



Contribution of temperament to eating disorder symptoms in emerging adulthood: Additive and interactive effects



Nicole M. Burt*, Lauren E. Boddy, David J. Bridgett

Northern Illinois University, United States

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ABSTRACT

Temperament characteristics, such as higher negative emotionality (NE) and lower effortful control (EC), are individual difference risk factors for developmental psychopathology. Research has also noted relations between temperament and more specific manifestations of psychopathology, such as eating disorders (EDs). Although work is emerging that indicates that NE and EC may additively contribute to risk for ED symptoms, no studies have considered the interactive effects of NE and EC in relation to ED symptoms. In the current investigation, we hypothesized that (1) low EC would be associated with increased ED symptoms, (2) high NE would be associated with increased ED symptoms, and (3) these temperament traits would interact, such that the relationship between NE and ED symptoms would be strongest in the presence of low EC. After controlling for gender and child trauma history, emerging adults' (N = 160) lower EC (i.e., more difficulties with self-regulation) was associated with more ED symptoms. NE did not emerge as a direct predictor of ED symptoms. However, the anticipated interaction of these temperament characteristics on ED symptoms was found. The association between NE and ED symptoms was only significant in the context of low EC. These findings provide evidence that elevated NE may only be a risk factor for the development of eating disorders when individuals also have self-regulation difficulties. The implications of these findings for research and interventions are discussed.

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1. Introduction

Eating disorders (EDs¹) are characterized by patterns of problematic eating behaviors, unrealistic perceptions of body weight and size, and engagement in behaviors aimed at reducing body weight and size and/or preventing weight gain (American Psychiatric Association [APA], 2013). Individuals with EDs can experience significant medical repercussions (e.g., increased mortality rates and cardiovascular problems; Arcelus, Mitchell, Wales, & Nielsen, 2011; Katzman, 2005), among other comorbid problems, highlighting the importance of identifying risk factors that may contribute to the development of EDs. Although a number of risk factors have been considered, such as internalization of a thin ideal (Striegel-Moore & Bulik, 2007) and dieting frequency (Stice, 2002), emerging findings also suggest that variations in temperament may place individuals at risk for developing EDs. Specially, effortful control (EC) and negative emotionality (NE), aspects of temperament, have been noted to be related to eating pathology (e.g., Claes, Robinson, Muehlenkamp, Vandereycken, & Bijttebier, 2010; Kitsantas, Gilligan, & Kamata, 2003; Stice, 2001). However, no

studies have considered temperament by temperament interactions in relation to ED symptoms despite research within other domains of developmental psychopathology noting such associations (e.g., anxiety; Lonigan, Vasey, Phillips, & Hazen, 2004). As such, the goal of the current study was to contribute to the growing body of work considering relations between temperament and ED symptoms by examining the additive and interactive effects of NE and EC in relation to ED symptoms.

1.1. Temperament, developmental psychopathology, & personality

According to the psychobiological model of temperament, temperament reflects biologically-based individual differences in reactivity and self-regulation that develop over time and are influenced by maturation, genetics, heritability, and the environment (Rothbart, Derryberry, & Posner, 1994; Shiner et al., 2012). NE and EC are two broad dimensions of temperament that have been influential in models of developmental psychopathology, as well as in conceptualizations of the origins of personality. NE encompasses emotions of frustration, fear, sadness, anger, and discomfort (Evans & Rothbart, 2007), appears within the first few months of life (Bridgett, Burt, Laake, & Oddi, 2013a; Bridgett et al., 2009), develops rapidly until approximately 24 months of age, and then remains fairly stable through childhood (Putnam, Ellis, & Rothbart, 2001). Individuals who are characterized as experiencing higher NE, on the basis of rating scales or laboratory tasks, experience more frequent and intense anger/frustration, fear, and sadness,

* Corresponding author at: Department of Psychology, Emotion Regulation & Temperament Laboratory, Psychology-Computer Science Building Rm. 400, Northern Illinois University, DeKalb, IL 60115, United States. Tel.: +1 815 753 7229.

E-mail address: nicole.m.burt@gmail.com (N.M. Burt).

¹ Abbreviations: ED: eating disorder; NE: negative emotionality; EC: effortful control.

placing them at increased risk of behavioral or emotional difficulties, including internalizing and externalizing problems (e.g., Gartstein et al., 2010; Muris & Ollendick, 2005; Nigg, 2006; Oldehinkel, Hartman, Ferdinand, Verhulst, & Ormel, 2007).

EC is the ability to inhibit a dominant response and employ a subdominant response, attentional control, and planning (Rothbart, Ellis, Rosario Rueda, & Posner, 2003). It is the self-regulatory aspect of temperament and has been conceptually and empirically linked to closely related (if not overlapping) aspects of self-regulation, such as executive functioning and emotion regulation (Bridgett, Burt, Edwards, & Deater-Deckard, *In Press*; Bridgett, Oddi, Laake, Murdock, & Bachmann, 2013b). Like NE, EC also emerges early in life, between 12 and 18 months of age, develops rapidly through early childhood (Gartstein, Bridgett, Young, Panksepp, & Power, 2013; Kochanska, Murray, & Harlan, 2000) and then steadily, but less rapidly, through adolescence (Hofer, Eisenberg, & Reiser, 2010; Lengua, 2006). Thus, by the time individuals with adequate EC reach emerging adulthood, they are able to flexibly employ EC to regulate behavior and emotion. However, across developmental stages, those who have poorer (i.e., less than adequate) EC are at elevated risk for experiencing behavioral or emotional difficulties, such as aggression and related externalizing problems (Bridgett et al., *in press*; Valiente et al., 2004).

