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# French validation of the Alcohol Urge Questionnaire: Psychometric properties and relationships with alcohol dependence and drinking behaviour

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**Running title:** French Validation of Alcohol Urge Questionnaire

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**Keyword:** Craving; Alcohol dependence; Questionnaire; validation; French.

## **Abstract**

### **Introduction**

The main objective is to validate a French translation of the Alcohol Urge Questionnaire (AUQ) that measures craving in patients with alcohol dependence (AD) entering a detoxification program.

### **Methods**

All patients aged >18 years who were hospitalized for alcohol detoxification from February to May 2019 in the alcohol unit of the Rennes university hospital were eligible. A back-translated version of the AUQ was completed at admission. Patients were then interviewed at the end of the 7-day detoxification program by a trained resident (MS), using tablet computed-based questionnaires assessing state craving (visual analog scale, VAS), AD severity, drinking behaviour, psychological distress and physical/mental health. The same investigator assessed relapse one month after discharge.

### **Results**

A total of 80 inpatients were recruited and completed questionnaires. The single factor structure of the French version of the AUQ was similar to the original questionnaire, and supported by strong internal reliability and item-scale validity. The AUQ score correlated highly with acute craving measure, but moderately with scales assessing the severity of AD, drinking behaviour and mental health. Relapse one month after discharge was significantly related to AUQ score assessed either at baseline, or at the end of the 7-day detoxification period.

### **Conclusion**

As the original questionnaire, the French version of the AUQ provides a reliable measure of state craving, which is best described as a context-dependant single-factor variable, related to but distinct from dependence severity and drinking behaviour. The ease of administration makes the AUQ a useful tool for French-speaking patients with AD.

## **Short summary**

We examined the psychometric properties of the French version of the Alcohol Urges Questionnaire in 80 patients entering a detoxification program in the Rennes University Hospital. This questionnaire provides a reliable measure of state craving, a context-dependant single-factor variable related to but distinct from dependence severity and drinking behaviour.

## Introduction

Many patients with alcohol dependence report persistent urges to drink or craving. This is a key element of the alcohol syndrome dependence (de Bruijn et al., 2004), and could play a role in relapse after a period of abstinence (Sliedrecht et al., 2019). Various factors could play a role in the determination of individual differences in the development and the modulation of craving: negative emotions, personality, stress, environmental cues, cognition and genetic factors (Papachristou et al., 2013; Snelleman et al., 2018; Stormark et al., 1995). Craving can vary and can be described as a combination of contextual and intra individual's factors including alcohol cues, the availability of the product, the patient's age, and the environment.

Single-item scales such as 5-point scale and Visual Analog Scale (VAS) provide a direct and time-effective approach to quantify the intensity of craving in patients. However, they are limited in their ability to provide information about the multiple elements that can define the craving experience (Sayette et al., 2000; Tiffany et al., 2000), and researchers cannot determine the internal consistency of the instrument used. Because of these limitations, these tools should be replaced with multi-item instruments with desirable psychometric properties. Bohn et al. provided the Alcohol Urge Questionnaire (AUQ), an 8-item questionnaire providing an index of acute craving. An initial validation showed that it comprised a single factor accounting for 38% of variance, and provided evidence of high internal consistency, construct and convergent validity (Bohn et al., 1995b). Drummond et al. (2002) confirmed the structure as a single-factor accounting for 69% of variance, and provided further evidence for its validity. Another study further validated the use of the AUQ for real-time measurement of alcohol craving in human laboratory research (MacKillop, 2006). While multiple statistical validations of the AUQ were undertaken, they were mostly limited to some English-speaking countries. The main objective of the present study is to validate a French translation of the Alcohol Urge Questionnaire (AUQ) that measures craving in patients with alcohol dependence entering a detoxification program.

