



HHS Public Access

Author manuscript

Eat Behav. Author manuscript; available in PMC 2017 August 01.

Published in final edited form as:

Eat Behav. 2016 August ; 22: 133–140. doi:10.1016/j.eatbeh.2016.06.009.

Associations of Neuroticism-Impulsivity and Coping with Binge Eating in a Nationally Representative Sample of Adolescents in the United States

Angela E. Lee-Winn,

Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, 624 North Broadway Hampton House, Baltimore, MD 21205, USA

Lisa Townsend,

Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, 624 North Broadway Hampton House, Baltimore, MD 21205, USA

Shauna P. Reinblatt, and

The Johns Hopkins University School of Medicine, Department of Psychiatry and Behavioral Sciences, Division of Child and Adolescent Psychiatry, 550 North Broadway, Room 206D, Baltimore, MD 21205 USA

Tamar Mendelson

Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, 624 North Broadway Hampton House, Baltimore, MD 21205, USA

Angela E. Lee-Winn: aleewin1@jhu.edu; Lisa Townsend: ltownse8@jhu.edu; Shauna P. Reinblatt: sreinbl1@jhmi.edu; Tamar Mendelson: tmendel1@jhu.edu

Abstract

Objective—Binge eating behavior is a public health concern due to its negative physical and mental health consequences. Little is known about the interplay of personality traits, coping styles,

Correspondence to: Angela E. Lee-Winn, aleewin1@jhu.edu.

*Angela E. Lee-Winn is now at National Institutes of Health, *Eunice Shriver Kennedy* National Institute of Child Health and Human Development, 6100 Executive Blvd 7B13 Rockville, MD 20892 USA, angela.lee-winn@nih.gov

Contributors

A. Lee-Winn contributed to the study conceptualization, acquisition of data, analysis and interpretation of the acquired data, and drafting and revision of the manuscript. L. Townsend, S. Reinblatt, and T. Mendelson contributed to interpretation of the study results and critical revision of the manuscript. All authors have approved the final manuscript.

Conflict of Interest

L. Townsend has spousal disclosures: In the last 36 months, L. Townsend's spouse has received research support, acted as a consultant, and/or served on a speaker's bureau for Alexa Pharmaceuticals, American Academy of Child & Adolescent Psychiatry, American Physician Institute, American Psychiatric Press, AstraZeneca, Bracket, Bristol-Myers Squibb, Clinsys, Cognition Group, Coronado Biosciences, Dana Foundation, Forest, GlaxoSmithKline, Guilford Press, Johns Hopkins University Press, Johnson & Johnson, KemPharm, Lilly, Lundbeck, Merck, NIH, Novartis, Noven, Otsuka, Oxford University Press, Pfizer, Physicians Postgraduate Press, Rhodes Pharmaceuticals, Roche, Sage, Seaside Pharmaceuticals, Shire, Stanley Medical Research Institute, Sunovion, Supernus Pharmaceuticals, Transcept Pharmaceuticals, Validus, and WebMD. S. Reinblatt has received royalties from the Osler Institute for Past Board Review CME Lectures; non-financial support (travel) from Sunovion, Actavis and Alcobra; consulting for the National Board of Medical Examiners. All other authors declare that they have no conflicts of interest.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

and binge eating in the general adolescent population. We examined the associations among the combination of neuroticism and impulsivity (NI), maladaptive coping styles (poor problem solving, distraction, and escape-avoidance), and lifetime prevalence of binge eating in a nationally representative sample of U.S. adolescents. We also explored coping as a moderator of the NI–lifetime binge eating association and gender as a moderator of the NI–coping associations and coping–lifetime binge eating associations.

Methods—We used data from the National Comorbidity Survey: Adolescent Supplement (NCS-A: 2001–2004), a cross-sectional nationally representative study of adolescents aged 13 to 18 years ($n=10,028$). We studied the associations of NI and coping with lifetime binge eating using multivariate regression models.

Results—High NI was significantly associated with all three coping styles, especially escape-avoidance ($\beta = 3.96$, confidence interval [CI] = 3.62, 4.29, $p < 0.001$). Gender was a significant moderator of the NI–distraction coping association ($\beta = -0.68$, CI = $-1.33, -0.03$, $p = 0.041$), indicating a stronger association in males ($\beta = 1.20$, CI = 0.81, 1.58, $p < 0.001$) than females ($\beta = 0.53$, CI = 0.02, 1.03, $p = 0.042$). Lifetime prevalence of binge eating was 1.13 times higher with increased escape-avoidance coping (CI = 1.10, 1.18, $p < 0.001$).

Discussion—Our findings indicate significant associations among high NI, increased escape-avoidance coping, and higher lifetime prevalence of binge eating in adolescents. Findings of our study have potential to inform development of interventions that target modification of maladaptive personality traits and coping styles to reduce problematic eating.

Keywords

Binge eating disorder; National Comorbidity Survey: Adolescent Supplement (NCS-A); personality; coping; adolescents; psychiatric epidemiology

1. Introduction

Recent findings from population-level studies suggest binge eating disorder (BED) is a public health concern (Austin, 2012; Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011) due to its prevalence of 1.6% in adolescents (Swanson et al., 2011) and 2.8% in adults (Hudson, Hiripi, Pope, & Kessler, 2007) in the general U.S. population and its negative health consequences, including obesity (Marcus & Wildes, 2013; Neumark-Sztainer et al., 2007; Stankovic & Potenza, 2010) and comorbidity with almost all major psychiatric disorders (Fairburn et al., 1998; Hudson et al., 2007; Swanson et al., 2011). BED, a new diagnosis in DSM5 (American Psychiatric Association, 2013), is characterized by persistently consuming uncommonly large quantities of food with a sense of loss of control and distress. Subthreshold binge eating disorder is also problematic as it is even more prevalent than BED in the general adolescent population (Swanson et al., 2011) and also has associations with negative health outcomes (Sonnevile et al., 2013; Stice, Marti, Shaw, & Jaconis, 2009; Swanson et al., 2011). Identifying psychosocial correlates of binge eating is an important first step toward developing prevention and treatment strategies to reduce binge eating.

We previously found that the combination of high neuroticism and high impulsivity (NI) was significantly associated with higher lifetime prevalence of binge eating (Lee-Winn, Townsend, Reinblatt, & Mendelson, 2016). Coping --cognitive and behavioral responses that individuals use to manage perceived stress (Susan Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986)-- is linked with adolescents' well-being, such as adjustment, school performance, and physical and mental health (Garcia, 2010; Schonert-Reichl, 2003; Sveinbjornsdottir & Thorsteinsson, 2008). We know little, however, about the potential interplay between NI and coping in relation to binge eating in the general population. Assessing this interplay, such as exploring coping as a potential moderator of the association between NI and binge eating in the general adolescent population will provide a more nuanced understanding of how personality and coping are linked with maladaptive patterns of behavior relevant for eating issues.

Evidence suggests that personality traits and coping styles have both independent and interactive effects on mental and physical health (Carver & Connor-Smith, 2010). Personality scholars have conceptualized personality in different ways, including three major frameworks of personality: 1) Eysenck's Three Factor Model (neuroticism, extraversion, and psychoticism) (Eysenck, Eysenck, & Barrett, 1985), 2) Costa and McCrae's Five Factor Model (FFM: neuroticism, conscientiousness, agreeableness, openness, and extraversion) (Costa & McCrae, 1992), and 3) Zuckerman and Kuhlman's alternative Five Factor Model, which proposes variations on the FFM and Eysenck models (Zuckerman, 2002; Zuckerman, Michael, Joireman, Teta, & Kraft, 1993). Research suggests that individuals with low conscientiousness (i.e., high impulsivity) and high neuroticism tend to be more vulnerable to stress and dysfunctional coping (Grant & Langan-Fox, 2006; Vollrath & Torgersen, 2000). This combination of high impulsivity and neuroticism can be conceptualized as *negative urgency* --the tendency to engage in rash actions (i.e. impulsivity) under emotional distress (neuroticism) (Fischer, Smith, & Cyders, 2008; Racine et al., 2013; Settles et al., 2012; Whiteside & Lynam, 2001). In a prior study, NI was found to have a robust association with bulimic symptomatology (Fischer et al., 2008). In previous work, our team also identified NI as a significant correlate of binge eating behavior among adolescents in the general population (Lee-Winn et al., 2016).

