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Night eating is associated with emotional and external eating in college students

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ABSTRACT

The night eating syndrome (NES) consists of evening hyperphagia and/or nocturnal eating and has been associated with depressed mood that worsens in the evening. However, it is not consistently related to elevated BMI. The present study was conducted to examine whether a relationship exists between NES and emotional, external, and restrained eating. BMI and sleep quality were also obtained. A sample of 246 students completed the Night Eating Diagnostic Questionnaire (NEDQ), Night Eating Syndrome History and Inventory (NESHI), Sleep Quality Index (SQI), and Dutch Eating Behavior Questionnaire (DEBQ), containing subscales for emotional, external, and restrained eating. They also provided demographic information, including height and weight. Participants were grouped by severity of NES features using the NEDQ and NESHI: normal, mild night eater, moderate night eater, and full night eater syndrome. MANOVA was used to compare DEBQ subscores for the groups; those in the full syndrome category had significantly higher emotional eating scores and external eating scores than those in the normal and mild categories. There was no difference in restrained eating between the normal and full syndrome groups. Those with moderate and full syndrome NES symptoms also reported significantly lower sleep quality. No significant relationship was found between NES and BMI. The results show that NES is associated with more eating in response to negative mood and in response to food cues.

1. Introduction

The night eating syndrome (NES) was first described as consisting of morning anorexia, evening hyperphagia, and insomnia, and the onset was related to stressful events (Stunkard, Grace, & Wolff, 1955). The feature of nocturnal awakening to eat was later added to the description (Birketvedt et al., 1999). NES has also been associated with depressed mood that worsens in the evening (Birketvedt et al., 1999). The defining symptoms appear to be evening hyperphagia and nocturnal ingestion (Allison, Latzer, Tzischinsky, & Vinai, 2009). NES has been linked to elevated BMI (Aronoff, Geliebter, & Zammit, 2001; Stunkard et al., 1955), but much more so in clinical populations than in epidemiological studies (Allison et al., 2008). No sex differences have been associated with NES (Striegel-Moore, Franko, & Garcia, 2009). NES is not a formally recognized disorder; however, a case for inclusion of NES in the fifth edition of the DSM has been developing (see Stunkard et al., 2009).

NES is associated with several psychopathological features including depressed mood (Allison et al., 2009; Gluck, Geliebter, & Satov, 2001; Striegel-Moore et al., 2008; Striegel-Moore et al., 2010), low self-esteem (Gluck et al., 2001; Striegel-Moore et al., 2010), and functional impairment (Striegel-Moore et al., 2010). NES severity is positively associated with trait anxiety, cortisol levels, and perceived stress (Pawlow, O'Neil, & Malcolm, 2003). Independent of BMI, NES is linked to pathological attitudes regarding eating, as well as to mood and sleep disturbance, anxiety disorders, and substance-related disorders (Lundgren, Allison, O'Reardon, & Stunkard, 2008).

Only a few studies have been conducted examining the presence of NES in college students, a population in which stress and anxiety levels tend to be high (Brougham, Zail, Mendoza, & Miller, 2009) and in which sleep disturbances are often more prevalent than in the general population; 88.5% of college students were found to have at least occasional sleep difficulties (Buboltz et al., 2009) as compared to approximately one-third of the general population who experienced at least one sleep problem (Roth et al., 2006) or met the criterion for broadly defined insomnia (Ohayon, 2009). Disordered eating is among the most common mental health problems in college students (18–19% in a large longitudinal study; Zivin, Eisenberg, Gollust, & Golberstein, 2009). NES appears to be more prevalent in young adults (18–30 years old) than in older adults (Striegel-Moore, Franko, Thompson, Affenito, & Kraemer, 2006). Thus, studying NES in college students is appropriate and informative. In a study of college students, higher Beck depression scores were associated with a number of NES features including the need to eat in order to fall back asleep, and cravings to eat when waking up at night (Thompson & DeBate, 2010). NES severity was associated with higher

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perceived stress in college students, which was mediated by maladaptive coping strategies (Wichianson, Bughi, Unger, Spruijt-Metz, & Nguyen-Rodriguez, 2009).

Stress and depression are also associated with emotional eating, which has been described as increased eating in response to negative affect (Lindeman & Stark, 2001), ego-threat (Wallis & Hetherington, 2004), or distress (van Strien & Ouwens, 2007). Emotional eating has been correlated with overeating, binge eating, bulimia nervosa, and obesity (see Lindeman & Stark, 2001 for review). Thus, the present study was conducted to determine whether emotional eating as assessed with the Dutch Eating Behavior Questionnaire (DEBQ), which contains emotional, external, and restraint subscales, is associated with NES. Since the DEBQ measures of emotional eating and external eating are consistently positively correlated (van Strien, Frijters, Bergers, & Defares, 1986; Wardle, 1987), it was expected that external eating would also be associated with NES severity. Furthermore, since dietary restraint measured by the Eating Disorders Examination Interview (EDE) was associated with NES (Allison, Grilo, Masheb, & Stunkard, 2005), and restraint is often correlated with emotional eating as measured by the DEBQ (van Strien et al., 1986; Wardle, 1987), the relationship between DEBQ restraint score and NES symptoms was examined. In addition, since sex differences have not been observed with NES (Striegel-Moore et al., 2009), none was expected in the present study. We also examined the relationship between severity of NES symptoms and BMI; none was expected since the sample studied was not from a clinical population. Finally, it was expected that sleep quality would be lower in those with greater NES severity since previous research showed that sleep quality in NES patients is poorer than in controls (Lundgren et al., 2008).

