



## Emotional overeating is common and negatively associated with alcohol use in normal-weight female university students

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### ABSTRACT

**Introduction:** Eating in response to specific emotional cues was hitherto investigated in relation to weight gain, eating disorders, and psychiatric and addictive disorders. Given the difficulties in treating established obesity, preventive interventions towards normal-weight subjects could be more appropriate and cost effective. In order to design such interventions, it is important to characterize emotional overeating in normal-weight subjects, especially young women.

**Methods:** Female university students aged 18–24 years with healthy Body Mass Index (comprised between 18.5 and 24.9) were asked to complete questionnaires while attending a medical consultation. Emotional Eating frequency in the last 28 days was assessed together with data on habitual physical activity, drinking patterns, substance abuse, suspected eating disorders and cognitive/behavioural components of eating. Sociodemographic data and tobacco use were also collected.

**Results:** Half of participants reported intermittent Emotional Overeating in the last 28 days, mostly during one to five days in the last 28 days, in response to Anxiety (51.3%), Loneliness (45.1%), Sadness (44.8%), and Happiness (43.6%), and to a lesser extent in response to Tiredness (27.4%) and Anger (14.6%). In multivariate analysis, Distress-Induced Overeating (DIO) correlated positively with inability to resist emotional cues, disordered eating symptoms, and loss of control over food intake. It correlated negatively with moderate and excessive drinking.

**Conclusion:** A large proportion of normal-weight female students used intermittent overeating episodes as a time-limited response to emotional states, especially anxiety. DIO was negatively correlated with alcohol use, which suggests two distinct and somewhat exclusive ways of coping with negative emotions. It was higher in the minority of students with disordered eating symptoms and loss of control over food intake, highlighting the need for a systematic screening in all female students entering college.

### 1. Introduction

High school and university students have to cope with many issues such as academic pressure, autonomy from parents, financial difficulties, and social competition or isolation, among others (D. R. Adams, Meyers, & Beidas, 2016; Boujut & Bruchon-Schweitzer, 2009). Many of them engage in physical and social activities to relieve stress and get social support (Decamps, Boujut, & Brisset, 2012). But when they fail to adapt adequately, they may display maladaptive coping behaviours (Deasy, Coughlan, Pironom, Jourdan, & McNamara, 2015). A study

conducted in France showed that one out of five students drank alcohol more than 10 times a month, and that 3.7% consumed cannabis more than 10 times per month. Regarding high-risk alcohol consumption, 32.5% of the study population misused alcohol, with 18.7% of students experiencing frequent bouts of drunkenness (Tavolacci et al., 2013). While men are largely overrepresented among students with alcohol and substance abuse (Verger, Guagliardo, Gilbert, Rouillon, & Kovess-Masfety, 2010), women seem to be more vulnerable to disordered eating (Tavolacci et al., 2015), e.g. chronic restrained eating, binge eating disorder commonly known by compulsive overeating, with

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associated loss of control.

Research also suggests a gender difference in stress-related eating, with women choosing more palatable food (Bennett, Greene, & Schwartz-Barcott, 2013; Wansink, Cheney, & Chan, 2003) and being more prone to turn to food for psychological comfort rather than physiological need as regards to men (Jaaskelainen et al., 2015; Kandiah, Yake, Jones, & Meyer, 2006; Oliver & Wardle, 1999). In the U.S., weight gain in female college students was negatively associated with being stress-free, eating vegetables, and consuming less high-cholesterol foods, and positively associated with alcohol consumption (T. Adams & Rini, 2007). Another study conducted in three European countries found that perceived stress was associated with more frequent consumption of sweet/fat foods and less frequent consumption of fruits/vegetables in female students, but not in men (Mikolajczyk, El Ansari, & Maxwell, 2009). Eating in response to specific emotional cues was hitherto investigated in relation to weight gain (Koenders & van Strien, 2011; Masheb & Grilo, 2006), eating disorders (De Young, Zander, & Anderson, 2014; Pinaquy, Chabrol, Simon, Louvet, & Barbe, 2003), and psychiatric and addictive disorders (Brunault et al., 2017; Van Strien, Schippers, & Cox, 1995).

It is of importance to note that overeating, and especially emotional overeating in normal-weight young people could further lead to increase in weight and subsequent obesity. Given the difficulties in treating established obesity, preventive interventions towards normal-weight subjects could be more appropriate and cost effective. In order to design such interventions, it is important to characterize emotional overeating in normal-weight subjects, especially young women. Specific objectives were 1) to estimate the frequency of overeating in response to emotions in normal-weight female university students, 2) to determine its factor structure, and 3) to investigate its association with maladaptive coping behaviours, eating patterns and eating disorders suspicion.