## Methods

### Participants

The study protocol was approved by the local research ethics committee, and informed consent was obtained from all participants. All patients aged >18 years who were hospitalized for alcohol detoxification from February to May 2019 in the alcohol unit of the university hospital were eligible for inclusion in the study. The exclusion criteria were severe cognitive impairment, and refusal. Patients were referred to the detoxification program by their primary care practitioners or by outpatient addiction treatment facilities. Inpatient detoxification was indicated in case of severe alcohol withdrawal symptoms, including history of seizures or delirium, or more often in case of failure in community based alcohol withdrawal. Detoxification lasted one to two weeks and consisted of treatment of alcohol withdrawal symptoms using personalized treatment with diazepam, careful multidimensional evaluation of the patient, psychosocial support, care of other addictions and alcohol related diseases and the establishment of a treatment plan for aftercare.

### Procedure and baseline assessment

A trained addiction specialist (MS), using tablet computed-based questionnaires, interviewed patients at the arrival of the patient in hospital (baseline) and at the end of the 7-day detoxification period. The same investigator called each participant one month after discharge to assess relapse in drinking. The following data were collected: age, gender, marital status (living alone or with a partner), diploma (no high school degree, high school degree/further education), employment (active, inactive), tobacco use (yes/no), history of detoxification program (yes/no), number of days since the last drink (<7 days;  $\geq 7$  days), and medical treatment for craving (yes/no).

## Measures

The AUQ is an eight-item self-report questionnaire assessing drinking urges (Bohn et al., 1995b). Questions are in the form of a 7 points Likert scale and participants endorse the extent to which they agree or disagree with statements relating to desire to drink, expectation of a desired outcome from drinking, and inability to avoid drinking if alcohol was available. Two items in the eight-item version of the AUQ are reverse-scored (items #2 and #7). The AUQ was translated in French using the back translation approach: a first translator translated the questionnaire from English to French, followed by questionnaire translation from French to English. The two versions were compared during a meeting with clinical investigators (RM, MA, MV, FN). This draft of the AUQ in French was pilot-tested on 15 inpatients in order to ensure of the comprehension of the different items. Some patients expressed comprehension problems with the negatively worded questions (items #2 and #7), excluding its use as a self-report questionnaire without assistance. Patients were also asked to rate the intensity of their craving on a 10-cm Visual Analogic Scale (VAS) by indicating a vertical mark along a line that connects the two anchor statements. The distance in centimeters between the “no-craving” end of the line and the patient’s mark provides an index of craving, from 0 (no craving) to 10 (extreme craving). The AUQ was completed at the arrival of the patient in hospital (baseline) and after the 7-day detoxification period.

The Alcohol Use Disorders Identification Test (AUDIT) is a 10-item screening tool developed by the World Health Organization (WHO) to assess alcohol consumption, drinking behaviors, and alcohol-related problems (Bohn et al., 1995a). It also provides a framework for intervention to help risky drinkers reduce or cease alcohol consumption. A score  $\geq 8$  is considered to indicate possible hazardous or harmful alcohol use. A score  $\geq 13$  indicates

possible dependence. The AUDIT has been validated across genders and in a wide range of racial/ethnic groups and language, including French (Gache et al., 2005) and is well suited for use in primary care settings.

The Alcohol Dependence Scale (ADS) is a 25-item multiple-choice questionnaire, yielding a score from 0 to 40 assessing symptoms of alcohol-dependence. It provides a quantitative measure of the severity of alcohol dependence consistent with the concept of the alcohol dependence syndrome (Skinner and Horn, 1984). The 25 items cover alcohol withdrawal symptoms, impaired control over drinking, awareness of a compulsion to drink, increased tolerance to alcohol, and salience of drink-seeking behavior. A score  $\geq 9$  is highly predictive of DSM diagnosis of alcohol dependence.

The Obsessive and Compulsive Drinking Scale (OCDS) (Ansseau et al., 2000; Connor et al., 2010), is a 14-item self-report instrument with a 5-point response scale (0 to 4) that quantifies both obsessions and compulsions related to drinking. Higher scores indicate more obsessive thoughts or compulsive behaviors regarding alcohol use. After initial validation of the OCDS, it was found to have a good concurrent validity.