2. Method

2.1. Participants

Participants were university students ($N = 246$) with a mean age of 18.84 years ($SD = 1.43$) and of these 75.20% was women and 24.80% was men. Participants volunteered by enrolling in an online participant pool. The BMI of the sample ranged from 16.95 to 44.92 kg/m^2 ($M = 23.33$, $SD = 4.06$); 3.25% was underweight (BMI less than 18.50; $M = 17.91$, $SD = 0.44$), 71.95% was in the normal weight range (BMI from 18.50 to 24.99; $M = 21.71$, $SD = 1.64$), 18.70% was overweight (BMI from 25 to 29.99; $M = 26.95$, $SD = 1.53$), and 5.69% was obese (BMI greater than 30; $M = 34.88$, $SD = 4.53$). One participant did not provide height and weight information and was, therefore, excluded from analyses where BMI was a variable. The sample was comprised of individuals who identified themselves as White (83.33%), Black (3.66%), mixed race (2.85%), Asian (1.22%), other (1.22%), Native American or Pacific Islander (<1%) with 6.91% not replying to the question. In response to a separate question, 4.07% identified as Latino (60.00% of whom identified as White, 30.00% as mixed or other; 10.00% did not respond to the ethnicity question).

2.2. Measures

2.2.1. Night eating

Night eating was assessed by two questionnaires. 1) The Night Eating Diagnostic Questionnaire (NEDQ; Gluck et al., 2001) includes 22 questions about the schedule of eating and sleeping, whether the person perceives him or herself as being a night eater, the awareness of night eating, and whether there is distress over the eating behavior. Its psychometric properties have not yet been published. 2) The Night Eating Syndrome History and Inventory short form (NESHI; see Allison et al., 2008) is an unpublished semi-structured interview that contains 13 questions (25 if all sub-questions are included in the count) about the schedule and amount of food eaten in a 24-hour day, history of NES symptoms, sleep patterns, mood, and stressors. Here the NESHI was administered as a questionnaire without interviewer scoring instructions since the questions are specific and not open ended. It contains all of the questions from the Night Eating Questionnaire (NEQ), a validated scale for assessing NES (with a reliability of .70) that is administered as a questionnaire (Allison et al., 2008).

To have full-fledged NES by the latest provisional diagnosis (Allison et al., 2010), a person must meet 6 criteria (see Table 1 for a description of NES criteria). The NEDQ and NESHI were used to place participants into four categories (normal, mild, moderate, and full syndrome) by severity of NES (see Table 1 for description of categories).

2.2.2. Eating styles

Emotional, restrained and external eating were assessed with the Dutch Eating Behavior Questionnaire (DEBQ). The DEBQ contains three subscales: emotional eating (DEBQ-E), restrained eating (DEBQ-R), and external eating (DEBQ-X). The DEBQ-E contains 13 items, 4 of which describe eating in response to diffuse emotions, and 9 of which describe eating in response to clearly labeled emotions (van Strien et al., 1986). The DEBQ-R (cognitive restraint of eating) and DEBQ-X (eating in the presence of external cues) scales each have 10 items. All 33 questions are rated on a 5-point Likert-type scale with "never" and "very often" as the anchors. The DEBQ is reliable in both obese and nonobese men and women; Cronbach's $\alpha = .95$, .94, and .80 for restraint, emotional eating, and external eating respectively (van Strien et al., 1986).

2.2.3. Sleep quality

Sleep quality was assessed with the Sleep Quality Index (SQI; Urponen, Partinen, Vuori, & Hasan, 1991), a validated brief questionnaire containing 8 items to indicate the frequency of various sleep disturbances per week for the past 3 months. Higher scores on this measure indicate poorer quality of sleep. The SQI has acceptable reliability of .71 in a US sample (Buboltz et al., 2009) and .74 in a European sample (Urponen et al., 1991). Furthermore, a significant relationship between quality of sleep and subjective health has been reported (Urponen et al., 1991).

2.2.4. Participant characteristics

Information regarding the height, weight, sex, age, and ethnicity was collected by use of a questionnaire. Reported height and weight were used to compute BMI. Although direct measures of height and weight are preferable, self-reports of height and weight have been

Table 1
Criteria used for diagnostic categories of NES based on provisional criteria[a] using the NEDQ and NESHI.

Criterion 1: One or both of the following for 3 or more months.	
a) Consume 25% or more of food after the evening meal.	
b) Two or more nocturnal eating episodes per week.	
Criterion 2: Awareness of evening and nocturnal eating episodes.	
Criterion 3: At least three of the following.	
a) Lack of interest in eating in morning and/or skip breakfast four or more times per week.	
b) Strong urge to eat between dinner and sleep onset and/or during the night.	
c) Sleep maintenance or onset insomnia four or more times per week.	
d) Personal belief that one must eat in order to initiate or return to sleep.	
e) Mood depressed or lowered mood in evening.	
Criterion 4: Significant distress and/or impairment in functioning.	
Criterion 5: Maintenance of disordered eating for a minimum of three months.	
Criterion 6: Disordered behavior is not secondary to another medical or psychiatric disorder.	
NES severity	
None	Does not meet any criteria category below.
Mild	More than 2 of 5 qualifiers from criterion 3 and none from 1.
Moderate	More than 2 of 5 qualifiers from criterion 3 plus 1 from criterion 1.
Full	More than 3 of 5 qualifiers from criterion 3 plus two from criterion 1 plus criteria 4 and 5.

[a] Allison et al. (2010).