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Explaining the Relationship between Neuroticism and Eating Disorder Risk in Female University Students: The Roles of Perceived Stress and Coping Style

Vanessa Bruce
University of Windsor

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By Vanessa A. Bruce, B.A. (Hons)

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by

Vanessa A. Bruce, B.A. (Hons)

APPROVED BY:

Dr. S. McMahon
Faculty of Nursing

Dr. S. Voelker
Department of Psychology

Dr. C. D. Thomas, Advisor
Department of Psychology

Dr. R. Orr, Chair of Defense
Department of Psychology

September 11, 2009

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Abstract

Although it is well established that neuroticism is associated with many psychiatric disorders, including eating disorders, little is known about the mechanism through which they are related. The purpose of this two-stage study was to test three models to determine if stress and coping might help explain this relationship. In the first stage, female undergraduates (119), an at-risk population for eating disorders, completed the NEO PI-R, the EDI-3, the YA-FILES, and the CISS. In the second stage of the study, participants completed daily records of perceived stress, chosen coping strategies, and change in daily eating habits for a period of two weeks. Previous relationships between neuroticism, eating disorder risk, and coping styles were supported. Neither stress, nor coping style explained the relationship between neuroticism and eating disorder risk, although neuroticism partially mediated the relationship between retrospective recall of stress and eating disorder risk. Possible explanations of these findings are discussed.

Acknowledgements

I would like to thank my supervisor, Dr. Cheryl Thomas, for her support and guidance throughout the preparation and conduction of this study and its accompanying manuscript.

I would also like to thank my mother for helping to score the hundreds of measures my participants completed. Without her assistance, I would probably still be scoring questionnaires.

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Overview

An estimated 3 to 10% of the population have subclinical or sub-threshold symptoms of an eating disorder (Bennett & Cooper, 1999; Keel, Leon, & Fulkerson, 2001), and the prevalence is especially high among adolescent and college-age women. The presence of subclinical or "partial" eating disorders puts women at increased risk for more serious eating pathology so it is important to identify factors that predict a more serious course of illness and suggest specific preventative interventions (VanBoven & Espelage, 2006).

Neuroticism can be defined as a predisposition to experience negative affect (McCrae, 1990). Past research has found that individuals high in this personality trait are more likely to develop a range of psychiatric disorders, including eating disorders (Cassin & von Ranson, 2005; Schmitz, Kugler, & Rollnik, 2003; Widiger & Trull, 1992). However, the mechanism by which neuroticism is linked to eating disorder risk is uncertain. The relationship between these two variables may possibly be mediated by stressful experiences, moderated by coping style, or perhaps explained by an interaction between the two. The purpose of the current study was to assess the relationships among neuroticism, stress, coping, and eating disorder risk, and to test three general models that have been proposed to account for the link between personality variables and psychological disorders in this more specific context.

The methodology in the current study was also designed to address some methodological issues that have been identified in previous research. First, neuroticism

was assessed as a continuous rather than a dichotomous (low versus high) variable so that important information was not lost. Second, stress and coping variables were assessed both retrospectively and through daily reports over a two-week period because previous research has shown that retrospective reports do not accurately predict how individuals perceive and respond to specific situations. Third, a more specific set of coping styles was assessed in the current study compared to previous studies.

Eating Disorders and Eating Disorder Risk

Clinical eating disorders. The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR; American Psychiatric Association, 2000) describes three types of eating disorders. Anorexia Nervosa (AN) is a refusal to maintain normal body weight, accompanied by a fear of gaining weight and a distorted body image. Individuals with AN can either lose weight through restrictive measures such as dieting, fasting, and excessive exercise (Restricting Type) or they may binge eat and purge the food consumed through the use of vomiting, laxatives, or diuretics (Binge-Eating/Purging Type) (*DSM-IV-TR*; APA, 2000).

Bulimia Nervosa (BN) is a cycle of binge eating and compensatory behaviors used to prevent weight gain. Binge eating is defined as feeling a lack of control while consuming more food in a discrete period of time than most individuals would eat under similar circumstances. Compensatory behaviors include self-induced vomiting, the misuse of laxatives, fasting, and excessive exercise, among others. There are two subtypes of BN: Purging Type is evidenced when the individual regularly engages in self-induced vomiting or the misuse of laxatives, diuretics, or enemas; Nonpurging Type

is seen when the individual uses other compensatory behaviors such as fasting or excessive exercise but does not engage in purging behavior (*DSM-IV-TR*; APA, 2000).

Eating Disorder Not Otherwise Specified (EDNOS) is a category created for eating disorders that do not meet the criteria for AN or BN. One of the disorders that currently falls into the category of EDNOS is Binge-Eating Disorder (BED). BED is the potential eating disorder listed by the DSM-IV-TR (APA, 2000) as requiring further study. Individuals with BED experience distressing binge eating episodes, accompanied by a loss of control, but they do not regularly use inappropriate compensatory behaviors to accommodate for the binge. See Appendix A for a complete list of DSM-IV-TR diagnostic criteria for AN, BN, and EDNOS, and research criteria for BED.

Subclinical eating disorders. Subclinical or sub-threshold eating disorders are sometimes diagnosed as Eating Disorder Not Otherwise Specified. Individuals with subclinical eating disorders exhibit some eating disorder symptoms but do not meet specific DSM-IV-TR diagnostic criteria for Anorexia Nervosa or Bulimia Nervosa because some symptoms are not present, or present with less frequency or severity than required for these diagnoses.

Often, subclinical or sub-threshold eating disorders are not diagnosed at all. For example, Becker, Grinspoon, Klibanski, and Herzog (1999) reported that 50% of women presenting for treatment of eating disorder symptoms did not meet formal diagnostic criteria for an eating disorder.

Vulnerability and eating disorder risk. The typical age of onset for Bulimia Nervosa (BN) is between the ages of 18 and 22 years whereas Anorexia Nervosa (AN) has a bimodal age of onset with the first peak at 14 years, and the second peak around age

18 (Keel et al., 2001). This late adolescence - early adulthood time frame encompasses an important developmental stage when many young women are attending university, moving out on their own, learning to become independent, and generally going through significant transition. The characteristic onset of the disorder during adolescence and young adulthood is believed to relate to stress experienced during important transitional periods (Keel et al., 2001), such as the transition from adolescence to adulthood.

Women in university undergraduate populations have been consistently identified as particularly vulnerable to developing eating disorders (Espelage, Quittner, Sherman, & Thompson, 2000). Prevalence rates for undergraduate females diagnosed with eating disorders typically range from one to five percent (Hart & Ollendick, 1985; Kugu, Akyuz, Dogan, Ersan, & Izgic, 2006; Mancilla-Diaz, Franco-Paredes, Vazquez-Arevalo, Lopez-Aguilar, Alvarez-Rayon, & Tellez-Giron, 2007; Mulholland & Mintz, 2001; Pemberton, Vernon, & Lee, 1996; Zuckerman et al., 1986). However, Gentile, Raghavan, Rajah, and Gates (2007) reported a prevalence rate of 12.2% for diagnosable eating disorders in their female university student sample.

Much higher rates have been reported for sub-threshold eating disorders among female university students. In a study of students in health professions, Szweda and Thorne (2002) found that after controlling for age and ethnicity, 19% to 21% of their sample possessed disordered eating patterns that required further investigation. More recently, Sepulveda, Carrobles, and Gandarillas (2008) reported that as many as 20.8% of female university students were at high risk for developing an eating disorder. Moreover, the prevalence rates for subclinical eating disorder symptoms do not seem to vary across different ethnicities. Zuckerman et al. (1986) found that 23% of female

college freshman and seniors reported eating disorder symptoms, and Mulholland and Mintz (2001) found that the same percentage of women in their African American college sample possessed eating disorder symptoms.

Neuroticism and Eating Disorder Risk

The main psychological dimensions of personality, commonly known as the "Big Five", are Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. These five personality dimensions are known to be relatively stable across cultures and across ages (Hendriks, Perugini, Angleitner, Ostendorf, Johnson, & De Fruyt, 2003; McCrae, Costa, del Pilar, Rolland, & Parker, 1998), and are believed to have a biological basis (John & Srivastava, 1999; Rothbart & Bates, 1998). Of the five main personality dimensions, neuroticism is considered to be the "chief determinant of psychological distress" (Bolger & Schilling, 1991, p. 357). Individuals who are high in neuroticism usually experience high levels of anxiety, anger and hostility, depression, self-consciousness, and impulsivity (Costa & McCrae, 1992). High levels of neuroticism are characteristic of individuals with psychiatric disorders generally (Schmitz et al., 2003; Widiger & Trull, 1992).