Psychological distress was assessed using the French version of the *Hospital Anxiety and Depression Scale* (Zigmond and Snaith, 1983), which is widely used to measure psychological morbidity in patients with a variety of medical and psychological conditions. The scale consists of 14 items, of which 7 assess anxiety symptoms (HADS-A) and 7 assess depression symptoms (HADS-D). Each item is graded 0 (not present) to 3 (maximum), and total scores range from 0 (no symptoms) to 21 (high symptoms).

Physical and psychological functioning was assessed with the French version of the Medical Outcome Study Short Form 36 (Perneger et al., 1995), a multipurpose, 36-item survey that



measures and scores eight domains of health-related quality of life: physical functioning, role limitations due to physical health, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional problems, and mental health. A lower score indicates a poorer health-related quality of life. These eight scales can be aggregated into two summary measures: The Physical (PCS) and Mental (MCS) Health Component Summary scores (Jenkinson, 1998).

### Statistical analysis

Categorical data were expressed as numbers (N) and percentages (%), while numerical data were expressed as means  $\pm$  standard deviations. Factors were estimated using an Unweighted Least-Square factorial analysis, followed by a Promax rotation, a non-orthogonal (oblique) solution in which the factors are allowed to be correlated. This method was found to provide accurate and conservative parameter estimates when using ordinal data (Lee et al., 2012). This item reduction method established which of the 8 items belonged to domains or conceptual areas and which items should be maintained. Items are deleted if they loaded on two or more factors, or if they exhibited a correlation coefficient of less than 0.40 with their own factor. Internal consistency reliability was assessed by computing Cronbach's alpha coefficient (considered satisfactory if higher than or equal to 0.70). Correlations were computed with the non-parametric Spearman's correlation test. Test-retest reliability was assessed by computing intra-class correlation between AUQ scores at baseline and at the end of the 7-day hospital stay, while construct validity was investigated by comparing these scores using a repeated measure Analysis of Variance (ANOVA). Item-scale validity was assessed by computing correlations between each item and the total score of the factor to which it belongs after having being removed from it (considered satisfactory if item-scale correlation achieved a value higher than or equal to 0.40). Convergent validity was examined by analyzing the correlation between the AUQ scores and the Visual Analog Scale score (VAS). Divergent

validity was examined by analyzing the correlation between the AUQ scores and the previously cited questionnaires assessing different conceptual domains. When it comes to predictive validity, a logistic regression model was used to estimate the odd ratio (OR) of “drinking relapse one month after discharge” as a function of AUQ score at baseline and after the 7-day detoxification period. Estimates were expressed as OR with 95% confidence intervals (OR [95% CI]). Statistical analyses were performed using the SPSS statistical package, version 19 (SPSS, Chicago, Illinois, United States).

## Results

During the inclusion period, 95 patients were hospitalized for an alcohol detoxification or rehabilitation. Among them, 4 patients refused to participate, 2 had cognitive impairment, and 9 were under major legal protection. A total of 80 patients were therefore recruited and completed questionnaires with no missing data.

Unweighted Least-Square exploratory factorial analysis was performed on the 8 items of the AUQ. Eigen values for the first two factors were 5.18 and 0.93, suggesting a single-factor solution explaining 64.8% of the common variance of the data (Table 1). This single factor exceeded the minimum standard of 0.70 for internal consistency as assessed by the Cronbach alpha coefficient ( $\alpha = 0.918$ ) and comprised all the 8 items related to alcohol urge, with loadings above 0.40. They were accordingly grouped into an 8-item scale, and a summary score was computed. The AUQ mean score at baseline was  $18.6 \pm 12.3$  on a scale ranging from 8 to 56, and decreased significantly after the 7-day detoxification program (mean score:  $12.2 \pm 7.5$ ;  $p < 0.001$ ). Intra-class correlations showed satisfactory relationships between the two assessments ( $r = 0.731$ ;  $p < 0.001$ ) performed at a 7-day interval. Item-scale validity was elevated, ( $r > 0.680$ ) for each of the 8 items.

