to self-discrepancies. Only the third subfactor of SC Social Anxiety was related to distress caused by "actual/own vs ideal/others" discrepancy.

### Self-discrepancy and affective dimensions

Correlations between self-discrepancies and affect are displayed in Table 1. Self-discrepancies and associated distresses were significantly and negatively correlated to positive affect. Negative affect was positively correlated only to the distresses caused by "actual/own vs

ideal/own" and "actual/own vs ideal/others" discrepancies. Moreover, our results indicated significant positive correlations between BDI scores and both self-discrepancies as well as the distresses elicited by these discrepancies.

### Self-discrepancy and emotion regulation

Correlations between self-discrepancies and emotion regulation are displayed in Table 2. Concerning the tendency for repetitive thinking, the abstract, analytical mode of thinking was significantly positively related to the distress caused by "actual/own vs ideal/others" discrepancy.

Overall, there were only few significant correlations between Self-discrepancy and less adaptive regulation strategies measured by the CERQ. Only rumination and Self-blame were significantly and positively correlated to the distress caused by actual/own vs ideal/own discrepancy. Conversely, Self-discrepancies and associated distresses were significantly and negatively correlated to adaptive regulation strategies and especially positive refocusing, refocus on planning and positive reappraisal.

### Self-discrepancy and alcohol craving

Correlations between self-discrepancies and alcohol craving are displayed in Table 3.

First, the obsessive subscale was significantly and positively correlated to "actual/own vs ideal/others" discrepancy. There were tendencies that the obsessive subscale correlated with the distresses associated to self-discrepancies. Secondly, the compulsive subscale was positively and significantly related to distress associated to self-discrepancies.

### Self-discrepancy and alcohol intake

No significant correlations between Self-discrepancy and alcohol intake during the week preceding the admission to the hospital emerged from our analysis. We then used moderation analyses, using a linear regression analyses model in which we examined the interactive effects of self-discrepancy and subsequent distress on alcohol intake during the week preceding the admission to the hospital. As shown in Table 4, our analyses revealed that interactions between self-discrepancies and associated distresses were significant predictors of alcohol intake during the week preceding the admission to the hospital. In other words, AD patients who felt high distress related to high self-discrepancy had higher alcohol consumption the week preceding the admission to the hospital.

Finally, as it has been done in a previous study on self-consciousness in AD subjects [5], we repeated the moderation analysis after splitting the AD population according to median scores at private and public SC questionnaires. As shown in Table 5-6, results indicate that the interaction between self-discrepancies and the associated distresses was a significant predictor of alcohol intake only in the population of subjects scoring high for private or public Self-consciousness population.

## Discussion

Previous studies have shown that at least a subpopulation of AD subjects present with a specific sensitivity to self-related situations or stressors and that these situations are linked to a tendency to drinking in day to day situations or to relapsing after detoxification [3,5]. The self-awareness theory of drinking, developed by Hull [3], suggests that in AD subjects drinking is motivated by self-stressors. Hull's theory may be understood as a specific feature of a self-medication theory of

	PrSC	PuSC	SA	SC	PA	NA	BDI	Mean	SD
A/O vs I/O discrepancy	-.153	-.125	.210	-.054	-.292 <sup>†</sup>	.240	.470**	3.67	1.71
A/O vs I/O Distress	-.041	-.011	.195	.066	-.385*	.335*	.513**	3.23	1.81
A/O vs I/Oth discrepancy	-.154	-.179	.072	-.152	-.485**	.200	.515***	3.70	1.30
A/O vs I/Oth Distress	-.245	-.136	.345*	-.046	-.403**	.409**	.600***	3.49	1.68
Mean	16.24	14.98	6.71	37.93	32.80	17.43	8.00		
SD	4.59	4.44	3.92	8.01	8.68	5.63	6.08		

Abbreviations: PrSC = Private Self-Consciousness; PuSC = Public Self-Consciousness; SA = Social Anxiety, SC = Self-Consciousness, PA= Positive Affect scale, NA = Negative Affect scale, BDI = Beck Depression Inventory.

Values in the tables represent the Pearson-moment correlation coefficient (r).

<sup>†</sup> .05< p <.10, \*p<.05, \*\*p<.01, \*\*\*p<.001.