With respect to these major dimensions of personality, there appears to be either a weak association or no association at all between extraversion and eating disorder risk (Brookings & Wilson, 1994; Podar et al., 1999). Some evidence to date suggests that individuals with eating disorders may be more open to experience, less agreeable (Ghaderi & Scott, 2000), and less conscientious than individuals without eating disorders, or individuals enrolled in a weight loss program (Ghaderi & Scott, 2000; Podar et al.,

1999), but few researchers have examined these personality domains in eating disorder samples.

The primary focus in the current study was on neuroticism. Neuroticism has been consistently associated with eating disorder symptomatology (Cassin & von Ranson, 2005). Specifically, individuals with eating disorders tend to have higher levels of neuroticism than "normal" participants (Guijarro, Sanz Lopez, Sanchez Vasque, 2007; Podar, Jaanisk, Allik, & Harro, 2007), regardless of their specific eating disorder diagnosis (Pop-Jordanova, 2000). Neuroticism has also been found to be one of the best predictors of scores on the Eating Disorder Inventory, a commonly used measure of eating disorder symptoms (Brookings & Wilson, 1994; Podar, Hannus, & Allik, 1999).

The Role of Stress

Stress and eating disorder risk. Stress is believed to trigger the development and maintenance of clinical eating disorders in individuals who are predisposed (e.g., possess low self-esteem), and the presence of both stress and poor coping skills has been found to be directly related to disturbed eating attitudes in a community sample of adolescent girls (Fryer, Waller, & Kroese, 1997). Many people who develop eating disorders do not experience stress in the form of a traumatic major life event. In general, daily hassles have been found to better predict psychopathology than major life events (Compas, Davis, & Forsythe, 1985; Rowlison & Felner, 1988). Some research has even suggested that minor stressors have a stronger causal influence on distress than major life events (e.g., Pillow, Zautra, & Sandler, 1996). Thus, the daily hassles experienced by individuals who possess predisposing factors for eating disorders (e.g., neuroticism, low self-esteem)

may be exacerbated by ineffective coping strategies, and as a result, the mental health outcome may be symptoms of an eating disorder.

Stress and neuroticism. According to Bolger and colleagues, the relationship between neuroticism and stress has several levels. First, individuals who are high in neuroticism report more interpersonal conflicts than people who score low in neuroticism (Bolger & Schilling, 1991; Bolger & Zuckerman, 1995). Bolger and Zuckerman (1995) suggest three potential reasons for this increase in interpersonal conflict. First, the high levels of daily negative affect associated with neuroticism may lead to more interpersonal problems because their negative affect makes these individuals unpleasant to be around. The second explanation is that the strategies high-neuroticism individuals use to cope with conflict tend to be less adaptive and more confrontational. These ineffective coping strategies may cause new conflicts to arise because they do not properly address or resolve the issues causing stress, and in some cases, these coping strategies may be antagonistic (e.g., confrontation and venting). The final explanation suggested by the authors for why high-neuroticism individuals encounter more interpersonal conflict is that they engage in less preventative coping than other individuals, resulting in increased exposure to stressors because they have not taken steps to avoid them.

In addition to experiencing more interpersonal conflict, individuals who are high in neuroticism also perceive more stressors in their day-to-day lives than individuals who are low in neuroticism (Bolger & Schilling, 1991; Gunthert et al., 1999; Penley & Tomaka, 2002; Suls & Martin, 2005). They also appear to be susceptible to stress from a broad variety of situations, rather than a few specific situations (Suls & Martin, 2005). There has been some debate about whether highly neurotic individuals actually encounter

more stressful situations, due to a propensity to experience greater interpersonal conflict, or whether they simply have a lower threshold for stress. Watson and Hubbard (1996) found that individuals who are high in neuroticism have a tendency to interpret ambiguous stimuli in their environment as negative or threatening. Consequently, they are more likely to perceive problems and threats than other people, lending support to the lower threshold theory. Alternatively, Bolger and Schilling (1991) found that individuals high in neuroticism actually do encounter more stressful situations, potentially because of their negative and confrontational behavior, suggesting a lower threshold is not solely responsible for their increased perception of stress. It is possible that both of these findings are accurate. Individuals who are high in neuroticism may come across more stressful situations, as well as have a lower threshold for perceiving stress when those situations are encountered.

People high in neuroticism also appear to react with more distress to stressful situations than other individuals and appear to have a harder time letting go of the negative mood brought on by stress (Bolger & Schilling, 1991; Gunthert et al., 1999; Suls & Martin, 2005). Therefore, individuals who are high in neuroticism experience more stress in their daily lives, have difficulty relinquishing the negative side effects of stress, and consequently, individuals may develop symptoms of an eating disorder.

At first glance, it may appear that this path would lead to general mental illness and not eating disorders, specifically. Some researchers have suggested that this path results in eating disorders, as opposed to another psychiatric disorder because of the biological changes associated with stress. For example, corticotrophin-releasing hormone (CRH) is affected when an individual is under stress, and as a result, eating behavior

subsequently changes (Bennett & Cooper, 1999). An elevated level of CRH has been reported in individuals with restricted eating behavior (Gold, Gwirtsman, & Avgerinos, 1986; Rolla, Andreoni, Bellitti, Ferdeghini, Ghigo, & Muller, 1994), while other hormones secreted during stress can alter glucose tolerance levels, leading to increased appetite (Mauri, Rudelli, Somaschini, Papa, Mantero, Longhini, & Penati, 1996).

The Role of Coping

The definition of coping most consistently referred to in the literature is that of Lazarus and Folkman (1984). According to these authors, coping is "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person," (p.141). Lazarus (1993) observes that coping is a process through which an individual attempts to reduce stress and the emotional reaction caused by stress.

Coping can be examined in several different ways. One way of examining coping is to compare situational coping (i.e., how an individual copes with stress in relation to a specific incident) with dispositional coping (i.e., how an individual reports that they typically cope with stress). There has been some debate about whether dispositional coping is relevant in personality research (Connor-Smith & Flachsbart, 2007), or if situational and dispositional coping are equally related to personality (Bouchard, Guillemette, & Landry-Leger, 2004). One past study found that situational coping predicts psychological distress over and above distress accounted for by dispositional coping (Bouchard et al., 2004). In the current study, both situational and dispositional

coping will be examined to determine which type is most helpful when attempting to explain the relationship between neuroticism and eating disorder risk.

Another way to examine coping is by looking at coping styles. People respond to stress differently due to individual differences in genetics and environment (Kato & Pedersen, 2005). Individuals may respond to stress by using task-focused coping strategies (also known as problem-focused coping strategies), emotion-focused coping strategies, avoidance coping strategies (i.e., distraction and social diversion coping) (Endler & Parker, 2008) or some combination of these strategies.

In using task-focused coping, the individual attempts to find a solution to the problem that is causing the distress. Some examples of this are seeking information, brainstorming and evaluating a range of potential solutions, and being proactive in altering the situation that is causing the stress (Compas et al., 2001). Task-focused coping is used most often when the individual feels that the situation is within personal control and something productive can be done to resolve it (Carver, Scheier, & Weintraub, 1989).

Emotion-focused coping refers to efforts to alleviate the emotional distress experienced in response to a stressful situation. Some examples of this are expressing or venting emotion, and seeking comfort and support from others (Compas et al., 2001). Emotion-focused coping is used most often when the individual believes that the stress is outside of personal control and must be tolerated or endured (Carver et al., 1989).