More than 3 in 4 participants were men (76.3%), aged 49.8 years on average (Table 2). Most of them lived alone (71.3%), were professionally active (66.3%) and were regular smokers (83.7%), but only a minority had a high school degree or further education (33.7%). A significant proportion had a history of detoxification program (83.75%), but nearly 4 in 10 patients were sober for more than a week at inclusion, and half of them had a treatment to reduce craving. Craving was lower in patients with high school degree/further education and in those with a professional activity as compared to others.

When it comes to psychological variables, patients reported ADS and AUDIT scores above

the cut-off values, indicating severe alcohol use disorder, and SF-36 Mental and Physical Summary scores less than the standardised mean score of 50. However, patients also reported low scores of anxiety (mean score:  $10.7 \pm 5.0$ ), depressive symptoms (mean score:  $7.6 \pm 4.0$ ) and craving (mean score:  $1.95 \pm 2.1$  on a 10 cm VAS scale).

For convergent validity (Table 3), the AUQ score correlated strongly with the VAS ( $r=0.59$ ;  $p<0.001$ ); moderately with the AUDIT ( $r=0.30$ ;  $p=0.008$ ), the OCDS obsessions sub-scale ( $r=0.29$ ;  $p=0.008$ ), and the ADS ( $r=0.26$ ;  $p=0.017$ ). It correlated negatively with the SF-36 mental summary score ( $r=-0.25$ ;  $p=0.030$ ) and the HADS anxiety sub-scale ( $r=0.30$ ;  $p=0.007$ ), but no association was found with the SF-36 physical health summary score, or to the HADS depression sub-scale. One month after discharge, 6 patients were lost to follow-up. Of the 74 remaining participants, 39 (52.7%) reported relapse at least once. The likelihood of relapse one month after discharge was significantly associated with a one-point increase in the AUQ score, either at baseline (OR=1.07 [1.02 – 1.13];  $p=0.010$ ) or after the 7-day detoxification period (OR=1.18 [1.05 – 1.33];  $p=0.006$ ).

## Discussion

The factor structure of the French version of the AUQ was similar to the original questionnaire, albeit accounting for more variance (Bohn et al., 1995a), and was supported by strong internal reliability and item-scale validity. The AUQ score was sensitive to change and correlated highly with a VAS assessing acute craving, but moderately with scales assessing the severity of alcohol dependence, drinking behaviour and psychological distress. Relapse one month after discharge was significantly related to AUQ score assessed either at baseline, or with a better estimate, at the end of the 7-day detoxification period.

Our participants were representative of patients hospitalized for alcohol issues, whose characteristics have been investigated (Constant et al., 2015; Constant et al., 2017; Constant et al., 2019). They reported mental and physical functioning below average, since alcohol dependence includes the impairment of functional status, activity limitations, and restrictions in social interactions (Levola et al., 2014; Vancampfort et al., 2015). And more than half of them relapsed one month after discharge (Constant et al., 2015). But overall, they reported low levels of alcohol urges and psychological distress, although these symptoms tend to be more prevalent in people with alcohol dependence (Constant et al., 2015), and 4 in 10 were sober for more than a week before admission to the 7-day detoxification program. This probably reflects the particular situation of patients in detoxification programs, where mental health and withdrawal symptoms are carefully monitored and managed (Constant et al., 2019; Giorgi et al., 2015; Sander and Jux, 2006). Baseline assessments were indeed conducted at the beginning of the 7-day hospital stay precluding patients' exposure to drinking cues, stressful events and negative emotions. This situation may have reduced their desire for alcohol (Fatseas et al., 2015; Mason et al., 2008; Snelleman et al., 2018), and may also explain the absence of strong relationships between state measures of alcohol urges and global measures

of alcohol dependence severity, in contradiction with previous studies (Pombo et al., 2016; Sinha et al., 2009). During the interviews, some patients explained that they felt “safer” in the hospital than in their usual living environment.