**Table 1:** Correlations between Self-discrepancy factors and Self-consciousness subfactors, Positive and Negative Affect or Depression

	A/O vs I/O discrepancy	A/O vs I/O Distress	A/O vs I/Oth discrepancy	A/O vs I/Oth Distress	Mean	SD
AAT	.303 <sup>†</sup>	.270 <sup>†</sup>	.122	.374*	3.70	1.30
CET	-.079	-.073	-.263 <sup>†</sup>	-.248	3.49	1.68
Less adaptive strategies	.156	.218	-.054	.236	39.73	8.69
Self-blame	.174	.308*	.078	.191	10.82	3.22
Rumination	.025	.259*	-.164	.155	12.57	3.38
Catastrophizing	.225	.119	.013	.195	8.63	3.40
Blaming others	-.014	-.124	-.074	.092	7.70	2.86
Adaptive strategies	-.351*	-.433**	-.181	-.545***	60.23	15.15
Acceptance	-.190	-.287 <sup>†</sup>	-.128	-.380*	12.55	3.32
Positive refocusing	-.362*	-.484**	-.137	-.354*	9.31	4.20
Refocus on planning	-.378*	-.365*	-.326*	-.564***	13.14	4.20
Positive reappraisal	-.289 <sup>†</sup>	-.359*	-.268 <sup>†</sup>	-.604***	12.30	3.50
Putting into perspective	-.174	-.236	.155	-.310*	12.93	3.44
Mean	3.67	3.23	3.70	3.49		
SD	1.71	1.81	1.30	1.68		

Abbreviations: AAT = abstract, analytical thinking, CET = concrete, experiential thinking, A/O vs I/O discrepancy = actual/own vs ideal/own<sup>†</sup> discrepancy, A/O vs I/O Distress = Distress caused by actual/own vs ideal/own<sup>†</sup> discrepancy, A/O vs I/Oth discrepancy = "actual/own vs ideal/others" discrepancy, A/O vs I/Oth Distress = Distress caused by "actual/own vs ideal/others" discrepancy

Values in the tables represent the Pearson-moment correlation coefficient (r).

<sup>†</sup> .05<p<.10, \*p<.05, \*\*p<.01, \*\*\*p<.001.

**Table 2:** Correlations between Self-discrepancy and constructive-unconstructive repetitive thinking (Mini-CERTS) or adaptive and less adaptive cognitive regulation strategies (CERQ).

	Obsessive (N = 44)	Compulsive (N=19)	Mean	SD
A/O vs I/O discrepancy	.244	.364	3.67	1.71
A/O vs I/O Distress	.267 <sup>†</sup>	.472*	3.23	1.81
A/O vs I/Oth discrepancy	.352*	.373	3.70	1.30
A/O vs I/Oth Distress	.285 <sup>†</sup>	.477*	3.49	1.68
Mean	6.80	3.74		
SD	4.33	3.78		

**Table 3:** Correlations between Self-discrepancy and Compulsive-Obsessive subscales.

Abbreviations: A/O vs I/O discrepancy = "actual/own vs ideal/own" discrepancy, A/O vs I/Oth discrepancy = "actual/own vs ideal/others" discrepancy.

<sup>†</sup> .05< p <.10, \*p<.05.

drinking developed by by Khantzian (1997) [23], in which drinking serves as a form of medication that is abused by AD subjects to escape negative affects and depression. The specificity of Hull's theory is to propose that, as depression is frequently related to disordered self-referential thoughts (i.e. ruminations) [24], alcohol intake specifically serves as a mean to decrease self-awareness, to escape these specific self-related stressors. Later, Hull and colleagues [2] and our group [3] published data that supported this notion, by showing respectively that self-stressors could lead to relapse after detoxification or that self-consciousness was an important moderator of the relation between

depression and alcohol craving. However, these two studies showed that these processes were happening only in a subpopulation of AD subjects characterized by high self-consciousness, i.e. a marked tendency to pay attention to the self or to the way the self is perceived by others. These studies, however, failed to provide explanations on the processes that underlie this self-sensitivity of AD subjects. We took advantage of the recent development by two of our co-authors of a self-discrepancy questionnaire to deepen our understanding of the processes involved. Self-discrepancy [6] is indeed a notion that is central to understand self-related difficulties and that remains unexplored in AD subjects. The Self-discrepancy questionnaire [10] was used to evaluate actual/own vs ideal/own discrepancies and actual/own vs ideal/other discrepancies as well as the distresses that are associated to these discrepancies.