Learning adaptive skills to manage stress during adolescence is crucial (McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011; Silk et al., 2007; Steinberg & Avenevoli, 2000), as adolescents' coping patterns can impact both their present and future well-being (Broderick & Korteland, 2002; Garcia, 2010; Schonert-Reichl, 2003). Enhancing coping skills, especially problem solving, emotion regulation, and use of social support, may increase youths' resilience when faced with stressors (Compas, Champion, & Reeslund, 2005). Theorists have grouped coping in several ways (Carver & Connor-Smith, 2010; Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Skinner, Edge, Altman, & Sherwood, 2003). One common way of distinguishing coping styles is problem-focused versus emotion-focused coping (Lazarus & Folkman, 1984). Generally, problem-focused coping (e.g., logical analysis, direct action, decision making, planning) (Skinner et al., 2003) attempts to remove a stressor or minimize its impact, whereas emotion-focused coping (e.g., avoidance, denial, wishful thinking, rumination, yelling, crying) aims to diminish distress caused by a stressor (Carver & Connor-Smith, 2010; Lazarus & Folkman, 1984).

Most coping skills are not considered inherently adaptive or maladaptive, as a great deal depends on the context and manner of their use. Problem-focused coping, however, is generally linked with better adjustment and well-being whereas emotion-focused coping tends to be associated with increased distress and psychopathology (Ball & Lee, 2000; Compas et al., 2001; Ghaderi & Scott, 2000), including eating disorders (Ball & Lee, 2000; Compas et al., 2001). For instance, distraction coping, which aims to divert attention by engaging in secondary behavioral or cognitive activities (Skinner et al., 2003), was associated with both same day and next day binge eating (Freeman & Gil, 2004). Avoidance coping (e.g., escape, disengagement, wishful thinking) (Skinner et al., 2003) has been proposed as a predictor of eating disorders (Aldao, Nolen-Hoeksema, & Schweizer, 2010) and has been reported in patients with anorexia nervosa (AN) or bulimia nervosa (BN) in the U.S. and other countries (Bloks, Spinhoven, Callewaert, Willemse-Koning, & Turksma, 2001; Bloks, Van Furth, Callewaert, & Hoek, 2004; Brytek-Matera & Schiltz, 2013; Fitzsimmons & Bardone-Cone, 2010; Lobera, Estébanez, Fernández, Bautista, & Garrido, 2009; Nagata, Matsuyama, Kiriike, Iketani, & Oshima, 2000; Troop, Holbrey, & Treasure, 1998; Troop, Holbrey, Trowler, & Treasure, 1994), female college students in the U.S. (Dennard & Richards, 2013; Kelly, Lydecker, & Mazzeo, 2012; Wonderlich-Tierney & Vander Wal, 2010; Wolff, Crosby, Roberts, & Wittrock, 2000), and community samples of adolescents in Spain (García-Grau, Fusté, Miró, Saldaña, & Bados, 2002, 2004).

Research suggests that coping can be considered “personality in action” (Bolger & Zuckerman, 1995) based on a moderate shared genetic basis between coping and personality (Kato & Pedersen, 2005), as well as strong correlations between the constructs (Connor-Smith & Flachsbart, 2007). A recent-meta analysis of personality–coping associations based on the FFM (Costa & McCrae, 1992) revealed a general pattern of increased use of emotion-focused coping and decreased use of problem-focused coping in high neuroticism or low conscientiousness (Connor-Smith & Flachsbart, 2007). Studies that used Eysenck’s personality model (Eysenck et al., 1985) showed that young Canadian males (age 17–21) with serious gambling issues characterized by increased impulsivity/intensity seeking were more likely to use avoidance and distraction coping (Nower, Derevensky, & Gupta, 2004), and neuroticism and psychoticism had direct positive effects on avoidance coping among Croatian adolescents (Kardum & Krapi, 2001). Consideration of personality and coping in association with binge eating may contribute to theoretical models in this area and may guide the development of interventions that target either or both maladaptive personality traits and coping styles to decrease problematic eating among adolescents.

Evidence suggests that coping strategies individuals use to deal with stress may reduce or amplify personality–psychopathology associations (Carver & Connor-Smith, 2010). Current findings on moderation effects of coping on temperament/personality–psychopathology associations are inconsistent. For instance, using avoidance or denial coping strategies has been shown to strengthen the relationships between the behavioral approach (e.g., a tendency to seek rewards) and disordered eating among Australian adolescents (Hasking, 2006). However, another study showed emotion-oriented coping reduced the strength of associations between trait anxiety and disordered eating, indicating possible short-term usefulness of adaptive avoidance coping, such as going for a walk (Fitzsimmons & Bardone-Cone, 2010). Investigating coping as a potential moderator of the associations between

personality traits and binge eating may inform future interventions to decrease the use of maladaptive coping.

Research also suggests that personality–psychopathology associations may differ by gender (Tackett, 2006). For example, negative urgency was only significantly associated with disordered eating among female college students but not their male counterparts (Davis-Becker, Peterson, & Fischer, 2014). Assessing potential gender differences between personality traits and binge eating may be worthwhile for designing intervention programs that could benefit either or both genders. Little is known about relations among NI, coping styles, and binge eating, and no nationally representative studies of adolescents, to the authors' knowledge, have investigated coping styles in association with binge eating or whether the association of NI and binge eating varies as a function of coping style.

The current study is a follow-up to our earlier study with the National Comorbidity Survey: Adolescent Supplement (NCS-A) data, in which we found significant associations between NI and binge eating (Lee-Winn et al., 2016). In the present study, we extended our prior research by assessing associations among coping styles, NI, and binge eating in the general United States adolescent population, using data from the NCS-A. Based on previous research, we hypothesized that avoidance, distraction, and poor problem solving would be positively associated with NI and lifetime prevalence of binge eating. We also hypothesized that avoidance, distraction, and poor problem solving would moderate the associations between NI and lifetime binge eating. We explored adolescent gender as a potential moderator of each NI–coping and coping–lifetime binge eating association.

2. Methods

2.1 Study Design and Participants

The NCS-A is 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 (Kessler, Avenevoli, Costello, et al., 2009; Kessler, Avenevoli, Green, et al., 2009; Merikangas, Avenevoli, Costello, Koretz, & Kessler, 2009). 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). 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.

We intended to exclusively assess personality and coping in adolescents with only binge eating without compensatory behavior and therefore excluded adolescents who met lifetime criteria for other eating disorders, including AN or BN. We also excluded adolescents with recurrent overeating behavior who did not meet the criteria for lifetime BED or SBED. In our final model, we assessed 437 adolescents with lifetime binge eating (i.e. either lifetime BED or lifetime subthreshold BED [SBED]) and compared them to 9,591 adolescents without lifetime AN, BN, BED, or SBED.

2.2 Measures

2.2.1 Lifetime Binge Eating—The NCS-A used a modified version of the World Health Organization Composite International Diagnostic Interview (CIDI) Version 3.0 (Kessler & Üstün, 2004), 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). All items related to binge eating in this study had dichotomous (yes or no) responses. Because few children and adolescents meet full criteria for BED (Shomaker, Tanofsky-Kraff, & Yanovski, 2011) and subthreshold symptoms deserve research attention (Crow, Stewart Agras, Halmi, Mitchell, & Kraemer, 2002; Fairburn & Bohn, 2005; Stice et al., 2009), we combined adolescents with lifetime BED (n=162) and adolescents with lifetime SBED (n=275) and grouped them together as ‘adolescents with lifetime binge eating (n=437) to capture a wider range of adolescents with binge eating issues for the purpose of the current study.