In addition, it must be noted that the ADS and the AUDIT were both designed to assess the severity of alcohol dependence, but actually encompass different underlying psychological and behavioral dimensions. Instead of the original single factor, further analyses on the ADS supported a three-factor solution representing loss of behavioural control and heavy drinking, obsessive-compulsive drinking style, and psycho-perceptual and psychophysical withdrawal (Doyle and Donovan, 2009). The assumption that alcohol-related behaviours directly result from craving has been challenged on both theoretical and empirical grounds (Tiffany, 1990). Therefore, an index of acute craving as provided by the AUQ could be more related to the “obsessive-compulsive drinking style” than to others dimensions of the ADS. Moreover, the correlations found in the present study between the AUQ and the OCDS subscales tend to confirm this relationship with obsessive thoughts (i.e. obsessions), but not with their responses (i.e. compulsions). When it comes to the factor structure of the AUDIT, research supported a correlated, two-factor solution representing alcohol consumption and alcohol-related consequences (Doyle et al., 2007; Rist et al., 2009; Shevlin and Smith, 2007), which seems to correlate moderately with the AUQ score. This confirms that acute craving and general alcohol use behavior are related but distinct dimensions (Drobes and Thomas, 1999). More generally, our findings suggest that state measures assessing alcohol urges when the questionnaire is completed are context-dependent, and may be less useful for assessing the relationship between craving and general alcohol use, the latter being generally investigated by tools assessing alcohol-related behaviours over the last 12-month period (Drobes and Thomas, 1999). Conversely, the AUQ score was highly correlated to the Visual Analog Scale, probably because both instruments assess the same single-factor variable with the same time frame of assessment (Drobes and Thomas, 1999). However, the AUQ could be more sensitive

to subtle change than the VAS. For instance, the AUQ has been shown to successfully detect change in craving during alcohol cue exposure in relation with candidate anti craving drugs (George et al., 2008)

Estimate of test-retest reliability indicate a satisfactory stability of responses over time, even if alcohol urges significantly declined during the 7-day detoxification period, as expected. The French version of the AUQ may therefore detect the influence of a given treatment on craving, and may be useful as a surrogate marker for evaluating new drugs or therapies in early studies such as phase 2 trials. Finally, analyses showed a significant relationship between the AUQ score and relapse one month after discharge, with better estimate when using the assessment at the end of the 7-day detoxification period rather than the one at baseline. Regular monitoring of craving throughout treatment may aid clinicians in decisions since patients who continue to experience high levels of craving, despite specialized healthcare, may require continued support (Drobes and Thomas, 1999), such as rehabilitation or day hospital programs.

There are several limitations to this study. First, it was a single-center study conducted in the addiction department of the university hospital. The sample has the advantage of being a pre-treatment population, but nearly 4 in 10 patients were already detoxified at admission, and probably anticipated the absence of drinking cues and negative events that may induce craving. Second, highly intoxicated patients were excluded from the study, because of their inability to understand the study objectives and provide an informed consent. Finally, the relatively small size of the sample results in a lack of power when exploring small correlations.

## **Conclusion**

Overall, the French version of the AUQ provides a reliable measure of craving, best described as a context-dependant single-factor variable, related to but distinct from dependence severity.

The ease of administration makes the AUQ a useful tool for French-speaking patients with alcohol dependence.