Endler and Parker (1990) added the third category of avoidance coping to the more established task-focused and emotion-focused coping strategies. Through early factor analyses of the Coping Inventory for Stressful Situations (CISS), Endler and

Parker (1990) have further broken down avoidance coping into two subcategories: Distraction and Social Diversion. Distraction is when an individual tries to avoid stress by engaging in a substitute task (e.g., playing videogames, eating). Social diversion is when an individual tries to avoid stress by seeking social stimulation (e.g., calling up a friend, going to a party) (Koff & Sangani, 1997). Unfortunately, in many of the studies examining the relationship between coping style and other variables, only the overall category of avoidance coping has been used. Thus, there are relatively few studies that have examined the subtypes of distraction social diversion coping specifically, as the present study was designed to do.

In general, task-focused coping strategies are associated with better psychological functioning than are emotion-focused and avoidant coping strategies (Koff & Sangani, 1997). Both emotion-focused and distraction coping are positively associated with psychological distress, psychiatric symptoms, somatic complaints, and health problems (Koff & Sangani, 1997; Penley, Tomaka, & Wiebe, 2002). In contrast, task-focused coping and social diversion have been found to be negatively related or unrelated to psychological dysfunction (Koff & Sangani, 1997). In coping with daily life stress, it appears that failure to use task-focused coping, and reliance on avoidance coping leads to poor mental health outcomes (Vollrath, Torgersen, & Alnæs, 1998).

Coping and eating disorder risk. Koff and Sangani (1997) reported that, in general, women tend to use more emotion-focused coping and avoidant coping, whereas men more frequently use task-focused coping. Such gender differences are relevant to eating disorder research because 90% of individuals diagnosed with an eating disorder are female (APA; *DSM-IV-TR*, 2000).

Both emotion-focused coping and the overall category of avoidant coping have been found to correlate positively with scores on the Eating Attitudes Test and the Eating Disorder Inventory in samples of university students who may or may not have diagnosed eating disorders, women with diagnoses of anorexia nervosa and bulimia nervosa, and female university students who self-identify as binge eaters (Bennett & Cooper, 2001; Brytek, 2006; Espelage et al., 2000; Freeman & Gil, 2004; Koff & Sangani, 1997; Lee, Kwok, Liau, & Leung, 2002; Troop, Holbrey, Trowler, & Treasure, 1994; VanBoven & Espelage, 2006). Women with current diagnoses of bulimia nervosa use fewer adaptive coping strategies and more maladaptive coping strategies compared to women who have recovered from bulimia nervosa and women who have never been diagnosed with an eating disorder (Yager, Rorti, & Rossotto, 1995). Those with either a current or past diagnosis of an eating disorder have been found to use less task-focused coping than individuals who have not been diagnosed with an eating disorder and have no history of dieting (Ghaderi & Scott, 2000).

Although a difference in coping style is apparent, the actual number of coping strategies used by individuals with binge eating disorder does not appear to differ from individuals without a diagnosed eating disorder (Wolff, Crosby, Roberts, & Wittrock, 2000). Research does suggest that recovery from an eating disorder is connected to coping strategies. Women who have recovered from an eating disorder have been found to use coping strategies that are equally as adaptive as women who have never been diagnosed with an eating disorder (Bloks, Van Furth, Callewaert, & Hoek, 2004; VanBoven & Espelage, 2006; Yager et al., 1995), although there is some debate about whether the amount of task-focused coping used is equivalent (Ghaderi & Scott, 2000).

This would suggest that if women with eating disorders learned to use more effective coping strategies, they might respond faster to treatment and recover more quickly and/or completely. Thus, it is important to study the pathways individuals high in neuroticism follow in perceiving stress, using coping strategies, and potentially developing eating disorders.

Coping and neuroticism. Coping strategies used to deal with stressful situations have been found to relate to personality factors like neuroticism. Neuroticism is negatively associated with task-focused coping strategies (Connor-Smith & Flachsbart, 2007; O'Brien & DeLongis, 1996; Penley & Tomaka, 2002), and positively associated with the use of emotion-focused coping, a strategy which is associated with poor psychological well-being (Bolger & Zuckerman, 1995; Kato & Pedersen, 2005; O'Brien & DeLongis, 1996; Penley & Tomaka, 2002; Roesch, Wee, & Vaughn, 2006; Saklofske & Kelly, 1995; Uehara, Sakado, Sakado, Sato, & Someya, 1999). Thus, individuals who are high in neuroticism report using strategies like defensive coping, venting, and confrontational coping often.

As mentioned previously, often only the overall category of avoidance coping has been examined in previous research. In many studies, individuals who are high in neuroticism have been found to employ avoidant strategies like wishful thinking, withdrawal, self-distraction, and use of drugs or alcohol (Bishop, Tong, Diong, Enkelmann, Why, Khader, & Ang, 2001; Bolger, 1990, Bolger & Zuckerman, 1995; Connor-Smith & Flachsbart, 2007; Costa & McCrae, 1986; O'Brien & DeLongis, 1996; Roesch et al., 2006). It may be that avoidant strategies are used in order to minimize the unpleasant arousal associated with neuroticism (Connor-Smith & Flachsbart, 2007). Few

researchers have examined how the more specific components of distraction coping and social diversion coping are related to neuroticism. Results of the few studies that have been completed to date suggest that women who are high in neuroticism tend to use less social diversion coping (Cohan, Jang, & Stein, 2006; Nagata, Matsuyama, Kirike, Iketani, & Oshima, 2000), and more distraction coping (Cohan et al., 2006).

Neuroticism has been consistently associated with use of passive, ineffective, and maladaptive coping strategies (Fickova, 2001; Gunthert et al., 1999; Watson & Hubbard, 1996), and people high in neuroticism tend to react with more distress to certain types of coping strategies, such as self-blame and wishful thinking (Gunthert et al., 1999). These negative reactions may lead to negative mental health outcomes, such as the development of eating disorder symptoms.

Other research suggests that high-neuroticism individuals may alter their coping strategies randomly, as opposed to sticking with one coping strategy that has proved effective, or selecting particular coping strategies known to work in specific situations. Lee-Baggley, Preece, and DeLongish (2005) found that people with high neuroticism were less likely to alter their coping strategy based on the needs of the situation, and Atkinson and Violato (1994) found neuroticism to be related to less consistent coping strategies across situations.

Neuroticism, Stress, Coping, and Eating Disorder Risk: Some Potentially Useful Models

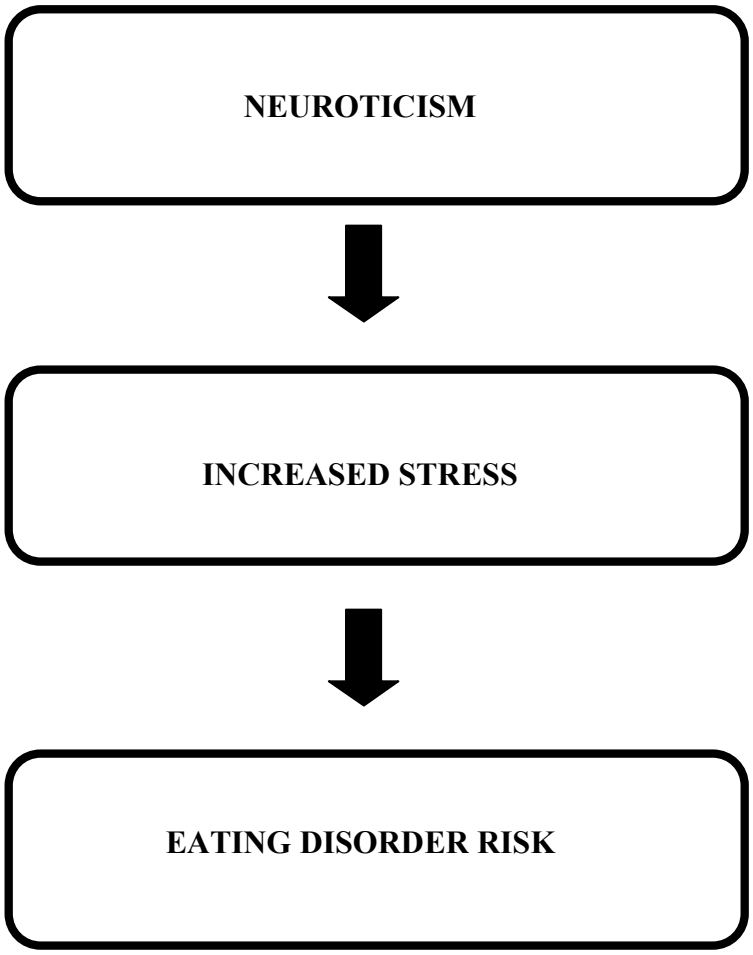
A number of different models involving stress and/or coping have been proposed to account for the relationship between personality variables and psychopathology. They are not necessarily mutually exclusive.