2.2.1.1 Lifetime binge eating disorder (BED): The NCS-A’s definitions of BED followed the proposed DSM5 criteria (Swanson et al., 2011). Lifetime BED was defined as: 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 AN or BN (see Appendix A for details).

2.2.1.2 Lifetime Subthreshold Binge Eating Disorder (SBED): The NCS-A characterized lifetime SBED as: 1) ever engaged in binge eating at least two days a week for three months or longer; 2) with one or more out of four indicators of a sense of lack of control; and 3) does not meet diagnostic criteria for AN, BN, or BED. A SBED diagnosis does not require additional features of binge eating and marked distress due to binge eating (see Appendix B for details).

2.2.2 Personality—The NCS-A’s personality assessment was largely adapted from the *Zuckerman Kuhlman Personality Questionnaire (ZKPQ)* (Zuckerman et al., 1993). As reported in a prior study (Lee-Winn et al., 2016), we conducted an exploratory factor analysis to identify the structure of personality in this sample. We identified neuroticism, lack of planning, and sensation seeking as three factors and combined the lack of planning sensation seeking factors to constitute the impulsivity scale, following the ZKPQ scale of impulsivity-sensation seeking. Because each neuroticism and impulsivity scale had different numbers of items and the distribution for each scale was not normal, we performed a median split for scores on each of the scales and created the NI variable (a combination of high neuroticism and high impulsivity) for the purpose of our study.

2.2.3 Coping—The NCS-A assessed adolescents’ coping with twenty self-report items adapted primarily from the *Ways of Coping Scale (WOCS)* (S. Folkman & Lazarus, 1980; Susan Folkman & Lazarus, 1985) The items included both problem- and emotion-focused

coping as commonly assessed in coping scales (Skinner et al., 2003). Sample questions included, “How much would you seek advice from other people?” (problem-focused coping) and “How much would you daydream about how things used to be?” (emotion-focused coping).

We conducted an exploratory factor analysis (EFA) to identify the structure of coping in this sample, given variability in factor structure of the WOCS across prior samples (Edwards & O’Neill, 1998; Rexrode, Petersen, & O’Toole, 2008). Since responses on the coping measure were coded on a four-point Likert-like scale, we performed polychoric correlations for categorical items for EFA. Inspection of the results from a principal component analysis and a parallel analysis as well as the Scree plot indicated a three-factor solution that accounted for 46.84% of the variance. We identified three factors: 1) problem solving (4 items), 2), distraction (6 items) and 3) escape-avoidance (7 items).¹ Our EFA results replicate previous studies that found distraction to be a separate factor from escape-avoidance (Ayers, Sandler, West, & Roosa, 1996; Compas et al., 2001; Connor-Smith, Compas, Wadsworth, Thomsen, & Saltzman, 2000; Connor-Smith & Flachsbart, 2007; Skinner et al., 2003). The factor structure of the measure was gender invariant. Internal consistencies of the coping scales were as follows: Cronbach’s alpha for problem solving=0.64, distraction=0.61, and escape-avoidance=0.72.

2.2.4 Sociodemographic variables—Adolescents’ self-reported gender, race/ethnicity, age, and years of education were collected.

2.2.5 Statistical Analyses—Preliminary analyses included calculating descriptive statistics for each demographic variable (gender, race, age, and education) and exploring their associations with NI, coping styles, and lifetime binge eating using weighted Chi-square tests. To explore the association of demographic variables with coping styles, we performed a median split (median for poor problem solving=3; distraction=11; escape-avoidance=8) and dichotomized each coping style as high vs. low. For analyses with lifetime binge eating as our binary outcome of interest, we used generalized linear modeling with a modified Poisson approach to calculate adjusted prevalence ratios (Barros & Hirakata, 2003; Zou, 2004) For analyses with coping styles as our continuous outcome of interest, we used generalized linear modeling with Gaussian family and identity link.

To test our first hypothesis regarding the NI–coping associations, three coping styles (poor problem solving, distraction, and escape-avoidance) were our dependent variables in separate models, and NI (high NI vs. low NI) was our independent variable of interest. To test our second hypothesis regarding coping–binge eating associations, lifetime prevalence of binge eating (endorsed vs. not endorsed) was our dependent variable, and the three coping styles were our independent variables. We first conducted unadjusted analyses and then analyses adjusted for adolescents’ age, education, gender, and race, as these variables were associated with eating disorders in previous studies (Hudson et al., 2007; Marques et al., 2011; Swanson et al., 2011; Thompson-Brenner et al., 2013). Other sociodemographic correlates, including parental education, parental marital status, household income, and

¹Cross-loaded items, items with a loading lower than 0.40, and items with the use of ambiguous language were dropped.

urbanicity, were not controlled for in our models since they were not found to be associated with any eating disorders in the NCS-A (Swanson et al., 2011).

To assess coping as a moderator of the NI–binge eating association, we created interaction terms between NI and each coping style. We estimated three regression models predicting binge eating, each with a different NI \times coping style interaction term. To explore adolescent gender as a potential moderator of the NI–coping associations, we created an interaction term between NI and gender and entered the relevant term into three regression models, each predicting a different coping style outcome. To explore adolescent gender as a potential moderator of the coping style–binge eating relationships, we created interaction terms between each coping style and gender. We entered each of the three interaction terms into a different regression model predicting binge eating.

We used listwise deletion by default to handle missing data since less than 2% of responses in this study were missing. To account for the sampling method of the NCS-A, complex survey weights with proper variables for the survey’s clustering and stratification were applied prior to all analyses. Statistical significance was set at p-values less than 0.05. All analyses were performed using Stata12 (StataCorp, 2011).

3. Results

3.1 Sample Characteristics

We compared the lifetime binge eating group (n=437; female=55.84%) to the comparison group (n=9,59; female=50.58%). The mean ages were 15.40 years (SD=1.52) for the lifetime binge eating group and 15.17 years (SD=1.50) for the comparison group. The mean years of education were 8.93 years (SD=1.56) for the lifetime binge eating group and 8.75 years (SD=1.90) for the comparison group. The binge eating group contained a greater proportion of non-Whites than the comparison group ($\chi^2=20.32$, $p=0.003$). Gender, age, and education did not differ between the groups.

3.2 Association of Demographic Characteristics with Neuroticism-Impulsivity and Coping

The high NI group was different from the low NI group with regard to gender ($\chi^2=20.62$, $p=0.023$) with a greater proportion of females in the high NI Group. Race, age, and education did not differ by NI status.

There was a higher proportion of males than females in the high poor problem solving group ($\chi^2=65.98$, $p<0.001$) and the high distraction group ($\chi^2=42.42$, $p<0.001$), but a higher proportion of females than males in the high escape-avoidance group ($\chi^2=146.56$, $p<0.001$). There was a higher proportion of non-Whites than Whites in the high distraction group ($\chi^2=58.73$, $p<0.001$) and the high escape-avoidance group ($\chi^2=60.96$, $p<0.001$). Age and education did not differ by coping status.

3.3 Associations Between Personality Traits and Coping Styles

Table 1 displays correlations of impulsivity, neuroticism, and NI with poor problem solving, distraction, and escape-avoidance. Neuroticism showed a moderate correlation with escape-avoidance coping, while impulsivity showed very weak correlations with all three coping

styles. NI showed a moderate correlation with escape-avoidance coping and, as expected, strong correlations with neuroticism and impulsivity.

Our regression analyses showed high NI was significantly associated with all three coping styles (poor problem solving: $\beta=0.63$, $CI=0.36, 0.90$, $p<0.001$; distraction: $\beta=0.86$, $CI=0.55, 1.16$, $p<0.001$; escape-avoidance: $\beta=3.96$, $CI=3.62, 4.29$, $p<0.001$). Gender was a significant moderator of the NI and distraction coping association ($\beta=-0.68$, $CI=-1.33, -0.03$, $p=0.041$); the NI–distraction coping relationship was stronger for males ($\beta=1.20$, $CI=0.81, 1.58$, $p<0.001$) than females ($\beta=0.53$, $CI=0.02, 1.03$, $p=0.042$).