The first aim of this study was to examine the relations between Self-discrepancy and Self-consciousness questionnaires [16]. We failed to observe any relation between Self-discrepancy and the private and public dimensions of self-consciousness, suggesting that the attention paid to the private or public self is unrelated to the importance of self-discrepancies or to the distresses that are elicited by these discrepancies. This reinforces the notion that these dimensions of self-consciousness can be seen as a personality trait, independent of emotional circumstances in this population. Conversely, we observed

	B	t	R <sup>2</sup>	F	Df
Int. A/O vs I/O discrepancy and subsequent distress	.31	2.03	.09	4.14*	1,40
Int. A/O vs I/Oth discrepancy and subsequent distress	.40	2.75*	.16	7.58**	1,40

Abbreviations: A/O vs I/O discrepancy = "actual/own vs ideal/own" discrepancy, A/O vs I/Oth discrepancy = "actual/own vs ideal/others" discrepancy. \*p<.05, \*\*p<.01.

**Table 4:** Regression analysis predicting alcohol intake during the week preceding the admission to the hospital from interaction between Self-discrepancies and subsequent distresses.

		B	t	R <sup>2</sup>	F	df
Int. A/O vs I/O discrepancy and subsequent distress	Low PrSC	.15	.68	.02	.46	1,20
	High PrSC	.43	1.98†	.19	3.91†	1,17
Int. A/O vs I/Oth discrepancy and subsequent distress	Low PrSC	.03	.11	.00	.01	1,20
	High PrSC	.66	3.66**	.44	13.37**	1,17

Abbreviations: A/O vs I/O discrepancy = "actual/own vs ideal/own" discrepancy, A/O vs I/Oth discrepancy = "actual/own vs ideal/others" discrepancy. †.05<p<.10, \*p<.05, \*\*p<.01.

**Table 5:** Regression analysis predicting alcohol intake during the week preceding the admission to the hospital from interaction between Self-discrepancies and subsequent distresses after splitting population on Private Self-consciousness.

		B	t	R <sup>2</sup>	F	df
Int. A/O vs I/O discrepancy and subsequent distress	Low PuSC	.02	.09	.00	.01	1,19
	High PuSC	.47	2.25*	.22	5.07*	1,18
Int. A/O vs I/Oth discrepancy and subsequent distress	Low PuSC	-.02	-.08	.00	.01	1,19
	High PuSC	.66	3.70**	.43	13.67**	1,18

Abbreviations: A/O vs I/O discrepancy = "actual/own vs ideal/own" discrepancy, A/O vs I/Oth discrepancy = "actual/own vs ideal/others" discrepancy. \*p<.05, \*\*p<.01.

**Table 6:** Regression analysis predicting alcohol intake during the week preceding the admission to the hospital from interaction between Self-discrepancies and subsequent distresses after splitting population on Public Self-consciousness.

a positive correlation between scores of social anxiety and the distress elicited by actual/own vs ideal/other discrepancies, which support that social anxiety is an expression of the distress elicited by the gap that may exist between the expectations of the others and the reality of the actual self. Altogether, self-discrepancy is clearly a construct distinct from self-consciousness, supporting the interest of investigating self-discrepancy in AD population.

The second aim of the study was to investigate the relation between self-discrepancies and the associated distress and affect, emotion regulation and alcohol craving. Results showed that AD patients' self-discrepancies and associated distress were negatively associated with positive affect at the PANAS and strongly positively correlated to scores of depression. Negative affects were only correlated to the distress associated to self-discrepancies. These results are in line with Higgins and Baumeister's hypotheses suggesting that Self-discrepancies may lead to discomfort [6,9] and even emotional distress [7]. These self-referential processes likely participate to the depression frequently observed in the AD population [25,26]. Concerning the relation of self-discrepancies and distress to repetitive thinking, we observed a positive relation between the distress elicited by actual/own and ideal/other discrepancies and the abstract and analytical unconstructive mode of thinking. This specific mode of rumination may lead to emphasize negative aspects and feelings of negative events [14,27], and may play a role in the development of negative affects and depression. The self-discrepancies and distress were also negatively correlated to adaptive emotion regulation strategies. The distress

elicited by the actual/own vs ideal/own discrepancy, was also positively and not surprisingly correlated to self-blame and rumination, two non-adaptive emotion regulation strategies. Finally, the distresses elicited by self-discrepancies were associated with the compulsive dimension of craving, suggesting that these self-related negative affects play a role in the drive for consumption [28]. Moreover, distress associated to self-discrepancies predicted to higher levels of alcohol-consumption during the week preceding the admission to the hospital. Negative affect associated to self-discrepancy seem to be related to abstract and analytical thinking, an unconstructive form of rumination that may emphasize negative aspects, feelings of negative events [14,27] as well as to less adaptive emotion regulation strategies. In other words, AD patients could be locked into a vicious circle, which maintains negative affect. Eventually, this unpleasant awareness of self-discrepancies leads to alcohol craving, and to even more alcohol intake as suggested by Baumeister [7].