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Table 1 : Factor matrix : Items and factor loadings for the single-factor solution for the AUQ

Items from the French back translation ( <i>Items from the original questionnaire</i> )	Loadings
1 : Je n'ai qu'une envie tout de suite : c'est boire ( <i>all I want to do now is have a drink</i> )	0.806
2 : Je n'ai pas besoin de boire pour le moment ( <i>I do not need to have a drink right now</i> )*	0.804
3 : Là, tout de suite, j'aurais du mal à refuser un verre. ( <i>It would be difficult to turn down a drink this minute</i> )	0.713
4 ; Si je pouvais boire maintenant, ça serait parfait. ( <i>Having a drink right now would make thing perfect</i> )	0.803
5 : J'ai tellement envie d'un verre que j'en ai le goût dans la bouche. ( <i>I want a drink so bad I can almost taste it</i> )	0.737
6 : Rien ne serait mieux que de boire à cet instant ( <i>Nothing would be better than a drink right now</i> )	0.798
7 : Je ne pense pas que je boirais si j'en avais l'occasion tout de suite ( <i>If I had the chance to have a drink, I don't think I would drink it</i> )*	0.698
8 : J'ai vraiment envie de boire tout de suite ( <i>I crave a drink right now</i> )	0.819

Note : \* :reversed scoring

Table 2: AUQ mean score (standard deviation) according to participants demographics (n=80)

Variables	N (%)	AUQ mean score (SD)	p-value
All patients	80 (100)	18.6 (12.3)	
Sex			NS
Male	61 (76.8)	18.4 (12.3)	
Female	19 (13.3)	19.0 (12.6)	
Marital Status			NS
Living alone	57 (71.3)	19.5 (13.3)	
Living with a stable partner	23 (28.7)	16.2 (9.1)	
Education Level			<0.001
No high school degree	53 (66.3)	22.2 (13.3)	
High school degree /further education	27 (33.7)	11.4 (4.7)	
Occupational Status			<0.02
Active	53 (66.3)	16.1 (9.5)	
Unemployed/Retired	27 (33.7)	23.4 (15.4)	
Tobacco use			<0.06
Yes	67 (83.7)	19.7 (12.9)	
No	13 (16.3)	12.5 (5.3)	
History of detoxification program			NS
Yes	69 (86.3)	19.1 (12.8)	
No	11 (13.7)	15.2 (7.9)	
Number days since the last drink			<0.10
<7 days	50 (62.5)	19.8 (12.6)	
≥ 7 days	30 (37.5)	14.3 (10.3)	
Previous treatment for Craving			NS
Yes	43 (53.8)	20.0 (13.3)	
No	37 (46.2)	16.9 (10.8)	

Note : NS = non-significant. SD= standard deviation. AUQ: Alcohol Urges Questionnaire

Table 3: Mean scores (standard deviations) and correlations with the AUQ score of age, Visual Analog Scale, AUDIT, ADS, OCDS, SF-36 summary scores and HADS. (N= 80)

Variables	Range	Mean (SD)	Coefficient	p-value
Mean age in years		49.8 (9.9)	-0.27	0.015
Visual Analog Scale	0 - 10	1.95 (2.1)	0.59	<0.001
AUDIT	1 - 40	31.5 (5.5)	0.30	0.008
ADS	0 - 47	17.1 (7.1)	0.26	0.017
OCDS				
Obsession	0 - 28	9.4 (4.1)	0.29	0.008
Compulsion	0 - 28	13.0 (3.2)	0.14	NS
SF-36 Component Summary				
Physical	0 - 100	41.4 (9.4)	-0.01	NS
Mental	0 - 100	44.6 (14.9)	-0.24	0.03
HADS				
Anxiety	0 - 21	10.7 (5.0)	0.30	0.007
Depression	0 - 21	7.6 (4.0)	0.17	NS

Note : NS = non-significant. AUQ: Alcohol Urges Questionnaire; AUDIT: Alcohol Use Disorders Identification Test ; ADS : Alcohol Dependence Scale ; OCDS : Obsessive and Compulsive Drinking Scale ; SF-36: Medical Outcome Study Short Form 36; HADS : Hospital Anxiety Depression Scale.