Personality-Induced Hyperactivity Model. The Personality-Induced Hyperactivity Model (Bennett & Cooper, 1999) suggests that certain personality characteristics cause people to be prone to exaggerated responses to stress. This model is used most often in relation to Type A personality and heart disease. Although it has rarely, if ever, been applied to eating disorder research (Bennett & Cooper, 1999), it could be useful in explaining neuroticism's connection to eating disorders. People who are high in neuroticism perceive more stress in their lives than people who are low in neuroticism (Bolger & Schilling, 1991; Penley & Tomaka, 2002), and tend to react more strongly to stress than individuals who are low in neuroticism (Gunthert, Cohen, & Armeli, 1999; Suls & Martin, 2005). These exaggerated responses to stress could serve as triggers for the onset of eating disorder symptoms, making this model applicable in eating disorder research. Please see Figure 1 for a diagram of the Personality-Induced Hyperactivity Model.

Constitutional Predisposition Model. A second model discussed by Bennett and Cooper (1999) is the Constitutional Predisposition Model. This model posits that personality characteristics that are related to illness, such as neuroticism, may not actually trigger the illness. Instead, they may actually be symptoms of an internal physical weakness that leaves the individual vulnerable to becoming ill (Bennett & Cooper, 1999). Thus, an internal abnormality both causes the person to be neurotic and predisposes him or her to develop an eating disorder. This model will not be tested in the present study, as it is would require a different type of research (e.g., genetic).

Precipitator of Dangerous Behaviors Model. The third model, also reviewed by Bennett and Cooper (1999) as a possible explanation for the relationship between

Figure 1. A graphical representation of the Personality-Induced Hyperactivity Model, as it applies to eating disorder risk.



personality characteristics and illness, is the Precipitator of Dangerous Behaviors Model. According to this model, personality traits possessed by some people prompt them to participate in behavior that increases their likelihood of developing an illness (Bennett & Cooper, 1999). For example, being high in neuroticism may cause individuals to cope inadequately with the stress they perceive, and as a result, develop symptoms of an eating disorder. Please see Figure 2 for a diagram of the Precipitator of Dangerous Behaviors Model.

Differential Exposure-Reactivity Model. Bolger and Schilling (1991) claim the best representation of the effects of personality on health and psychological outcomes can be found in a fourth model: the Differential Exposure-Reactivity Model. According to this model, personality affects both a person's exposure to stressful events, as well as their reactivity to those events (Bolger & Zuckerman, 1995). Thus, being high in neuroticism may cause an individual to perceive more stress in their environment, as well as choose less adaptive coping strategies, and a combination or interaction of these two factors could lead to the development of eating disorder symptoms. Please see Figure 3 for a diagram of the Differential Exposure-Reactivity Model.

Other Investigations into the Personality-Psychopathology Link

Studies relevant to general psychological well being. In several studies, the effects of personality, stress, and coping on psychological well-being have been examined, although they did not necessarily focus specifically on eating disorder risk. For a period of 14 days, Bolger and Zuckerman (1995) had male and female university students record the most stressful interpersonal event they experienced each day, as well

Figure 2. A graphical representation of the Precipitator of Dangerous Behaviors Model, as it applies to eating disorder risk.

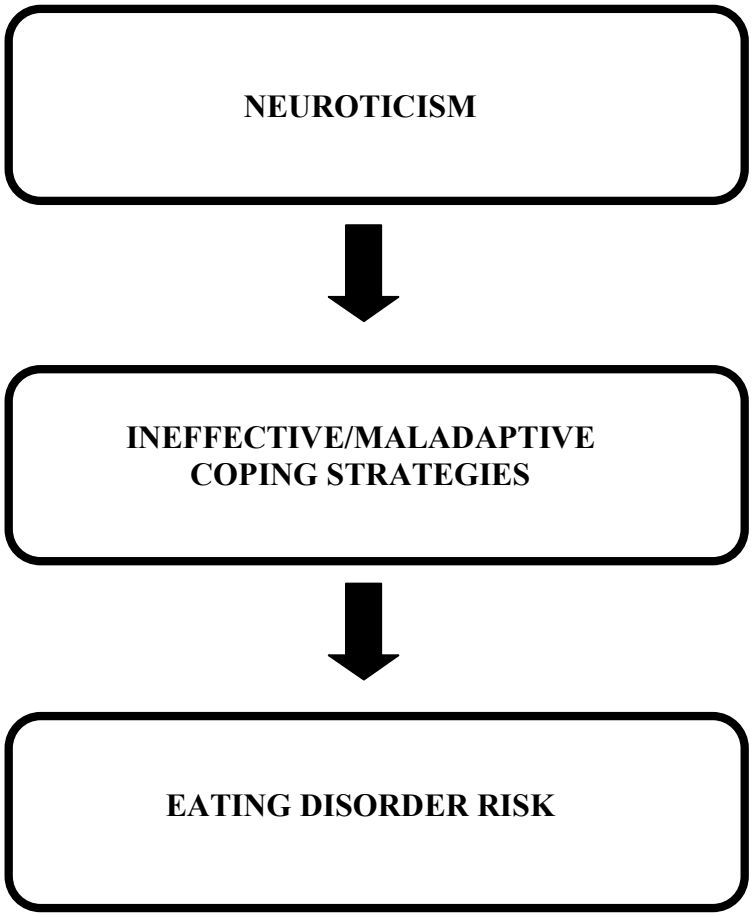
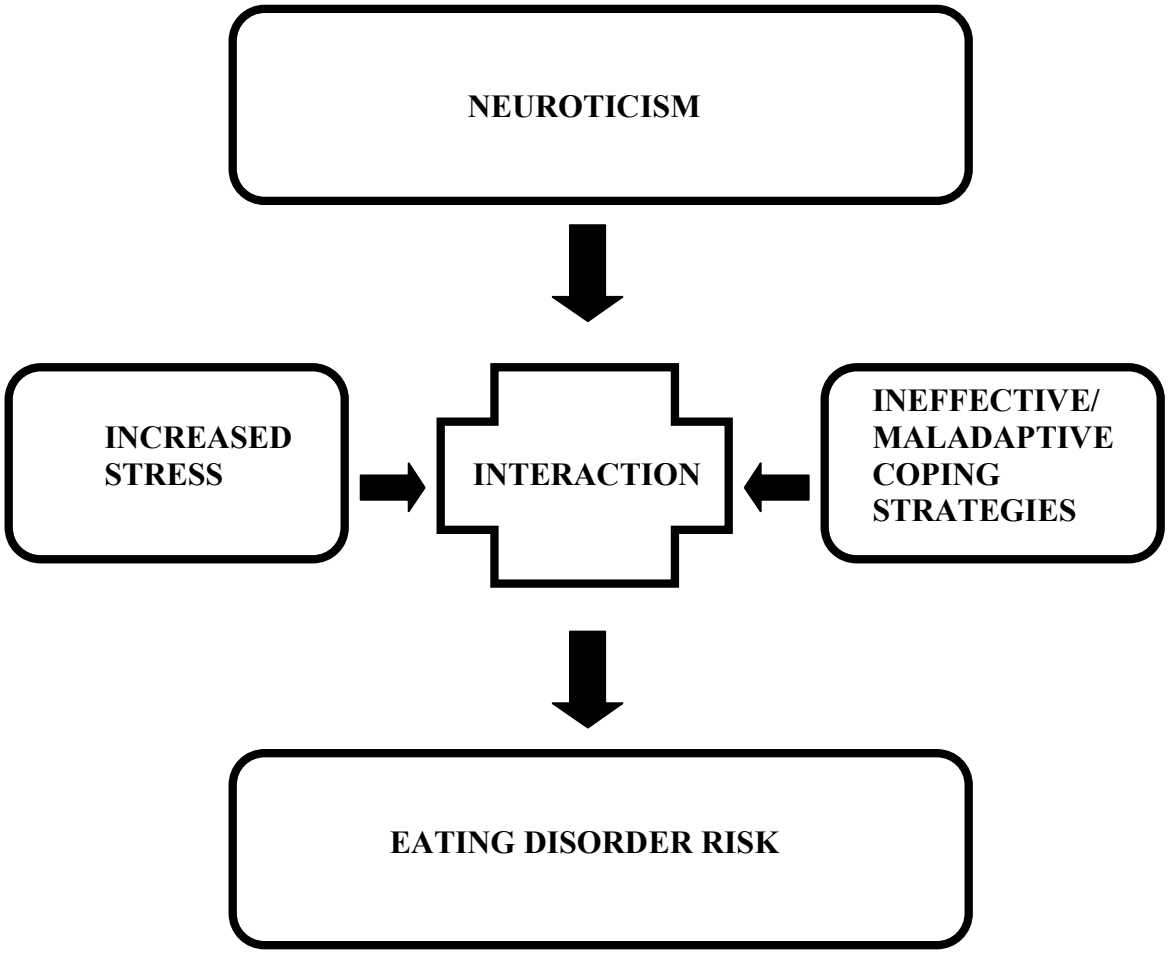