Although temperament is often considered in studies of children and in models of developmental psychopathology, it is gaining consideration in studies of adults (e.g., Bridgett et al., 2013a), and there are conceptual links between temperament and the emergence of long-studied personality characteristics. Specifically, temperament, in interaction with the environment across development, is viewed as forming the foundation for the development of personality (Clark, 2005; Eisenberg, Duckworth, Spinrad, & Valiente, 2012; Rothbart, 2011). Consistent with such views, the personality trait of neuroticism appears to stem from early NE (Clark, 2005; Rothbart, 2011; Rothbart & Ahadi, 1994). Likewise, similar to connections between NE and neuroticism, the roots of conscientiousness can be traced to EC (Eisenberg et al., 2012).

1.2. Temperament and ED symptoms

In addition to prior investigators who have reported associations between temperament and psychological problems more broadly, higher NE has also been concurrently and longitudinally related to increased risk for ED pathology (Haycraft, Farrow, Meyer, Powell, & Blissett, 2011; Müller et al., 2012; Ringham, Levine, Kalarchian, & Marcus, 2008; Stice, 2001, 2002). Martin et al. (2000) found that children with higher NE are at a greater risk for developing ED symptoms during adolescence, indicating that early temperament can have implications for ED development later in life. NE has also been associated with the degree of body dissatisfaction and rates of binge eating in a sample of women with an ED (Grilo, 2004), and may moderate the link between dietary restraint and binge eating (Stice, Akutagawa, Gaggard, & Agras, 2000). These findings highlight the possibility that NE may predispose individuals to develop ED symptoms when exposed to additional risk factors (e.g., poor self-regulation, dietary restraint). Similar to emerging findings regarding temperament, research within the personality literature has noted positive associations between neuroticism and eating pathology (Cassin & von Ranson, 2005; Cervera et al., 2003; Gual et al., 2002). This collection of evidence points to the role of NE in the development of ED pathology; it appears that high NE may increase the likelihood of negative self-evaluation and body size perception disturbance, and decrease self-esteem and body image satisfaction (Baker, Williamson, & Sylve, 1995; Grilo, 2004; Presnell, Bearman, & Stice, 2004). Subsequently, high NE may result in an increased drive to engage in maladaptive behaviors associated with EDs (Cooley & Toray, 2001; Gardner, Stark, Friedman, & Jackson, 2000; Vohs, Bardone, Joiner, & Abramson, 1999).

Self-regulation and related processes are perhaps the most frequently considered constructs in research investigating the development and

maintenance of EDs. This body of work demonstrates that individuals with lower or poor EC and poor emotion regulation, representing less self-regulatory ability, are more likely to develop ED symptoms (Claes, Mitchell, & Vandereycken, 2012; Claes, Bijttebier, Mitchell, de Zwaan, & Mueller, 2011; Harrison, Sullivan, Tchanturia, & Treasure, 2010; Kerremans, Claes, & Bijttebier, 2010; Müller et al., 2012). This broad area of research is in line with studies falling within a personality framework, wherein associations between low conscientiousness and ED symptoms have also been noted (Ghaderi & Scott, 2000; Heaven, Mulligan, Merrilees, Woods, & Fairouz, 2001). Extending beyond adolescent and young adult populations, research has also examined self-regulatory problems and abnormal eating behaviors early in life. Haycraft et al. (2011) found that young children who experience more difficulties with emotion regulation display problematic eating behaviors, including *both* over- and under-eating. This evidence points to the possibility that poor self-regulation increases the risk for ED symptomatology, perhaps because poor self-regulation results in an inability to regulate ED-related behavior, such as bingeing and purging. In contrast, adequate self-regulation may increase the ability to inhibit impulses to engage in problematic behaviors, and promote adaptive behavior, such as proper diet and exercise.

1.3. Temperament by temperament interactions

Although existing work has considered additive relations between aspects of temperament and a variety of outcomes, research has only recently begun examining how combinations of temperament dimensions may predispose individuals to develop specific forms of psychopathology. In particular, research has demonstrated that the combination of high NE and low regulation, or low EC, may be related to the development and maintenance of internalizing and externalizing problems (Oldehinkel et al., 2007; Valiente et al., 2004). The interactive combination of low regulation and high NE in relation to risk for psychopathology appears to occur, at least in part, because individuals with poor regulation cannot regulate behaviors and/or negative emotions following stressors (Bridgett et al., 2013b).

While consideration of temperament by temperament interactions in relation to psychopathology is growing, and specifically interactions between EC and NE, continued research is still needed (Lengua & Wachs, 2012; Muris & Ollendick, 2005; Nigg, 2006). In particular, studies have not examined temperament by temperament interactions in relation to ED symptoms, including the possibility that individuals with high NE and low EC are at the highest risk of experiencing elevated symptoms of EDs. Individuals with high NE are more likely to engage in negative self-evaluation and have poor body image and self-esteem (Baker et al., 1995; Grilo, 2004; Presnell et al., 2004); however, when individuals *also* have poor EC, their risk for ED symptoms may be heightened due to 1) increased difficulty regulating negative emotions, such as sadness, that result from poor self-esteem and negative self-evaluation, and 2) difficulties inhibiting ED-specific maladaptive behaviors (e.g., purging; Claes et al., 2010) aimed at reducing the negative emotions resulting from poor body image and self-esteem. Importantly, this interactive model would predict that individuals with high EC, even in the presence of NE, would be at lower risk of experiencing body image distress and engaging in problematic eating behaviors because they have the regulatory ability necessary to appropriately regulate these negative emotions and their behaviors in response to these emotions.

1.4. The current study

Prior studies have separately noted that high NE and low EC place individuals at risk for developing ED symptomatology (Claes et al., 2010, 2012; Kitsantas et al., 2003; Stice, 2001). Given these findings, the first goal of the present study is to contribute to this growing body of work by examining the additive effects of two aspects of temperament, NE

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