3.4 Associations Between Coping and Lifetime Binge Eating

Lifetime prevalence of binge eating was 1.13 times higher with increased escape-avoidance coping ($CI=1.10, 1.18$, $p<0.001$). Poor problem solving and distraction were not associated with lifetime prevalence of binge eating. None of the coping styles moderated the association between NI and lifetime binge eating (see Table 2). Interaction tests revealed no moderation by adolescent gender of the associations between coping styles and lifetime binge eating.

4. Discussion

This study investigated the associations among NI, coping styles, and lifetime prevalence of binge eating. Females reported higher levels of NI and used more escape-avoidance coping than males, whereas males reported using less problem solving and more distraction coping than females. Correlations among personality traits and coping styles were modest, corroborating prior evidence that personality and coping are not the same construct, and coping is not just a manifestation of personality (Carver & Connor-Smith, 2010). Our findings partially supported our hypotheses; NI was positively associated with all three coping styles, but only escape-avoidance coping was significantly associated with higher lifetime prevalence of binge eating. Counter to prediction, none of the coping styles moderated the association of NI and lifetime binge eating. Gender moderated the association between NI and distraction coping and showed the association was stronger for males than females but did not moderate the coping–lifetime binge eating associations.

Our findings indicate that adolescents with high neuroticism and impulsivity engage in more maladaptive coping than those low in these traits. Previous studies suggest possible explanations for these findings (Carver & Connor-Smith, 2010; Connor-Smith & Flachsbar, 2007). Evidence suggests that individuals with high neuroticism are more likely than those with low neuroticism to have frequent exposures to stressors, appraise stressful events as more threatening, and perceive their coping resources as less adequate (Bolger & Zuckerman, 1995; Grant & Langan-Fox, 2007). Because of their tendencies to experience stressful events more intensely than others, they are more likely to engage in coping strategies that provide immediate short-term relief of distress, particularly wishful thinking and withdrawal, but less likely to use problem solving skills that require focus and cognitive strengths (Connor-Smith & Flachsbar, 2007) and may lead to better resolution of the stressful situation. Individuals who score low in conscientiousness (i.e., high in impulsivity) tend to lack plans for dealing with potential stressors and are more likely to engage in

impulsive actions when faced with stressful situations, which can lead to greater problems (Carver & Connor-Smith, 2010; Vollrath, 2001). Impulsive individuals, therefore, are less likely to use problem solving but more likely to engage in unplanned, rash, and less deliberate coping, such as denial and substance use (Carver & Connor-Smith, 2010; Connor-Smith & Flachsbart, 2007). Based on these findings, we speculate that adolescents with high NI have increased vulnerability to stress and reduced capacity to problem solve, which in turn would lead to impulsive use of distraction or escape-avoidance coping. Future longitudinal and experimental studies are needed to further evaluate this hypothesized pathway.

Our finding of a positive association between escape-avoidance coping and binge eating is similar to previous findings of a population-based study on escape-avoidance coping among individuals with current or past DSM-IV eating disorders, including AN, BN, a combination of AN and BN, or eating disorders not otherwise specified (EDNOS) (Ghaderi & Scott, 2000) and findings from studies with community adolescent samples on escape-avoidance coping and binge eating (Sierra Baigrie, 2008; Sierra-Baigrie, Lemos-Giráldez, Paino, & Fonseca-Pedrero, 2012). Evidence suggests that escape-avoidance coping serves as a short-term stress relief by immediately disconnecting individuals from the stressful situation (Aldao et al., 2010; Connor-Smith & Flachsbart, 2007). This approach, however, may be ineffective in the long term since it prevents individuals from engaging in active problem solving to resolve issues (Ben-Zur, 2009) and may also result in repeated use of unhealthy behaviors (e.g., substance use, problematic eating behaviors) as avoidance techniques (Aldao et al., 2010; Connor-Smith & Flachsbart, 2007). Escape-avoidance coping has been shown to result in a paradoxical increase in unpleasant thoughts about stressors, which in turn increases negative mood (Carver & Connor-Smith, 2010; Najmi & Wegner, 2008). Our findings highlight that escape-avoidance coping may be a key correlate of binge eating among adolescents.

We were not, however, able to investigate whether adolescents use binge eating as a coping strategy. Escape theory conceptualizes binge eating as a means of escaping from aversive self-awareness (e.g., high standards of self; sensitivity to others' perception of self) that is accompanied by emotional distress (Heatherton & Baumeister, 1991). Future assessment of whether adolescents engage in binge eating as a form of escape-avoidance coping would be beneficial in clarifying the associations between escape-avoidance coping and binge eating.

In contrast to our expectations, no coping styles moderated the association of NI and lifetime binge eating. One possible explanation is that coping may be a mediator of personality–binge eating associations, rather than a moderator. As we used cross-sectional data, we were not able to conduct conclusive mediation analyses. Future longitudinal studies should assess the role of coping as a mediator between personality and binge eating. Another potential explanation is that personality and coping may be separate correlates of binge eating that do not necessarily have an additive effect. Future studies should also explore the use of multiple coping styles and their associations with binge eating, as coping strategies may be used in combination or sequentially. Findings from such investigations also may be helpful in differentiating coping strategies with respect to their long-term adaptiveness versus their short-term effectiveness (i.e., immediate effects on reducing experienced distress) of coping

(Edlynn, Gaylord-Harden, Richards, & Miller, 2008; Tolan, Guerra, & Montaini-Klov Dahl, 1997).

We found that the association between NI and distraction coping was stronger for males than females. A previous study found that while both male and female youth pathological gamblers displayed increased impulsivity, males but not females reported increased use of distraction coping (Nower et al., 2004). Our findings indicate that it may be beneficial from a clinical perspective to target prevention or intervention efforts by treating male adolescents who frequently use distraction coping in stressful situations. Additional implementation studies on fostering adaptive coping skills, both universal and gender-specific, may further guide researchers and clinicians to refine screening and intervention strategies.

Our findings are consistent with research indicating that interventions to reduce the use of maladaptive coping styles may decrease binge eating. For example, evidence-based treatments such as dialectical behavior therapy (DBT) (Linehan, 1993) and acceptance commitment therapy (Hayes, Strosahl, & Wilson, 1999) that include mindfulness training to target escape-avoidance as dysfunctional coping and promote the use of appropriate emotion regulation have been shown to reduce binge episodes in clinical samples (Chen, Matthews, Allen, Kuo, & Linehan, 2008; Lillis, Hayes, & Levin, 2011). DBT, in particular, encourages the use of short-term distraction as a temporary coping skill to tolerate distress so one can build toward more effective long-term coping strategies (McKay, Wood, & Brantley, 2007). Future studies should investigate whether these evidence-based treatments are effective in modifying maladaptive personality traits and coping styles among adolescents.

Our findings should be interpreted with several limitations in mind. First, as the NCS-A is a cross-sectional study, we cannot make causal inferences about the relationships among personality, coping, and binge eating. Future longitudinal studies should assess these associations by using, for example, participants' daily reports to better understand immediate effects of perceived stress on use of coping strategies, including binge eating. Studies with experimental designs that expose participants to standardized stressors may also allow researchers to observe and to test hypotheses regarding participants' coping strategies, personality traits, and binge eating behavior. Second, the NCS-A used layperson interviewers to gather information regarding binge eating from adolescents. The CIDI, however, is a widely used measure in population-level studies and has good concordance with clinician diagnoses (Kessler, Avenevoli, Green, et al., 2009). Third, two of the scales on the NCS-A's coping measures had internal consistencies less than the generally accepted cutoff of 0.70 (0.61 and 0.64 for distraction and problem solving respectively). The coping scales were self-reported, and responses may have been influenced by, for example, memory bias (Fredrickson, 2000). The authors are not aware of any clinical interviews to assess coping. Self-reports are also not necessarily unsound or less significant than clinical assessments (Chan, 2009). Fourth, as the NCS-A dataset does not contain information on the body mass index of adolescents, we could not control for it in our analyses. Lastly, the NCS-A collected only dispositional coping styles (i.e., general responses to stress). Effectiveness of coping strategies may be context-dependent. Future investigations should assess situational coping strategies (i.e., specific responses to a particular stressor) to understand which kinds of coping strategies are effective for which types of settings, as well as

individuals' coping flexibility (Cheng, 2003; Cheng & Cheung, 2005) to explore associations between the ability to seek and use different coping strategies for different stressful situations and problematic eating behavior.