Figure 3. A graphical representation of the Differential Exposure-Reactivity Model, as it applies to eating disorder risk.



as use a checklist of different coping strategies to record how they coped with the stressful situation. They found support for the Differential Exposure-Reactivity Model. Neuroticism was positively correlated with the amount of stress experienced, as well as affected their choice of coping strategies.

Bolger and Zuckerman's (1995) study, while informative, is not without problems. First, they dichotomized their sample into high or low neuroticism groups. Dichotomizing a continuous variable such as neuroticism, is somewhat arbitrary, and results in the loss of potentially important information (Irwin & McClelland, 2003). Bolger and Zuckerman (1995) also used a checklist of stressful events to measure participant's level of stress, which many researchers now consider to be an inaccurate method of obtaining stress information. For example, Bennet and Cooper (1999) point out that issues of reliability are brought into question when a checklist is used to measure life stress. Moreover, Connor-Smith and Flachsbart (2007) suggest that correlations between personality and coping will be stronger if coping is measured in response to a specific stressor selected by the participant, instead of generic stressors selected by the researcher. Since personality influences what people perceive as stressful, allowing participants to choose their stressor should theoretically be more representative of their actual coping style. In the present study, stress will be measured by using both a retrospective checklist (similar to past research) and by using daily reports of stressors perceived by participants, which may provide a more representative account of the participant's actual stress and coping.

Vollrath et al. (1998) questioned whether dispositional coping, as measured by the COPE, mediated the relationship between neuroticism, measured using the Basic

Character Inventory, and changes in different clinical syndromes in psychiatric outpatients, measured by the MCMI. They found that participants who were high in neuroticism used more disengagement, venting of emotions, and less task-focused coping, and, as a result, showed increases in somatoform disorder, dysthmia, alcohol dependence, and thought disorder. Eating disorders are not assessed by the MCMI, so it is not known if the same mediational effect would be found in individuals with clinical or subclinical eating disorders. The observed increase in alcohol dependence is relevant to eating disorder research as eating disorders are theoretically related to substance use disorders like alcohol dependence, and both are often conceptualized as addictive disorders (Baisy, 2005; Brisman & Siegel, 1984; Pryor & Wiederman, 1996). Eating disorders have been observed to share clinical similarities with psychoactive drug abuse (Lienard & Vamecq, 2004). Moreover, BN and BED are frequently comorbid with substance abuse (Conason & Sher, 2006). These links suggest that coping may also affect the relationship between neuroticism and eating disorder risk, much like it appears to do in substance disorders such as alcohol dependence. Unlike the Vollrath et al. (1998) study, the proposed research is designed to examine both situational and dispositional coping as a moderator. Previous literature has found that situational coping is a better predictor of psychological distress than dispositional coping (Bouchard et al., 2004); therefore, both constructs will be examined in the present study to determine which better predicts eating disorder risk.

Studies relevant to eating disorder risk. Bennett and Cooper (2001) examined personality, coping styles, and eating disturbances, using the Comrey Personality Scale, the Ways of Coping Scale, and the EAT-26, in a population of individuals diagnosed with

either a clinical or subthreshold eating disorder who were currently seeing a psychologist or who were attending a voluntary self-help group, as well as in a group of individuals who were dieting for nonmedical reasons. Their study was designed to test the Indigenous Model proposed by Cooper and Bagiloni (1988). This model asserts that the interaction between life stress, coping styles, social support, and personality, in addition to their independent effects, can adequately describe why eating disturbances occur (Bennett & Cooper, 1999). It is suggested that one way that the stress process manifests is as disturbed eating behavior. In Bennett and Cooper's (2001) study, the "eating disturbed" group, which consisted of individuals who had sought treatment for BN, AN, or a partial eating disorder in the last three months, reported using more emotion-focused coping than the dieting group. The eating disturbed group also reported experiencing more work and relationship stress. Interestingly, neuroticism did not distinguish between the two groups in this study. This may be because the two groups being compared already possessed common characteristics, such as restricting their food intake, and concerns about their weight. These common characteristics may be why no difference in the level of neuroticism was observed between the two groups.

The Current Study

In past studies, individuals who are high in neuroticism have been found to encounter more interpersonal conflict, and to perceive more stressors in their daily life. They have also been found to use maladaptive coping strategies, such as emotion-focused coping and avoidant coping, more often than adaptive coping strategies like task-focused coping, and to be more likely to develop an eating disorder, potentially due to the

biological effects of stress. It appears that no prior studies have examined these variables together, in order to observe how life stress and coping style may help explain the relationship between neuroticism and eating disorder risk.

The purpose of the current study was to test the previous presented models, while addressing some of the methodological issues that have been a problem in previous similar studies. In addition to replicating previous reports about relationships between neuroticism, stress, coping, and eating disorder risk, the proposed study is designed to assess three different models of the relationship between personality and eating disorder risk. As previously mentioned, the three models are not mutually exclusive, and it is possible that all three will be supported to some degree. Individually, stress and coping style may appear to partially mediate or moderate the relationship between neuroticism and eating disorder risk, but testing their interaction may demonstrate complete mediation. These models will be tested in a sample of undergraduate university women; this is a population in which relative high rates of subthreshold eating disorders have been consistently observed.

Methodological Issues and Contributions of the Current Study

The current study involved three methodological innovations that were suggested by the review of existing literature. First, neuroticism was assessed as a continuous variable to avoid losing valuable information through dichotomization of participants into high/low categories. Second, the two subtypes of avoidant coping (Distraction and Social Diversion) were examined separately; this is a fairly new approach in the coping literature. Third, in addition to assessment via one-time retrospective/dispositional

questionnaires which are prone to memory errors (Connor-Smith & Flachsbart, 2007), stress, coping, and eating disturbances were assessed via daily reports. It is important to note that the daily reports were also retrospective in that they were completed at the end of each day and not in the moment of the stressful experience. However, as the time passed between the event and the report is much shorter than for the retrospective measure, the daily reports are expected to provide a more accurate picture of participants' stress and coping. Daily process methodology minimizes recall bias and reduces error because there is a shorter span of time between the stressful experience occurring and the point at which it is recalled and reported (Gunthert et al., 1999; Lee-Baggley, Preece, & DeLongis, 2005). Using long-term retrospective and short-term retrospective (daily) forms of data collection also allows for comparisons between retrospective recall and daily reporting. Previous comparisons indicate that retrospective reports may not be reliable indicators of actual daily coping (Ptacek, Smith, Espe, & Rafferty, 1994; Smith, Leffingwell, & Ptacek, 1999). Neuroticism was examined using a one-time, self-report questionnaire and not through daily reports as it is considered a stable personality trait and is unlikely to change over time (Costa & McCrae, 1992).

Hypotheses

Hypothesis 1. Neuroticism will be positively correlated with eating disorder risk, retrospective and daily reports of stressful events, degree of stress reported for daily stressful events, and use of Emotion-focused and Distraction Coping strategies. The purpose of testing this hypothesis is to replicate past research and extend findings to include subcategories of avoidance coping.