Finally, when distinguishing AD subjects between high versus low in private and public self-consciousness, it appears that the interactions between self-discrepancies and associated distresses predicted alcohol intake preceding the admission to the hospital only in high self-conscious subjects. Hence the level of attention paid by patients to the private or public self remains an important moderator of the relation between the stress induced by self-discrepancies and the quantity of drinking, supporting Hull's hypothesis of a self-related theory of drinking, where the function of drinking is to reduce temporarily self-awareness, in order to decrease the effects of self-stressors [1]. Our data also clearly shows the existence of two subpopulations of drinkers with different levels of self-consciousness and distinct sensitivity to self-relevant elements that will induce specific drinking behaviors, as previous studies had suggested [2,3]. A first subpopulation may consist of AD patients with high private or public self-consciousness who are more sensitive to self-discrepancy and associated distress. In a second AD subpopulation where the level of self-consciousness is low, subjects may consume with different motivations than unpleasant self-related elements (e.g., self-discrepancy), such as consumption habits or positive reinforcement processes. They seem somehow disconnected from their Self, which may explain this insensitivity to Self-related elements.

## Conclusion and Clinical Perspectives

Altogether, this study supports the hypothesis of a sensitivity of self-related elements in AD population as previously suggested [3,5]. Self-discrepancies are related to negative affect and to depressive symptoms in AD population. Furthermore, high Self-discrepancies and associated distresses were related to less adaptive emotion regulation strategies. Finally, distress associated to self-discrepancies predicted alcohol intake during the week preceding the admission to the hospital in subjects with high self-consciousness. This suggests that two AD subpopulations could be distinguished with differences of sensitivity to Self-related elements. Clinicians exposed to this type of population should be aware of this hypothesis of difference of self-sensitivity. The therapeutic process could be different according the AD subpopulation. In the first subpopulation with sensitivity to self-discrepancy, therapists could identify patients' personal values and help to establish action in line with these values. Moreover, increasing self-acceptance (e.g., mindfulness [29,30]) is important to reduce distress caused by self-discrepancy. In the second subpopulation, it could be interesting to increase AD patients' awareness of self-related elements to (re)connect to their Self during therapeutic process (e.g., psychoeducation, etc.), while promoting acceptance of self-discrepancies.

## Acknowledgment

We thank all patients of the Unité Intégrée d'Hépatologie of Saint-Luc Hospital who participated in this study.