Despite these limitations, this study extends the current understanding of the associations among personality, coping, and binge eating among adolescents. Our findings have potential to guide future research on risk factors for binge eating and the development of programs that could modify both maladaptive personality traits and coping styles to lower problematic eating among adolescents.

Acknowledgments

Role of Funding Sources

S. Reinblatt received research support from the U.S. National Institutes of Health, National Institute of Mental Health (NIMH) for manuscript preparation (K23MH083000). The NIMH had no role in the study design, collection, analysis or interpretation of the data and the decision to submit the paper for publication.

This research was supported in part by the Intramural Research Program of the Eunice Kennedy Shriver National Institute of Child Health and Human Development.

References

- Aldao A, Nolen-Hoeksema S, Schweizer S. Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*. 2010; 30(2):217–237. <http://doi.org/10.1016/j.cpr.2009.11.004>. [PubMed: 20015584]
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5. Arlington, VA: American Psychiatric Association; 2013.
- Austin SB. A public health approach to eating disorders prevention: It's time for public health professionals to take a seat at the table. *BMC Public Health*. 2012; 12(1):854. <http://doi.org/10.1186/1471-2458-12-854>. [PubMed: 23043459]
- Ayers TS, Sandler IN, West SG, Roosa MW. A dispositional and situational assessment of children's coping: Testing alternative models of coping. *Journal of Personality*. 1996; 64(4):923–958. <http://doi.org/10.1111/j.1467-6494.1996.tb00949.x>. [PubMed: 8956518]
- Ball K, Lee C. Relationships between psychological stress, coping and disordered eating: A review. *Psychology & Health*. 2000; 14(6):1007–1035. <http://doi.org/10.1080/08870440008407364>. [PubMed: 22175259]
- Barros AJD, Hirakata VN. Alternatives for logistic regression in cross-sectional studies: An empirical comparison of models that directly estimate the prevalence ratio. *BMC Medical Research Methodology*. 2003; 3:21. <http://doi.org/10.1186/1471-2288-3-21>. [PubMed: 14567763]
- Ben-Zur H. Coping styles and affect. *International Journal of Stress Management*. 2009; 16(2):87–101. <http://doi.org/10.1037/a0015731>.
- Bloks H, Spinhoven P, Callewaert I, Willemse-Koning C, Turksma A. Changes in coping styles and recovery after inpatient treatment for severe eating disorders. *European Eating Disorders Review*. 2001; 9(6):397–415. <http://doi.org/10.1002/erv.408>.
- Bloks H, Van Furth EF, Callewaert I, Hoek HW. Coping Strategies and Recovery in Patients with a Severe Eating Disorder. *Eating Disorders: The Journal of Treatment & Prevention*. 2004; 12(2):157–169. <http://doi.org/10.1080/10640260490445131>.
- Bolger N, Zuckerman A. A framework for studying personality in the stress process. *Journal of Personality and Social Psychology*. 1995; 69(5):890–902. <http://doi.org/10.1037/0022-3514.69.5.890>. [PubMed: 7473036]
- Broderick PC, Korteland C. Coping style and depression in early adolescence: Relationships to gender, gender role, and implicit beliefs. *Sex Roles*. 2002; 46(7–8):201–213. <http://doi.org/10.1023/A:1019946714220>.

- Brytek-Matera A, Schiltz L. Comparative structural study of the configuration of coping strategies among female patients with eating disorders and a non-clinical control group. *Psychiatria Danubina*. 2013; 25(4):359–365. [PubMed: 24247047]
- Carver CS, Connor-Smith J. Personality and coping. *Annual Review of Psychology*. 2010; 61:679–704. <http://doi.org/10.1146/annurev.psych.093008.100352>.
- Chan, D. Statistical and methodological myths and urban legends: Doctrine, verity and fable in the organizational and social sciences. New York, NY, US: Routledge/Taylor & Francis Group; 2009. So why ask me? Are self-report data really that bad?; p. 309-336.
- Chen EY, Matthews L, Allen C, Kuo JR, Linehan MM. Dialectical behavior therapy for clients with binge-eating disorder or bulimia nervosa and borderline personality disorder. *International Journal of Eating Disorders*. 2008; 41(6):505–512. <http://doi.org/10.1002/eat.20522>. [PubMed: 18348281]
- Cheng C. Cognitive and motivational processes underlying coping flexibility: a dual-process model. *Journal of Personality and Social Psychology*. 2003; 84(2):425–438. [PubMed: 12585814]
- Cheng C, Cheung MWL. Cognitive Processes Underlying Coping Flexibility: Differentiation and Integration. *Journal of Personality*. 2005; 73(4):859–886. <http://doi.org/10.1111/j.1467-6494.2005.00331.x>. [PubMed: 15958137]
- Compas BE, Champion JE, Reeslund K. Coping with Stress: Implications for Preventive Interventions with Adolescents. *Prevention Researcher*. 2005; 12(3):17–20.
- Compas BE, Connor-Smith JK, Saltzman H, Thomsen AH, Wadsworth ME. Coping with stress during childhood and adolescence: Problems, progress, and potential in theory and research. *Psychological Bulletin*. 2001; 127(1):87–127. <http://doi.org/10.1037/0033-2909.127.1.87>. [PubMed: 11271757]
- Connor-Smith JK, Compas BE, Wadsworth ME, Thomsen AH, Saltzman H. Responses to stress in adolescence: Measurement of coping and involuntary stress responses. *Journal of Consulting and Clinical Psychology*. 2000; 68(6):976–992. <http://doi.org/10.1037/0022-006X.68.6.976>. [PubMed: 11142550]
- Connor-Smith JK, Flachsbart C. Relations between personality and coping: A meta-analysis. *Journal of Personality and Social Psychology*. 2007; 93(6):1080–1107. <http://doi.org/10.1037/0022-3514.93.6.1080.supp>. [PubMed: 18072856]
- Costa, PT.; McCrae, RR. Revised NEO Personality Inventory (NEO PI-R) and NEO Five-Factor Inventory (NEO-FFI). Odessa, FL: Psychological Assessment Resources; 1992.
- Crow SJ, Stewart Agras W, Halmi K, Mitchell JE, Kraemer HC. Full syndromal versus subthreshold anorexia nervosa, bulimia nervosa, and binge eating disorder: A multicenter study. *The International Journal of Eating Disorders*. 2002; 32(3):309–318. <http://doi.org/10.1002/eat.10088>. [PubMed: 12210645]
- Davis-Becker K, Peterson CM, Fischer S. The relationship of trait negative urgency and negative affect to disordered eating in men and women. *Personality and Individual Differences*. 2014; 56:9–14. <http://doi.org/10.1016/j.paid.2013.08.010>.
- Dennard EE, Richards CS. Depression and coping in subthreshold eating disorders. *Eating Behaviors*. 2013; 14(3):325–329. <http://doi.org/10.1016/j.eatbeh.2013.05.011>. [PubMed: 23910775]
- Edlynn ES, Gaylord-Harden NK, Richards MH, Miller SA. African American inner-city youth exposed to violence: Coping skills as a moderator for anxiety. *American Journal of Orthopsychiatry*. 2008; 78(2):249–258. <http://doi.org/10.1037/a0013948>. [PubMed: 18954188]
- Edwards JR, O’Neill RM. The construct validity of scores on the Ways of Coping Questionnaire: Confirmatory analysis of alternative factor structures. *Educational and Psychological Measurement*. 1998; 58(6):955–983. <http://doi.org/10.1177/0013164498058006007>.
- Eysenck S, Eysenck H, Barrett P. A revised version of the psychoticism scale. *Personality and Individual Differences*. 1985; 6(1):21–29. [http://doi.org/10.1016/0191-8869\(85\)90026-1](http://doi.org/10.1016/0191-8869(85)90026-1).
- Fairburn C, Bohn K. Eating disorder NOS (EDNOS): An example of the troublesome “not otherwise specified” (NOS) category in DSM-IV. *Behaviour Research and Therapy*. 2005; 43(6):691–701. <http://doi.org/10.1016/j.brat.2004.06.011>. [PubMed: 15890163]
- Fairburn C, Doll H, Welch S, Hay P, Davies B, O’Connor M. Risk factors for binge eating disorder: A community-based, case-control study. *Archives of General Psychiatry*. 1998; 55(5):425–432. <http://doi.org/10.1001/archpsyc.55.5.425>. [PubMed: 9596045]