Hypothesis 2. Neuroticism will be negatively correlated with Task-focused and Social Diversion Coping strategies. The purpose of testing this hypothesis is to replicate past research and extend findings to include subcategories of avoidance coping.

Hypothesis 3. Eating disorder risk will be positively correlated with retrospective and daily reports of stressful events, degree of stress reported for daily stressful events,and with use of Emotion-focused and Distraction Coping strategies. The purpose of testing this hypothesis is to replicate past research, and extend findings to include subcategories of avoidance coping.

Hypothesis 4. Eating disorder risk will be uncorrelated with reported use of Task-focused and Social Diversion Coping strategies. The purpose of testing this hypothesis is to replicate past research, and extend findings to include subcategories of avoidance coping.

Hypothesis 5. Stress will mediate the relationship between neuroticism and eating disorder risk. The purpose of testing this hypothesis is to assess the Personality-Induced Hyperactivity Model. A reduction in the strength of the relationship between Neuroticism and Eating Disorder Risk when stress is included in the equation would support the Personality-Induced Hyperactivity model. If the strength of the relationship between Neuroticism and Eating Disorder Risk does not change with the inclusion of perceived stress, the Personality-Induced Hyperactivity model would not be supported.

Hypothesis 6. Use of dispositional and situational coping strategies will moderate the relationship between neuroticism and eating disorder risk. The purpose of testing this hypothesis is to assess the Precipitator of Dangerous Behaviors Model. Findings would support the Precipitator of Dangerous Behaviors model if the variance

accounted for by the interaction between Predominant Coping Style and Neuroticism is greater than the variance accounted for by either Neuroticism or Predominant Coping Style alone. If the interaction does not account for a significant amount of variance in the model, the Precipitator of Dangerous Behaviors model would not be supported.

Hypothesis 7. The interaction between perceived stress and predominant coping style will mediate the relationship between neuroticism and eating disorder risk. The purpose of testing this hypothesis is to assess the Differential Exposure-Reactivity Model. Findings would support the Differential Exposure-Reactivity model if the strength of the relationship between Neuroticism and Eating Disorder Risk decreases when the interaction between stress and Predominant Coping Style is included.

It is also feasible that all three of the above models could be partially supported through the partial mediation of the relationship between Neuroticism and Eating Disorder Risk, leading to the development of a more comprehensive model.

Method

Participants

To be included in the study, participants had to be female [1]students who were registered in the University of Windsor Psychology Participant Recruitment Pool, and who were between 17 and 25 years of age[2]. They had to complete an initial questionnaire package during Part 1 of the study, and submit daily reports on stressful events, their coping efforts, and any changes in eating behavior for at least ten days of a two-week period in Part 2 of the study.

One hundred and seventy women completed Part 1 of the study but 51 either declined to participate in Part 2 or provided less than ten days of data for Part 2. Seventy of the 119 participants completed 14 days of daily reports. Ninety-two participants completed at least 13 days of daily reports. All 119 participants completed at least 10 days of daily data.

As can be seen in Table 1, participants who completed the entire study and participants who completed only the first part of the study did not differ significantly on any of the major study variables from Part 1 (i.e., BMI, Eating Disorder Risk, Neuroticism, YA-FILES, or CISS Coping Styles).

Thus, the final sample included 119 [3]women with a mean age of 21.29 years (*SD* = 2.50); 22.7% (*N* = 27) were in their first year of university, 17.6% (*N* = 21) were in

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[1] Eating disorders occur much more frequently in females than in males (*DSM-IV-TR*, 2000), and it has been suggested that males develop eating disorders for different reasons than females.

[2] The age of onset for both anorexia nervosa and bulimia nervosa is typically during late adolescence and early adulthood.

[3] G*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007), a statistical power analysis program, was used to determine the sample size required to detect a medium effect. In order to determine the number of

Table 1.

Mean comparisons on Part 1 study variables between participants who completed the entire study and participants who completed only the first part.

Study Variables	Part 1 Only *M*	Both Parts *M*	df	*F*	*p* value
BMI	23.89	23.23	1, 163	0.716	.399
Eating Disorder Risk	37.04	35.74	1, 167	0.529	.468
Neuroticism	60.00	58.12	1, 169	1.053	.306
YA-FILES	22.10	21.86	1, 162	0.021	.884
CISS Task	53.98	54.06	1, 169	0.002	.961
CISS Emotion	53.70	50.42	1, 169	3.731	.055
CISS Distraction	56.56	55.81	1, 169	0.226	.635
CISS Social Diversion	53.32	52.74	1, 169	0.132	.717

observations necessary to conduct Pearson correlations, a medium effect size of .3, an alpha of .05, and a power value of .95 were used. This analysis indicated that a sample size of 111 participants would be desirable. Another analysis was conducted to determine the number of participants required to detect a medium effect in multiple regression. Using a medium effect size of .15, an alpha of .05, a power value of .95, and two predictors, a sample size of 107 participants is required.

second year, 29.4% (*N* = 35) were in third year, 21.8% (*N* = 26) were in fourth year, and 8.4% (*N* = 10) were in fifth or sixth year. See Table 2 for details regarding the demographic characteristics of the final sample.

The majority of participants reported their racial/ethnic identity as Caucasian/White (70.6%, *N* = 84); remaining participants identified themselves as Asian or Pacific Islander (8.4%, N = 10), African-Canadian/Black (4.2%, *N* = 5), Middle Eastern (2.5%, *N* = 3), Latina (1.7%, *N* = 2), and Other (12.6%, *N* = 15). Based on self-reported height and weight, the majority of women in the sample (74.4%, *N* = 87) were of normal body weight (Body Mass Index or BMI [4]between 18.5 and 24.9), 2.6% of the sample (*N* = 3) had BMIs under 18.5 and would be considered underweight, 16.2% of the sample (*N* = 19) had BMI scores between 25 and 29.9 and would be considered overweight, and 6.8% of the sample (*N* = 8) had BMI scores over 30 and would be considered obese. Based on previous reports of the prevalence of eating disorders and eating disorder symptoms in undergraduate females, it was expected that 0.5% to 3% of the sample would possess diagnosed eating disorders. The prevalence of eating disorders in the present sample[5] was similar to previous literature, with 0.9% (*N* = 1) of the sample currently possessing an eating disorder diagnosis, and 2.6% (*N* = 3) of the sample having been diagnosed with an eating disorder in the past. Overall, 91.3% (*N* = 105) of the sample reported no current psychiatric diagnosis, 82.6% (*N* = 95) reported no past psychiatric diagnosis, and 54.8% (*N* = 63) reported no family history of psychiatric disorders.

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[4] BMI = weight in kilograms divided by height in meters, squared; The BMI is not necessarily the best indicator of whether someone is overweight as muscle mass also affects BMI calculations. The BMI index was used as a crude indication of appropriate weight because it is easily understood and widely used.

[5] According to self-report on a demographic questionnaire

Table 2.

Descriptive statistics for all demographic variables (N = 119).

Demographic Questionnaire	*Mean*	*SD*	*Range*
Age in Years	21.29	2.50	17-25
Body Mass Index (BMI)	23.23	3.85	17.3-39.2
	Frequencies		
Weight Category	**%**	***N***[6]	
Underweight (BMI < 18.5)	2.6	3	
Normal (BMI = 18.5 to 24.9)	74.4	87	
Overweight (BMI = 25.0 to 29.9)	16.2	19	
BMI > 30 (obese)	6.8	8	
Year of Study	**%**	***N***	
First Year	22.7	27	
Second year	17.6	21	
Third Year	29.4	35	
Fourth Year	21.8	26	
Fifth/Sixth year	8.4	10	
Racial/Ethnic Identification	***%***	***N***	
African-Canadian/Black	4.2	5	
Asian or Pacific Islander	8.4	10	
Caucasian/White	70.6	84	
Latino/Latina	1.7	2	
Middle Eastern	2.5	3	
First Nations	0.0	0	
Other	12.4	15	

[6] *N* = 117

Relationship Status	***%***	***N***[7]
Single	45.7	53
In a relationship (< 6 months)	11.2	13
In a relationship (> 6 months)	37.9	44
Engaged	1.7	2
Married	2.6	3
Divorced	0.9	1

