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Associations of neuroticism and impulsivity with binge eating in a nationally representative sample of adolescents in the United States

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ABSTRACT

Binge eating behavior is a public health concern with serious physical and mental health consequences. Certain personality traits have been found to contribute to the development of eating disorders in clinical samples of youth, but little is known about associations between personality traits and binge eating in the general adolescent population. We examined the associations of neuroticism and impulsivity – both independently and in combination – with lifetime prevalence of binge eating, using nationally representative, cross-sectional data from the National Comorbidity Survey: Adolescent Supplement (n = 437). Neuroticism and impulsivity were each significantly associated with lifetime prevalence of binge eating (adjusted prevalence ratio [aPR] = 1.11, confidence interval [CI] = 1.07, 1.15, $p < 0.001$; aPR = 1.06, CI = 1.04, 1.09, $p < 0.001$, respectively). The combination of high neuroticism and high impulsivity was associated with higher lifetime binge eating than the combination of low neuroticism and low impulsivity (aPR = 3.72, CI = 2.45, 5.65, $p < 0.001$), and this association was stronger for female than male adolescents (females: aPR = 5.37, CI = 3.24, 8.91, $p < 0.001$ vs. males: aPR = 2.45, CI = 1.43, 4.22, $p = 0.002$). Our findings have implications for informing theories of etiology and interventions to target binge eating behaviors.

1. Introduction

Binge eating disorder (BED) is a public health concern (Austin, 2012; Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011), as it is the most prevalent eating disorder in adolescents (Swanson et al., 2011) and adults (Hudson, Hiripi, Pope, & Kessler, 2007) in the general U.S. population and has physical and mental health consequences, including obesity (Marcus & Wildes, 2013; Neumark-Sztainer et al., 2007; Stankovic & Potenza, 2010) and comorbidity with many psychiatric disorders (Fairburn et al., 1998; Hudson et al., 2007; Swanson et al., 2011). BED, newly included as a diagnostic category in DSM5 (American Psychiatric Association, 2013), is characterized by recurrent episodes of eating unusually large quantities of food without engaging in purging behavior, accompanied by a feeling of loss of control and distress. Subthreshhold binge eating (SBED) that does not meet full BED diagnostic criteria is also important because it is more prevalent than BED among adolescents in the general population (Swanson et al., 2011), is significantly associated with development of BED (Stice, Marti, Shaw, & Jaconis, 2009), and increases risk for negative mental and physical health outcomes (Sonneville et al., 2013; Stice et al., 2009; Swanson et al., 2011). Research suggests that adolescence is a common period of BED onset (Stice et al., 2009). Identifying psychosocial correlates of binge eating in this age group may be a useful first step in identifying modifiable risk factors for binge eating that can inform prevention efforts.

Personality, defined as a relatively stable tendency with respect to an individual's cognitive, emotional, and behavioral responses (Shiner & Caspi, 2003), is strongly associated with the development of mental disorders in children and adolescents (Tackett, 2006), including eating disorders (Keel & Forney, 2013; Lilenfeld, 2011; Lilenfeld, Wonderlich, Riso, Crosby, & Mitchell, 2006). Personality researchers from different theoretical backgrounds have developed systems for classifying core dimensions of personality and temperament to facilitate the study of personality and psychopathology (Andersen & Bienvenu, 2011). The most widely accepted and studied models of personality are the Five Factor Model (FFM) by Costa and McCrae (conscientiousness, agreeableness, neuroticism, openness, and extraversion) (Costa & McCrae, 1992) and the Three Factor Model by Eysenck (neuroticism, extraversion, and psychoticism) (Eysenck, Eysenck, & Barrett, 1985). An alternative model by Zuckerman and colleagues includes neuroticism-anxiety (neuroticism in the FFM and Eysenck's model), impulsive-sensation

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seeking (conscientiousness in the FFM and psychoticism in Eysenck's model), aggression-hostility (agreeableness in the FFM), and sociability and activity (extraversion in the FFM and Eysenck's model) (Zuckerman, 2002; Zuckerman, Michael, Joireman, Teta, & Kraft, 1993).

Problematic eating behavior (Macht & Simons, 2000; Polivy & Herman, 2002), including binge eating, often occurs in response to experiencing negative emotions (Munsch, Meyer, Quartier, & Wilhelm, 2012; Stein et al., 2007; Stice et al., 2001). Both neuroticism and impulsivity reflect a propensity to experience and to express negative emotions (Carver, 2004; Davis-Becker, Peterson, & Fischer, 2014; Shiner & Caspi, 2003). Evidence suggests neuroticism – a predisposition towards negative emotionality, tension, and anxiety (Cassin & von Ranson, 2005; Costa & McCrae, 1992; Zuckerman, 2002) – has robust associations with a variety of both physical and mental health issues, including eating disorders (Lahey, 2009). Evidence from prospective studies of female adolescents supports neuroticism as a risk factor for eating disorders, including anorexia nervosa, bulimia nervosa, and eating disorders not otherwise specified (Cervera et al., 2003; Ghaderi & Scott, 2000; Lilenfeld et al., 2006). It has been proposed that binge eating behavior may provide relief from intense and prolonged unpleasant emotional states (Heatherton & Baumeister, 1991), which individuals with elevated neuroticism tend to experience (Izydorczyk, 2012).