- Fischer S, Smith GT, Cyders MA. Another look at impulsivity: A meta-analytic review comparing specific dispositions to rash action in their relationship to bulimic symptoms. *Clinical Psychology Review*. 2008; 28(8):1413–1425. <http://doi.org/10.1016/j.cpr.2008.09.001>. [PubMed: 18848741]
- Fitzsimmons EE, Bardone-Cone AM. Differences in coping across stages of recovery from an eating disorder. *International Journal of Eating Disorders*. 2010; 43(8):689–693. <http://doi.org/10.1002/eat.20781>. [PubMed: 19950115]
- Folkman S, Lazarus RS. An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behavior*. 1980; 21(3):219–239. [PubMed: 7410799]
- Folkman S, Lazarus RS. If it changes it must be a process: Study of emotion and coping during three stages of a college examination. *Journal of Personality and Social Psychology*. 1985; 48(1):150–170. <http://doi.org/10.1037/0022-3514.48.1.150>. [PubMed: 2980281]
- Folkman S, Lazarus RS, Dunkel-Schetter C, DeLongis A, Gruen RJ. Dynamics of a stressful encounter: Cognitive appraisal, coping, and encounter outcomes. *Journal of Personality and Social Psychology*. 1986; 50(5):992–1003. <http://doi.org/10.1037/0022-3514.50.5.992>. [PubMed: 3712234]
- Fredrickson BL. Extracting Meaning From Past Affective Experiences: The Importance of Peaks, Ends, and Specific Emotions. *Cognition and Emotion*. 2000; 14(4):577–606.
- Freeman LMY, Gil KM. Daily stress, coping, and dietary restraint in binge eating. *The International Journal of Eating Disorders*. 2004; 36(2):204–212. <http://doi.org/10.1002/eat.20012>. [PubMed: 15282690]
- García C. Conceptualization and measurement of coping during adolescence: A review of the literature. *Journal of Nursing Scholarship*. 2010; 42(2):166–185. <http://doi.org/10.1111/j.1547-5069.2009.01327.x>. [PubMed: 20618601]
- García-Grau E, Fusté A, Miró A, Saldaña C, Bados A. Coping style and disturbed eating attitudes in adolescent girls. *The International Journal of Eating Disorders*. 2002; 32(1):116–120. <http://doi.org/10.1002/eat.10060>. [PubMed: 12183940]
- García-Grau E, Fusté A, Miró A, Saldaña C, Bados A. Coping style and vulnerability to eating disorders in adolescent boys. *European Eating Disorders Review*. 2004; 12(1):61–67. <http://doi.org/10.1002/erv.550>.
- Ghaderi A, Scott B. Coping in dieting and eating disorders. *Journal of Nervous and Mental Disease*. 2000; 188(5):273–279. <http://doi.org/10.1097/00005053-200005000-00004>. [PubMed: 10830564]
- Grant S, Langan-Fox J. Occupational stress, coping and strain: The combined/interactive effect of the Big Five traits. *Personality and Individual Differences*. 2006; 41(4):719–732. <http://doi.org/10.1016/j.paid.2006.03.008>.
- Grant S, Langan-Fox J. Personality and the occupational stressor-strain relationship: The role of the Big Five. *Journal of Occupational Health Psychology*. 2007; 12(1):20–33. <http://doi.org/10.1037/1076-8998.12.1.20>. [PubMed: 17257064]
- Green JG, Avenevoli S, Gruber MJ, Kessler RC, Lakoma MD, Merikangas KR, ... Zaslavsky AM. Validation of diagnoses of distress disorders in the US National Comorbidity Survey Replication Adolescent Supplement (NCS-A). *International Journal of Methods in Psychiatric Research*. 2012; 21(1):41–51. <http://doi.org/10.1002/mpr.357>. [PubMed: 22086845]
- Hasking PA. Reinforcement sensitivity, coping, disordered eating and drinking behaviour in adolescents. *Personality and Individual Differences*. 2006; 40(4):677–688. <http://doi.org/10.1016/j.paid.2005.07.017>.
- Hayes, SC.; Strosahl, KD.; Wilson, KG. *Acceptance and commitment therapy: An experiential approach to behavior change*. New York, NY US: Guilford Press; 1999.
- Heatherton TF, Baumeister RF. Binge eating as escape from self-awareness. *Psychological Bulletin*. 1991; 110(1):86–108. <http://doi.org/10.1037/0033-2909.110.1.86>. [PubMed: 1891520]
- Hudson JI, Hiripi E, Pope HGJ, Kessler RC. The Prevalence and Correlates of Eating Disorders in the National Comorbidity Survey Replication. *Biological Psychiatry*. 2007; 61(3):348–358. <http://doi.org/10.1016/j.biopsych.2006.03.040>. [PubMed: 16815322]
- Kardum I, Krapic N. Personality traits, stressful life events, and coping styles in early adolescence. *Personality and Individual Differences*. 2001; 30(3):503–515. [http://doi.org/10.1016/S0191-8869\(00\)00041-6](http://doi.org/10.1016/S0191-8869(00)00041-6).