Living Situation	***%***	***N***[8]
Alone	2.6	3
With Parents	56.0	65
In University Residence	10.4	12
With Roommates	24.1	28
With Significant Other	6.9	8

Psychological Diagnoses[9]	**Current**		**Past**		**Family**	
	%	***N***	***%***	***N***	***%***	***N***
Eating Disorder	0.9	1	2.6	3	0.0	0
Depressive Disorder	5.2	6	10.4	12	25.2	29
Anxiety Disorder	1.7	2	2.6	3	1.7	2
ADHD	0.8	1	0.9	1	4.3	5
Substance Abuse	0.0	0	0.0	0	4.3	5
Learning Disorder	0.0	0	0.9	1	1.7	2
Bipolar Disorder	0.0	0	0.0	0	6.1	7
Other Disorder	0.0	0	0.0	0	1.7	2
No Disorder	91.3	105	82.6	95	54.8	63

[7] $N = 116$
[8] $N = 116$
[9] $N = 115$

Recruitment and Data Collection Procedures

After the study was reviewed and approved by the Research Ethics Board at the University of Windsor, a brief description of the study (see Appendix B) was posted on the Psychology Participant Pool website. The study was described as a two part study. Female participants between the ages of 17 and 25 were able to view the study description and could sign up online for scheduled testing sessions for Part 1 of the study.

One course credit was offered for completing a 60-minute questionnaire package in Part 1. An additional two course credits were offered if they participated in Part 2, which would involve submission of brief (10 to 20 minute) online reports about their daily experiences of stress and coping for a period of two weeks. During Part 1, participants met with the researcher in small groups to provide written, informed consent for Part 1 of the Study (see Appendix C) and complete a demographic questionnaire, the Eating Disorder Inventory-3 (EDI-3; Garner, 2004), the revised NEO Personality Inventory (NEO PI-R; Costa & McCrae, 1992), the Young Adult Family Inventory of Life Events and Changes (YA-FILES; McCubbin, Patterson, & Growchowski, 1991), and the Coping Inventory for Stressful Situations (CISS; Endler & Parker, 2008). The measures were presented in randomized counterbalanced order to control for possible order effects. To ensure confidentiality, all forms were identified with a participant number that was not linked to the individual's name.

After completing the Part 1 questionnaires, all participants were invited to participate in Part 2 of the study for the additional two course credits. Participants who were willing to participate then provided written informed consent for Part 2 of the study. They were given instructions on how to complete the online daily measures (see

Appendix D), along with the web address, user name, and password necessary to access the study. When completing the online questionnaire, participants were instructed to enter the generic user name and password provided to them, followed by their participant ID (given to them on their page of instructions), the date, and the number of stressful events they had experienced that day. The next page of the online survey provided space for participants to give details about the stressful event, rate how stressful they perceived the event to be, check off the coping strategies they used to deal with the event, and rate how much their eating habits changed as a result of the stressful event. Participants were provided with a separate form for each event they reported.

Participants were asked to complete the daily measures at the end of each day for a period of two weeks (14 days). The importance of completing and submitting the measures regularly at the end of each day, as opposed to completing them all at once, was strongly emphasized. The women who chose to participate in Part 2 of the study received an email from the researcher each evening reminding them to complete and submit their daily measures online (see Appendix E). In addition to the two course credits for participating in Part 2, the names of participants were entered into a draw for one of four $25 gift certificates for a local shopping mall. The winners of the draw were notified by email.

Measures for Part 1

Demographic information. Participants self-reported their age, height, weight, racial/ethnic identification, year of study, relationship status, living situation, and past

and current psychological diagnoses on a structured demographic questionnaire designed for this purpose (see Appendix F).

Eating disorder risk. The Eating Disorder Inventory, Third Edition (EDI-3; Garner, 2004) was used to assess eating disorder risk. The EDI-3 is a self-report measure appropriate for use with females between the ages of 13 and 53 years. It consists of 12 primary scales, which load onto six composites. Only the Eating Disorder Risk Composite was used in the present study, as we were only interested in the scales that assess eating disturbances. The remaining scales on the EDI-3 are general psychological scales that are relevant to eating disorders, but not relevant to the present investigation (e.g., Ineffectiveness, Overcontrol). The Eating Disorder Risk Composite consists of three scales; Drive for Thinness, Bulimia, and Body Dissatisfaction. There are seven items on the Drive for Thinness scale that assess the extent to which participants feel the need to be thin. The Bulimia scale also has seven items and measures participants' tendency to binge, purge, and engage in other detrimental behaviors. The Body Dissatisfaction scale consists of nine items that assess how participants feel about their bodies. Items on all scales are rated on a 6-point Likert scale: Always, Usually, Often, Sometimes, Rarely, or Never. The four most negative options are scored from one to four, whereas the two most positive options receive a score of zero. Higher scores imply a greater risk for eating disorders.

Garner (2005) reports internal consistency reliabilities for the Eating Disorder Risk Composite ranging from .90 to .97. The median test-retest coefficient for the three Eating Disorder Risk scales is .95, and short-term test-retest reliability for the composite is .98 (Garner, 1995). Long-term test-retest reliability has not yet been established with

this edition of the EDI. However, one-year test-retest reliability for the previous edition of the EDI (EDI-2) was .41 to .75 in non-patients (Williamson, Anderson, Jackman, and Jackson, 1995). Construct validity of the EDI-3 is supported through factor analytic research, and the EDI-3 demonstrates adequate discriminant validity with the Millon Clinical Multiaxial Inventory–II and the Symptom Checklist-90 (Cumella, 2006). The EDI-3 has been found to have good convergent validity with other reliable measures of eating pathology (Cumella, 2006), including strong correlations between the EDI-3 and EDI-2 versions of the Eating Disorder Risk scales of Drive for Thinness (.96) and Body Dissatisfaction (.97).

Internal consistency reliabilities were also calculated for the present sample. The reliability for the Eating Disorder Risk Composite was .950. For the individual scales, the reliability was .912 (Body Dissatisfaction), .886 (Bulimia), and .905 (Drive for Thinness).

Neuroticism. The 48-item Neuroticism domain of the NEO Personality Inventory, Revised (NEO PI-R; Costa & McCrae, 1992) was used to assess neuroticism. The NEO PI-R provides a comprehensive and detailed assessment of personality for individuals aged 17 and older (Costa & McCrae, 1992). Respondents rate statements about their preferences, emotional responses, and behaviours on a five-point scale, ranging from Strongly Disagree to Strongly Agree. The neuroticism dimension yields six specific facet scores: Anxiety, Hostility, Depression, Self-Consciousness, Impulsiveness, and Vulnerability. Each facet contains 8 items, some of which are reverse scored. The total score of the eight items in each facet is the raw score for that subscale. Facet raw scores are added together to obtain the domain raw score for neuroticism. Raw scores can then

be converted to *T* scores which enable comparison with a normative sample (Costa & McCrae, 1992).

The internal consistency coefficient for the overall neuroticism domain is .92, with the coefficients for individual neuroticism facets ranging from .68 to .81 (Costa & McCrae, 1992). In the present study, the internal consistency coefficient for the overall neuroticism domain was .935, similar to that cited by Costa and McCrae (1992). A six-year longitudinal study by Costa and McCrae (1988) showed retest-reliability of .87 for the neuroticism domain, and .78 to .86 for the individual neuroticism facets. Factor structure of the NEO PI-R reveals that all of the facet scores load solely on the neuroticism domain, with the exception of Angry Hostility, which also loads negatively on the Agreeableness domain.

Researchers have observed that using the NEO Personality Inventory, Revised (NEO PI-R; Costa & McCrae, 1992) is a potentially promising way to assess variability among individuals with eating disorders (Bennett & Cooper, 1999), and there are research precedents for using only the neuroticism domain of the NEO PI-R for this purpose. For example, Connolly, Rieger, and Caterson (2007) used the neuroticism domain to determine that anger suppression did not predict binge eating once trait neuroticism was included in the prediction.