Impulsivity is generally defined as a tendency to act without thinking or a need for thrills and novelty (Cassin & von Ranson, 2005; Costa & McCrae, 1992; Zuckerman, 2002). Cross-sectional studies have found significant associations between impulsivity and eating disorders that involve purging behavior (Fedorowicz et al., 2007; Lilenfeld, 2011). Impulsivity has not, however, been examined as extensively in association with binge eating without purging behavior. Impulsivity has been linked with loss of control eating (Hartmann, Czaja, Rief, & Hilbert, 2010), a type of binge eating in children characterized by disinhibition and lack of capacity to control food intake. Research suggests individuals with elevated impulsivity are more likely to binge eat because of their tendency to engage in reckless actions under distress (Fischer, Smith, & Cyders, 2008; Waxman, 2009).

Research on personality and binge eating has focused primarily on binge eating among adult female clinical or college samples (Cassin & von Ranson, 2005; Lilenfeld, 2011; Lilenfeld et al., 2006) as a subtype of anorexia nervosa or bulimia nervosa (American Psychiatric Association, 1994). No studies, to the authors' knowledge, have investigated neuroticism or impulsivity as potential correlates of binge eating in a nationally representative adolescent sample. The combination of neuroticism and impulsivity has also not yet been examined as a correlate of binge eating behavior. The construct of *negative urgency* – characterized by high neuroticism and associated with emotion-driven impulsive behavior (Settles et al., 2012) – integrates negative emotionality (i.e., neuroticism) and reckless action (i.e., impulsivity) (Fischer et al., 2008; Whiteside & Lynam, 2001). A recent meta-analysis reported negative urgency as the most relevant factor of bulimic symptom expression (Fischer et al., 2008). Negative urgency was also significantly linked to binge eating in preadolescents (Combs, Pearson, & Smith, 2011; Fischer, Settles, Collins, Gunn, & Smith, 2012; Pearson, Combs, & Smith, 2010). These findings suggest that the combination of neuroticism and impulsivity merits exploration in relation to binge eating in adolescents more generally. Evidence also suggests that the associations between personality traits and psychopathology may differ between females and males (Tackett, 2006). For example, negative urgency was significantly associated with eating pathology in female but not in male college students (Davis-Becker et al., 2014). No studies have assessed gender differences in the associations between personality traits and binge eating in the general adolescent population.

We used data from the National Comorbidity Survey: Adolescent Supplement (NCS-A) (Kessler, Avenevoli, Costello, et al., 2009; Kessler, Avenevoli, Green, et al., 2009; Merikangas, Avenevoli, Costello, Koretz, & Kessler, 2009) to examine associations between maladaptive personality traits and binge eating in a nationally representative sample of U.S. adolescents. We hypothesized that neuroticism and impulsivity would each be associated with increased lifetime prevalence of binge eating. We also hypothesized that adolescents with high levels of both neuroticism and impulsivity (NI) would show higher lifetime prevalence of binge eating than those with low levels of both traits or high levels of only one trait. We also explored adolescent gender as a potential moderator of each personality trait–binge eating association.

2. Methods

2.1. Study design and participants

We used data from the NCS-A (Kessler, Avenevoli, Costello, et al., 2009; Kessler, Avenevoli, Green, et al., 2009; Merikangas et al., 2009), a nationally representative, cross-sectional dataset that contains information such as prevalence estimates, correlates, and service use patterns for major psychiatric disorders in a U.S. sample of 10,148 adolescents aged 13 to 18 years. Detailed description of the NCS-A's background, measures, and design is provided elsewhere (Kessler, Avenevoli, Costello, et al., 2009; Kessler, Avenevoli, Green, et al., 2009; Merikangas et al., 2009).

2.2. Procedure

We compared 437 adolescents with lifetime binge eating behavior (i.e. either lifetime BED or lifetime SBED) to 9591 adolescents without eating issues (i.e., no diagnoses of lifetime anorexia nervosa, bulimia nervosa, BED, or SBED). We received authorization to access the restricted NCS-A data from the Interuniversity Consortium for Political and Social Research and also obtained Johns Hopkins Bloomberg School of Public Health IRB approval for this study.

2.3. Measures

2.3.1. Lifetime binge eating

A modified version of the World Health Organization Composite International Diagnostic Interview (CIDI) Version 3.0 (Kessler & Üstün, 2004) was used in the NCS-A, administered by lay interviewers who assessed BED symptoms and diagnosis among adolescents. The CIDI is a widely used diagnostic instrument that has exhibited good psychometric properties (Green et al., 2012; Kessler, Avenevoli, Green, et al., 2009); the eating disorders diagnostic instrument of the CIDI, however, were previously validated only in adult samples (Swanson et al., 2011). All items related to binge eating had dichotomous (yes or no) responses. For the purpose of the current study, we combined adolescents with lifetime BED ($n = 162$) and adolescents with lifetime subthreshold binge eating disorder ($n = 275$) as 'adolescents with lifetime binge eating' ($n = 437$). We selected this categorization in order to capture a wider range of binge eating behavior, since few children and adolescents meet full criteria for BED (Shomaker, Tanofsky-Kraff, & Yanovski, 2011), and subthreshold symptoms are a serious issue in their own right (Crow, Stewart Agras, Halmi, Mitchell, & Kraemer, 2002; Fairburn & Bohn, 2005; Stice et al., 2009).

2.3.1.1. Lifetime binge eating disorder (BED). The NCS-A's definitions of BED were similar to the DSM5 criteria (Swanson et al., 2011). Adolescents were considered to have lifetime BED if they reported: 1) ever engaging in binge eating at least twice a week for three months or longer; 2) having one or more out of four indicators of a sense of lack of control while binge eating; 3) having three or more out of five features associated with binge eating; 4) having one or more out of four indicators of marked distress due to binge eating; 5) not engaging in inappropriate compensatory behaviors such as purging; and 6) not meeting the diagnostic criteria for lifetime anorexia nervosa or bulimia nervosa (see Appendix A for details).