## 2. Materials & methods

### 2.1. Participants and procedure

The INRA data protection agent approved the declaration of conformity of this questionnaire study, which was used for the selection of volunteers to be included in a laboratory neurocognitive study conducted at the Rennes University Hospital and approved by an independent national research ethics committee (Comité de Protection des Personnes “Ile de France II”, project N°2017-03-03; N°ID-RCB/EUDRACT, 2017-A00133-50; National Clinical Trial number: NCT03076489). The data used and provided in this paper or as supplemental data, were completely anonymized, with no mean to infer the volunteers' identity. Female university students aged 18–24 years with healthy Body Mass Index (between 18.50 and 24.99) who either responded to a call for volunteers *via* students' mailing-lists or attended a visit in a clinic devoted to university students (SIMPSS, Université de Rennes, Brittany, France) between January 2017 and January 2018 were eligible. Initial instructions also specified that the final neurocognitive study would not include low French language skills, left-handed subjects, pregnant or lactating women, as well as daily smokers, which might have limited the inclusion of such profiles in our initial questionnaire study. Participants attending a medical visit for psychiatric or addiction problems were also excluded. After free and informed consent, participants completed questionnaires including sociodemographic data: age (in years), weight (in kg), height (in cm), tobacco use (never, occasional, regular), and several other psychological and behavioural variables as described below. Two subsidiary questions were added to record a recent and significant weight gain/loss or familial history of obesity. Apart from the Emotional Overeating Questionnaire (EOQ), for which determination of the factor structure was one of our goals, only French validated versions of questionnaires were used in this study.

### 2.2. Frequency of overeating in response to emotions

The Emotional Overeating Questionnaire (EOQ) is a six-item self-report questionnaire that assesses overeating frequency in response to six emotions, namely anxiety, sadness, loneliness, tiredness, anger, and happiness (Masheb & Grilo, 2006), previously used in a French study (Brunault et al., 2017). Each item begins with, “Have you eaten an unusually large amount of food given the circumstances in response to feelings of (...)”. Each of the six emotions is presented in all capital letters, followed by three more synonyms in parentheses and in lower case. The response set for the six items is a 7-point scale reflecting the frequency of days in which the behaviour occurred in the past 28 days (*i.e.*, 0 = no days, 1 = 1–5 days, 2 = 6–12 days, 3 = 13–15 days, 4 = 16–22 days, 5 = 23–27 days, and 6 = every day).

### 2.3. Habitual physical activity

The Ricci-Gagnon questionnaire (RG) is a French cultural adaptation of the Baecke Questionnaire (Baecke, Burema, & Frijters, 1982; Duclos et al., 2015) and includes nine items assessing habitual daily activity. Four items are devoted to everyday activities such as walking, climbing stairs, work and handiwork-related activity; four items assess recreational and sport activities; one item assesses sedentary. Responses are scored on a 5-point scale, and anchors can vary across items (*e.g.*, time spent, or never to at least once a week). Final score ranges from 5 to 40 and indicates a low (< 16), intermediate (18–32), or high (> 32) level of activity. A subsidiary question was added to detect high-level athletes and exclude them from our study, similarly to subjects with a score > 32.

### 2.4. Drinking patterns

The Alcohol Use Disorders Identification Test (AUDIT) is a ten-question test to determine whether a person may be at risk for alcohol abuse problems (Bohn, Babor, & Kranzler, 1995). The test was designed to be used internationally, and was validated in a study drawing patients from six countries. There is some evidence that the AUDIT works well in young adults and students (Garcia Carretero, Novalbos Ruiz, Martinez Delgado, & O'Ferrall Gonzalez, 2016; Kelly, Donovan, Chung, Bukstein, & Cornelius, 2009). In the validated French version of the AUDIT, a score of 6 or more is considered to indicate excessive consumption in women (Gache et al., 2005). Accordingly, participants with AUDIT score  $\geq 6$  were categorized as “excessive drinker”, while those with scores ranging between 1 and 5 were categorized as “moderate drinker”. Participants with null score were categorized as “abstainers”.

### 2.5. Substance abuse

The CRAFFT Screening Test consists of a series of 6 questions developed to screen adolescents for high-risk alcohol and other drug use disorders (Karila et al., 2007; Knight, Sherritt, Shrier, Harris, & Chang, 2002). It is a short, effective screening tool meant to assess whether a longer conversation about the context of use, frequency, and other risks and consequences of alcohol and other drug use is warranted. The questions are the following. 1) Have you ever ridden in a car driven by someone (including yourself) who was “high” or had been using alcohol or drugs? 2) Do you ever use alcohol or drugs to relax, feel better about yourself, or fit in? 3) Do you ever use alcohol/drugs while you are by yourself, alone? 4) Do you ever forget things you did while using alcohol or drugs? 5) Do your family or friends ever tell you that you should cut down on your drinking or drug use? 6) Have you gotten into trouble while you were using alcohol or drugs? A score of 2 positive answers or above indicates a potential drug issue. Diagnostic threshold for regular substance use in the French version of the CRAFFT was fixed at two positive answers with a sensitivity of 90.3% and a specificity of 77.7% (Karila et al., 2007).

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