- Kato K, Pedersen NL. Personality and coping: a study of twins reared apart and twins reared together. *Behavior Genetics*. 2005; 35(2):147–158. <http://doi.org/10.1007/s10519-004-1015-8>. [PubMed: 15685428]
- Kelly NR, Lydecker JA, Mazzeo SE. Positive cognitive coping strategies and binge eating in college women. *Eating Behaviors*. 2012; 13(3):289–292. <http://doi.org/10.1016/j.eatbeh.2012.03.012>. [PubMed: 22664415]
- Kessler RC, Avenevoli S, Costello EJ, Green JG, Gruber MJ, Heeringa S, ... Zaslavsky AM. National comorbidity survey replication adolescent supplement (NCS-A): II. Overview and design. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2009; 48(4):380–385. <http://doi.org/10.1097/CHI.0b013e3181999705>. [PubMed: 19242381]
- Kessler RC, Avenevoli S, Green J, Gruber MJ, Guyer M, He Y, ... Zaslavsky AM. National comorbidity survey replication adolescent supplement (NCS-A): III. Concordance of DSM-IV/CIDI diagnoses with clinical reassessments. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2009; 48(4):386–399. <http://doi.org/10.1097/CHI.0b013e31819a1cbc>. [PubMed: 19252450]
- Kessler RC, Üstün TB. The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *International Journal of Methods in Psychiatric Research*. 2004; 13(2):93–121. <http://doi.org/10.1002/mpr.168>. [PubMed: 15297906]
- Lazarus, RS.; Folkman, S. *Stress, Appraisal, and Coping*. New York: Springer Publishing Company; 1984.
- Lee-Winn AE, Townsend L, Reinblatt SP, Mendelson T. Associations of neuroticism and impulsivity with binge eating in a nationally representative sample of adolescents in the United States. *Personality and Individual Differences*. 2016; 90:66–72. <http://doi.org/10.1016/j.paid.2015.10.042>. [PubMed: 26705374]
- Lillis J, Hayes SC, Levin ME. Binge eating and weight control: The role of experiential avoidance. *Behavior Modification*. 2011; 35(3):252–264. <http://doi.org/10.1177/0145445510397178>. [PubMed: 21362746]
- Linehan, M. *Cognitive-behavioral Treatment of Borderline Personality Disorder*. Guilford Press; 1993.
- Lobera IJ, Estébanez S, Fernández MJS, Bautista EÁ, Garrido O. Coping strategies in eating disorders. *European Eating Disorders Review*. 2009; 17(3):220–226. <http://doi.org/10.1002/erv.920>. [PubMed: 19274619]
- Marcus, MD.; Wildes, JE. Eating disorders: Binge Eating. In: Caballero, B., editor. *Encyclopedia of Human Nutrition (Third Edition)*. Waltham: Academic Press; 2013. p. 120-125. Retrieved from <http://www.sciencedirect.com/science/article/pii/B9780123750839000854>
- Marques L, Alegria M, Becker AE, Chen C, Fang A, Chosak A, Diniz JB. Comparative prevalence, correlates of impairment, and service utilization for eating disorders across US ethnic groups: Implications for reducing ethnic disparities in health care access for eating disorders. *International Journal of Eating Disorders*. 2011; 44(5):412–420. <http://doi.org/10.1002/eat.20787>. [PubMed: 20665700]
- McKay, M.; Wood, J.; Brantley, J. *The Dialectical Behavior Therapy Skills Workbook: Practical DBT Exercises for Learning Mindfulness, Interpersonal Effectiveness, Emotion Regulation, a*. New Harbinger Publications; 2007.
- McLaughlin KA, Hatzenbuehler ML, Mennin DS, Nolen-Hoeksema S. Emotion dysregulation and adolescent psychopathology: A prospective study. *Behaviour Research and Therapy*. 2011; 49(9): 544–554. <http://doi.org/10.1016/j.brat.2011.06.003>. [PubMed: 21718967]
- Merikangas K, Avenevoli S, Costello J, Koretz D, Kessler RC. National comorbidity survey replication adolescent supplement (NCS-A): I. Background and measures. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2009; 48(4):367–369. <http://doi.org/10.1097/CHI.0b013e31819996f1>. [PubMed: 19242382]
- Nagata T, Matsuyama M, Kiriike N, Iketani T, Oshima J. Stress coping strategy in Japanese patients with eating disorders: relationship with bulimic and impulsive behaviors. *The Journal of Nervous and Mental Disease*. 2000; 188(5):280–286. [PubMed: 10830565]

- Najmi, S.; Wegner, DM. Handbook of approach and avoidance motivation. New York, NY, US: Psychology Press; 2008. Thought suppression and psychopathology; p. 447-459.
- Neumark-Sztainer DR, Wall MM, Haines JI, Story MT, Sherwood NE, van den Berg PA. Shared risk and protective factors for overweight and disordered eating in adolescents. *American Journal of Preventive Medicine*. 2007; 33(5):359–369. <http://doi.org/10.1016/j.amepre.2007.07.031>. [PubMed: 17950400]
- Nower L, Derevensky JL, Gupta R. The Relationship of Impulsivity, Sensation Seeking, Coping, and Substance Use in Youth Gamblers. *Psychology of Addictive Behaviors*. 2004; 18(1):49–55. [PubMed: 15008685]
- Racine SE, Keel PK, Burt SA, Sisk CL, Neale M, Boker S, Klump KL. Exploring the relationship between negative urgency and dysregulated eating: Etiologic associations and the role of negative affect. *Journal of Abnormal Psychology*. 2013; 122(2):433–444. <http://doi.org/10.1037/a0031250>. [PubMed: 23356217]
- Rexrode KR, Petersen S, O'Toole S. The Ways of Coping Scale: A reliability generalization study. *Educational and Psychological Measurement*. 2008; 68(2):262–280. <http://doi.org/10.1177/0013164407310128>.
- Schonert-Reichl K. Adolescent Help-Seeking Behaviors. *Prevention Researcher*. 2003; 10(4):1–3.
- Settles RE, Fischer S, Cyders MA, Combs JL, Gunn RL, Smith GT. Negative urgency: A personality predictor of externalizing behavior characterized by neuroticism, low conscientiousness, and disagreeableness. *Journal of Abnormal Psychology*. 2012; 121(1):160–172. <http://doi.org/10.1037/a0024948>. [PubMed: 21859164]
- Shomaker, LB.; Tanofsky-Kraff, M.; Yanovski, JA. Disinhibited Eating and Body Weight in Youth. In: Preedy, VR.; Watson, RR.; Martin, CR., editors. *Handbook of Behavior, Food and Nutrition*. Springer; New York: 2011. p. 2183-2200. Retrieved from http://link.springer.com/chapter/10.1007/978-0-387-92271-3_139
- Sierra Baigrie S. Examining the relationship between binge eating and coping strategies and the definition of binge eating in a sample of Spanish adolescents. *The Spanish Journal of Psychology*. 2008; 11(1):172–80. [PubMed: 18630658]
- Sierra-Baigrie S, Lemos-Giráldez S, Paino M, Fonseca-Pedrero E. Exploring the relationship between coping strategies and binge eating in nonclinical adolescents. *European Eating Disorders Review: The Journal of the Eating Disorders Association*. 2012; 20(1):e63–69. <http://doi.org/10.1002/erv.1103>. [PubMed: 21413104]
- Silk JS, Vanderbilt-Adriance E, Shaw DS, Forbes EE, Whalen DJ, Ryan ND, Dahl RE. Resilience among children and adolescents at risk for depression: Mediation and moderation across social and neurobiological contexts. *Development and Psychopathology*. 2007; 19(3):841–865. <http://doi.org/10.1017/S0954579407000417>. [PubMed: 17705905]
- Skinner EA, Edge K, Altman J, Sherwood H. Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological Bulletin*. 2003; 129(2): 216–269. <http://doi.org/10.1037/0033-2909.129.2.216>. [PubMed: 12696840]
- Sonneville KR, Horton NJ, Micali N, Crosby RD, Swanson SA, Solmi F, Field AE. Longitudinal associations between binge eating and overeating and adverse outcomes among adolescents and young adults: does loss of control matter? *JAMA Pediatrics*. 2013; 167(2):149–155. <http://doi.org/10.1001/2013.jamapediatrics.12>. [PubMed: 23229786]
- Stankovic, A.; Potenza, MN. Obesity and Binge Eating Disorder. In: Koob, GF.; Moal, ML.; Thompson, RF., editors. *Encyclopedia of Behavioral Neuroscience*. Oxford: Academic Press; 2010. p. 477-483. Retrieved from <http://www.sciencedirect.com/science/article/pii/B9780080453965001822>
- StataCorp. *Stata Statistical Software: Release 12*. College Station, TX: StataCorp LP; 2011.
- Steinberg L, Avenevoli S. The role of context in the development of psychopathology: A conceptual framework and some speculative propositions. *Child Development*. 2000; 71(1):66–74. [PubMed: 10836559]
- Slice E, Marti CN, Shaw H, Jaconis M. An 8-year longitudinal study of the natural history of threshold, subthreshold, and partial eating disorders from a community sample of adolescents.