## References

1. Maurage P, Joassin F, Philippot P, Heeren A, Vermeulen N, et al. (2012) Disrupted regulation of social exclusion in alcohol-dependence: an fMRI study. *Neuropsychopharmacology* 37: 2067-2075.
2. Zywiak WH, Longabaugh R, Wirtz PW (2002) Decomposing the relationships between pretreatment social network characteristics and alcohol treatment outcome. *J Stud Alcohol* 63: 114-121.
3. Hull JG (1981) A self-awareness model of the causes and effects of alcohol consumption. *J Abnorm Psychol* 90: 586-600.
4. Hull JG, Young RD, Jouriles E (1986) Applications of the self-awareness model of alcohol consumption: predicting patterns of use and abuse. *J Pers Soc Psychol* 51: 790-796.
5. De Timary P, Cordovil de Sousa Uva M, Denoël C, Hebborn L, Derely M, et al. (2013) The Associations between Self-Consciousness, Depressive State and Craving to Drink among Alcohol Dependent Patients Undergoing Protracted Withdrawal. *PLoS ONE* 8: e71560.
6. Higgins ET (1987) Self-discrepancy: a theory relating self and affect. *Psychol Rev* 94: 319-340.
7. Baumeister RF, Zell AL, Tice DM (2007) How Emotions Facilitate and Impair Self-Regulation. *Handbook of Emotion Regulation, First Edition*. Guilford Press 408-426.
8. Key DE, Mannella M, Thomas AM, Gilroy FD (2000) An Evaluation of Higgins's Self-Discrepancy Theory and an Instrument to Test Its Postulates. *J Soc Behav Personal* 15: 303.
9. Strauman TJ, Higgins ET (1987) Automatic activation of self-discrepancies and emotional syndromes: when cognitive structures influence affect. *J Pers Soc Psychol* 53: 1004-1014.
10. Philippot P, Dethier V, Baeyens C, Bouvard M ( ) Validation of Self-Discrepancy Questionnaire among French-Speaking community sample. In preparation.
11. Maurage P, de Timary P, Moulds ML, Wong QJ, Collignon M, et al. (2013) Maladaptive social self-beliefs in alcohol-dependence: a specific bias towards excessive high standards. *PLoS One* 8: e58928.
12. Bestgen AK, Schulze P, Kuchinke L (2015) Odor Emotional Quality Predicts Odor Identification. *Chem Senses* 40: 517-523.
13. Beck A, Steer R, Brown J (1996) *Manual for the Beck Depression Inventory- II*. San Antonio, TX.
14. Douilliez C (2014) Validation of the French version of a questionnaire that evaluates constructive and non-constructive repetitive thoughts. *Can J Behav Sci* 46:185-192.
15. Jermann F, Van der Linden M, Acremont M, Zermatten A (2006) Cognitive Emotion Regulation Questionnaire (CERQ). *Eur J Psychol Assess* 22: 126-131.
16. Fenigstein A, Scheier MF, Buss AH (1975) Public and private self-consciousness: Assessment and theory. *J Consult Clin Psychol* 43: 522.
17. Gaudreau P, Sanchez X, Blondin J-P (2006) Positive and Negative Affective States in a Performance-Related Setting: Testing the Factorial Structure of the PANAS across Two Samples of French-Canadian Participants. *Eur J Psychol Assess* 22: 240.
18. Anton RF, Moak DH, Latham P (1995) The Obsessive Compulsive Drinking Scale: a self-rated instrument for the quantification of thoughts about alcohol and drinking behavior. *Alcohol Clin Exp Res* 19: 92-99.
19. Anton RF, Moak DH, Latham PK (1996) The obsessive compulsive drinking scale: A new method of assessing outcome in alcoholism treatment studies. *Arch Gen Psychiatry* 53: 225-231.
20. Maisto SA, Sobell LC, Cooper AM, Sobell MB (1982) Comparison of two techniques to obtain retrospective reports of drinking behavior from alcohol abusers. *Addict Behav* 7: 33-38.
21. de Timary P, Cani PD, Duchemin J, Neyrinck AM, Gihousse D, et al. (2012) The loss of metabolic control on alcohol drinking in heavy drinking alcohol-dependent subjects. *PLoS One* 7: e38682.
22. Aiken L, West S (1991) *Multiple Regression: Testing and Interpreting Interactions*. Milton Keynes: SAGE Publications, Inc 224.
23. Khantzian EJ (1997) The self-medication hypothesis of substance use disorders: a reconsideration and recent applications. *Harv Rev Psychiatry* 4: 231-244.
24. Sheline YI, Barch DM, Price JL, Rundle MM, Vaishnavi SN, et al. (2009) The default mode network and self-referential processes in depression. *Proc Natl Acad Sci U S A* 106: 1942-1947.
25. Schuckit MA (1994) Alcohol and depression: a clinical perspective. *Acta Psychiatr Scand Suppl* 377: 28-32.
26. Cordovil De Sousa Uva M, Luminet O, Cortesi M, Constant E, Derely M, et al. (2010) Distinct Effects of Protracted Withdrawal on Affect, Craving, Selective Attention and Executive Functions among Alcohol-Dependent Patients. *Alcohol* 45: 241-246.
27. Moberly NJ, Watkins ER (2008) Ruminative self-focus, negative life events, and negative affect. *Behav Res Ther* 46: 1034-1039.
28. Baker TB, Piper ME, McCarthy DE, Majeskie MR, Fiore MC (2004) Addiction motivation reformulated: an affective processing model of negative reinforcement. *Psychol Rev* 111: 33-51.
29. Bowen S, Chawla N, Collins SE, Witkiewitz K, Hsu S, et al. (2009) Mindfulness-based relapse prevention for substance use disorders: a pilot efficacy trial. *Subst Abuse* 30: 295-305.
30. Longmore RJ, Worrell M (2007) Do we need to challenge thoughts in cognitive behavior therapy? *Clin Psychol Rev* 27: 173-187.