- Journal of Abnormal Psychology. 2009; 118(3):587–597. <http://doi.org/10.1037/a0016481>. [PubMed: 19685955]
- Sveinbjornsdottir S, Thorsteinsson EB. Adolescent coping scales: A critical psychometric review. *Scandinavian Journal of Psychology*. 2008; 49(6):533–548. <http://doi.org/10.1111/j.1467-9450.2008.00669.x>. [PubMed: 18489531]
- Swanson SA, Crow SJ, Le Grange D, Swendsen J, Merikangas KR. Prevalence and correlates of eating disorders in adolescents: Results from the national comorbidity survey replication adolescent supplement. *Archives of General Psychiatry*. 2011; 68(7):714–723. <http://doi.org/10.1001/archgenpsychiatry.2011.22>. [PubMed: 21383252]
- Tackett JL. Evaluating models of the personality–psychopathology relationship in children and adolescents. *Clinical Psychology Review*. 2006; 26(5):584–599. <http://doi.org/10.1016/j.cpr.2006.04.003>. [PubMed: 16820251]
- Thompson-Brenner H, Franko DL, Thompson DR, Grilo CM, Boisseau CL, Roehrig JP, ... Wilson GT. Race/ethnicity, education, and treatment parameters as moderators and predictors of outcome in binge eating disorder. *Journal of Consulting and Clinical Psychology*. 2013; 81(4):710–721. <http://doi.org/10.1037/a0032946>. [PubMed: 23647283]
- Tolan, PH.; Guerra, NG.; Montaini-Klov Dahl, LR. Staying out of harm’s way: Coping and the development of inner-city children. In: Wolchik, SA.; Sandler, IN., editors. *Handbook of children’s coping: Linking theory and intervention*. New York, NY, US: Plenum Press; 1997. p. 453-479.
- Troop NA, Holbrey A, Treasure JL. Stress, coping, and crisis support in eating disorders. *International Journal of Eating Disorders*. 1998; 24(2):157–166. [http://doi.org/10.1002/\(SICI\)1098-108X\(199809\)24:2<157::AID-EAT5>3.0.CO;2-D](http://doi.org/10.1002/(SICI)1098-108X(199809)24:2<157::AID-EAT5>3.0.CO;2-D). [PubMed: 9697014]
- Troop NA, Holbrey A, Trowler R, Treasure JL. Ways of coping in women with eating disorders. *Journal of Nervous and Mental Disease*. 1994; 182(10):535–540. <http://doi.org/10.1097/00005053-199410000-00001>. [PubMed: 7931199]
- Vollrath M. Personality and stress. *Scandinavian Journal of Psychology*. 2001; 42(4):335–347. <http://doi.org/10.1111/1467-9450.00245>. [PubMed: 11547909]
- Vollrath M, Torgersen S. Personality types and coping. *Personality and Individual Differences*. 2000; 29(2):367–378. [http://doi.org/10.1016/S0191-8869\(99\)00199-3](http://doi.org/10.1016/S0191-8869(99)00199-3).
- Whiteside SP, Lynam DR. The Five Factor Model and impulsivity: Using a structural model of personality to understand impulsivity. *Personality and Individual Differences*. 2001; 30(4):669–689. [http://doi.org/10.1016/S0191-8869\(00\)00064-7](http://doi.org/10.1016/S0191-8869(00)00064-7).
- Wolff GE, Crosby RD, Roberts JA, Wittrock DA. Differences in daily stress, mood, coping, and eating behavior in binge eating and nonbinge eating college women. *Addictive Behaviors*. 2000; 25(2): 205–216. [PubMed: 10795945]
- Wonderlich-Tierney AL, Vander Wal JS. The effects of social support and coping on the relationship between social anxiety and eating disorders. *Eating Behaviors*. 2010; 11(2):85–91. <http://doi.org/10.1016/j.eatbeh.2009.10.002>. [PubMed: 20188291]
- Zou G. A modified Poisson regression approach to prospective studies with binary data. *American Journal of Epidemiology*. 2004; 159(7):702–706. [PubMed: 15033648]
- Zuckerman, M. Zuckerman-Kuhlman personality questionnaire (ZKPQ): An alternative five-factorial model. In: de Raad, B.; Perugini, M., editors. *Big five assessment*. Ashland, OH, US: Hogrefe & Huber Publishers; 2002. p. 376-392.
- Zuckerman M, Michael D, Joireman J, Teta P, Kraft M. A comparison of three structural models for personality: The Big Three, the Big Five, and the Alternative Five. *Journal of Personality and Social Psychology*. 1993; 65(4):757–768. <http://doi.org/10.1037/0022-3514.65.4.757>.

Appendix A

Algorithm for Binge Eating Disorder

- A. Both 1 and 2

1. Recurrent episodes of eating, in a discrete period of time (e.g., within any 2 hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances
 2. A sense of lack of control over eating disorder during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating), indicated by one (or more) of the following:
 1. eating until feeling uncomfortably full,
 2. eating large amounts of food when not feeling hungry,
 3. eating alone because of being embarrassed by how much one is eating, or
 4. being often upset both during and after binge eating.
- B.** The binge eating episodes are associated with three (or more) of the following:
1. eating much more quickly than usual,
 2. eating until feeling uncomfortably full,
 3. eating large amounts of food when not feeling hungry,
 4. eating alone because of being embarrassed by how much one is eating, or
 5. feeling guilty, very upset with oneself, or depressed after binge eating
- C.** The binge eating episodes are accompanied with marked distress regarding binge eating, indicated by one (or more) of the following:
1. feeling guilty, very upset with oneself, or depressed after binge eating
 2. worry about the long term effects of binge eating on health, weight, or on body shape
 3. around the time binging—very afraid you would gain weight
 4. being often upset during and after binge eating
- D.** The binge eating occurs, on average at least 2 days a week for 3 months
- E.** The binge eating is not associated with the regular use of inappropriate compensatory behaviors (e.g., purging, fasting, excessive exercise) and

does not occur exclusively during the course of Anorexia Nervosa or Bulimia Nervosa.

Appendix B

Algorithm for Subthreshold Binge Eating

- A.** Both 1 and 2
 - 1.** Recurrent episodes of eating, in a discrete period of time (e.g., within any 2 hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances
 - 2.** A sense of lack of control over eating disorder during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating), indicated by one (or more) of the following:
 - 1.** eating until feeling uncomfortably full,
 - 2.** eating large amounts of food when not feeling hungry,
 - 3.** eating alone because of being embarrassed by how much one is eating, or
 - 4.** being often upset both during and after binge eating.
- B.** The binge eating occurs, on average at least 2 days a week for 3 months

Highlights

- Females reported higher neuroticism-impulsivity (NI) and more escape-avoidance coping.
- Males reported using less problem solving and more distraction coping than females.
- Adolescents with high NI reported to use more maladaptive coping styles.
- The NI–distraction coping association was stronger in males than females.
- Escape-avoidance coping was associated with higher lifetime prevalence of binge eating.

Correlations among personality traits and coping styles in the National Comorbidity Survey: Adolescent Supplement (2001–2004)

Table 1

	Neuroticism	Impulsivity	Neuroticism-Impulsivity	Poor Problem Solving	Distraction	Escape-Avoidance
Neuroticism	-	0.14	0.70	0.05	0.04	0.42
Impulsivity		-	0.81	0.12	0.10	0.18
Neuroticism-Impulsivity			-	0.11	0.09	0.38
Poor problem solving				-	-0.10	-0.05
Distraction					-	0.26
Escape-Avoidance						-

Note. All correlations are significant at p 0.001

Table 2

Regression analyses evaluating the associations of personality, coping, and interactions of personality and coping with lifetime binge eating in the National Comorbidity Survey: Adolescent Supplement (2001–2004)

Lifetime Binge Eating				
Variables	β	SE	t	p
Coping				
Poor Problem Solving	1.07	0.05	1.64	0.108
Distraction	1.06	0.03	1.95	0.058
Escape-Avoidance	1.14	0.02	7.71	<0.001 *
Interaction: Personality \times Coping				
NI \times Poor Problem Solving	1.04	0.11	0.36	0.719
NI \times Distraction	0.86	0.07	-1.98	0.054
NI \times Escape-Avoidance	0.93	0.04	-1.50	0.140

SE=linearized standard error

NI=Neuroticism-Impulsivity

* statistically significant