Retrospective reports of stressful events. The Young Adult Family Inventory of Life Events and Changes (YA-FILES; McCubbin, Patterson, & Growchowski, 1991) assesses the extent to which respondents have experienced family and school-related stressors during the previous six months. It therefore provides a retrospective measure of stress. A total score is obtained by summing the number of stressful events that were

experienced in the past half year. The YA-FILES measure was developed using a sample of 184 college students. Scores on this measure have been shown to have very good internal consistency (α = .85) and test-retest stability (α = .85), and to correlate with measures of substance abuse and locus of control (McCubbin & Thompson, 1991). In the present study, the internal consistency of the YA-FILES was .862.

Dispositional coping. In order to measure participants' coping style, the Coping Inventory for Stressful Situations (CISS; Endler & Parker, 2008) was used. The CISS is appropriate for use with a wide range of individuals, including undergraduate students. It was normed on several samples, including 1242 English-speaking North American undergraduates (Endler & Parker, 2008).

Participants reported how often they used various coping strategies when they were in difficult, stressful, or upsetting situations. They responded on a five-point Likert scale where the options ranged from Not at All (1) to Very Much (5). This measure provides scores on Task-Focused Coping, Emotion-Focused Coping, and Avoidance Coping. Further, Avoidance Coping has two subscale scores: Distraction and Social Diversion. Scores are indicative of dispositional coping style (i.e., how a person would usually respond, regardless of specific situation). This is in contrast to the daily coping measure, which provides information on situational coping style (i.e., how a person responds in specific situations) and will be discussed shortly. Each scale has a raw score, which can then be converted to a T score.

The internal consistency of the CISS is reported to be highly satisfactory for female undergraduates, ranging from .78 to .90 on the individual scales. They are also highly satisfactory for all other normative samples, but as they are the only relevant

demographic, female undergraduate students will be the only normative group discussed. Test-retest reliability was measured over a six-week period with a portion of the undergraduate sample. The reliabilities were moderate to high for females, ranging from .59 (Distraction) to .72 (Task). For the present sample, internal reliabilities were calculated for the overall CISS (α = .837), as well as for Task-focused Coping (α = .875), Emotion-focused Coping (α = .905), Distraction Coping (α = .768), and Social Diversion Coping (α = .799).

Endler and Parker (1990) conducted a factor analysis of the 48 CISS items using a principal components analysis with a varimax rotation. This analysis yielded three factors (Task, Emotion, and Avoidance). Then each factor was analyzed separately using the same procedure. The Avoidance scale produced a solution with two additional factors (Distraction and Social Diversion). The CISS has good convergent and discriminant validity, showing meaningful correlations with appropriate aspects of the Ways of Coping (WCQ) questionnaire, and nonsignificant correlations with theoretically unrelated aspects of the WCQ (Endler & Parker, 2008).

Measures for Part 2

Daily reports of stressful events. Following the method used by Gunthert et al., (1999), participants were asked to complete daily reports about perceived stress (see Appendix G). They were expected to describe and record each stressful event they experienced and to rate the degree of stress experienced in relation to each event on a scale from 1 to 100 (100 being most stressful). For each event recorded, they were also asked to indicate if they perceived it to be within their personal control (i.e., something

they could fix) or outside their personal control (i.e., something. that had to be endured). Participants were allowed to record as many stressful events as they experienced each day. The average number of events experienced over the two-week rating period, and the average stress rating for each event were calculated and employed in analyses as daily measures of perceived stress.

Situational coping. To assess how participants coped with stressful events on a daily basis, for each stressful event they reported participants reviewed a list of coping strategies, adapted from the Coping Inventory for Stressful Situations (CISS; Endler & Parker, 2008), with the author's permission (see Appendix H). The coping strategies listed on the CISS were turned into a checklist by removing the Likert scale and placing a check box next to each coping strategy. This allowed participants to check off all coping strategies they used to deal with the stressor. They had an option to record an alternate strategy, if the strategy they used was not listed. Using the coping styles from the CISS, participant responses were classified into one of the four coping styles: task-focused, emotion-focused, avoidant-distraction, or avoidant-social diversion. This was done by tallying the number of coping strategies participants checked for each coping style. Then, the number of strategies selected for each coping style was divided by the number of possible strategies for that coping style to provide a percentage. Percentages were used because each coping style has a different number of coping strategies on the CISS. The coping style used most frequently by each participant was considered to be their predominant coping style. Thus, if the coping strategy used most often to respond to stressful events was "task-focused", their predominant coping style was classified as task-focused coping.

Situational change in eating habits. For each stressful event experienced, participants were asked to record the impact of the event on their eating habits (see Appendix G). Specifically, participants were asked to rate how much their eating habits changed as a result of the stressful event on a scale from zero to 10. They were also asked to provide a brief written description of how their eating habits were impacted by the event. Average eating change across events reported over the two-week reporting period in Part 2 of the study was calculated.

Results

Overview and Sequence of Analyses

Prior to performing analyses, the integrity of the data set was assessed and decisions were made regarding how to address problems such as missing data and outliers, and to establish that assumptions were met for all analyses. Internal consistencies were calculated for measures used in the study and descriptive statistics were calculated for all study variables. Correlational and multiple regression analyses were conducted to test hypotheses. Ancillary analyses were conducted as indicated. All analyses were conducted using SPSS 16.0 (2007, SPSS Inc.). Alpha was set at .05 for all analyses.

It is important to note that this data set has the potential for certain confounds. Participants are from a variety of racial and ethnic backgrounds, and much of past research on eating disorders has relied on predominantly Caucasian samples. In the present study, scores from Caucasian and non-Caucasian participants were compared on all major study variables and differed significantly only on the amount of stress perceived $F(1, 117) = 5.677$, $p < .05$. The non-Caucasian subset of participants perceived events to be significantly more stressful on average than did the Caucasian subset of participants. It should be acknowledged that this is a crude comparison, as the non-Caucasian subset of the sample consisted of people from a wide variety of ethnic backgrounds who, most likely, should not be collapsed into one group. There would be some justification for testing each of the proposed models separately for participants of different ethnic backgrounds, but within the present study design, it is not feasible to do an adequate assessment of cultural variations. As there are insufficient numbers of each ethnic group

to test the models individually and there are only rough significant differences on one study variable, analyses were conducted with the entire sample.

Treatment of missing data. Missing data in the study was excluded listwise for each analysis, meaning that if a person had a missing value for any variable involved in a particular analysis, all of their data were excluded from that analysis.

Statistical assumptions. Prior to conducting multiple regression analyses, the data were carefully examined. Outlying cases that might exert undue influence on a particular analysis were removed as necessary. Collinearity diagnostics and correlations between predictors were inspected to check for multicollinearity and singularity; residual plots were examined to ensure that assumptions of normality, linearity, and homoscedasticity of errors were met; and that error terms were independent of one another.

Statistical procedures. Pearson correlations were used to examine the first four hypotheses to determine if relationships existed between specified pairs of variables. Following the correlational analyses, the mediating and moderating models were tested. First, MRA was used to test the Personality-Induced Hyperactivity model, in order to determine if stress (retrospective, daily, & perceived) mediates the relationship between Neuroticism and Eating Disorder Risk. Next, the Precipitator of Dangerous Behavior model was tested also using MRA to analyze the predicted moderating effect of Predominant Coping Style on the relationship between Neuroticism and Eating Disorder Risk. As Predominant Coping Style is a categorical variable, with four different groups, it was dummy coded prior to running the moderation analysis. Finally, the hypothesized mediational effect of an interaction between stress and Predominant Coping Style on the relationship between Neuroticism and Eating Disorder Risk was examined using MRA

for both the mediating and moderating steps. This final analysis was to test the Differential Exposure-Reactivity model.

Descriptive Statistics

Basic descriptive statistics for the Eating Disorder Risk Composite of the EDI-3, the Neuroticism domain of the NEO PI-R, the YA-FILES, the number of stressful events reported over 14 days (daily reports of stressful events), the average stress associated with daily stressful events, and situational change in eating habits as a result of the stressful event can be found in Table 3.

Psychiatric diagnoses in the current sample. Only 0.9% of the total sample reported having a current diagnosis of eating disorder; another 7.8% reported another current diagnosis (e.g., depression, anxiety, ADHD). However, 2.6% reported a past diagnosis of eating disorder and 14.8% reported having been diagnosed with another psychiatric disorder in the past. None of the participants reported eating disorder diagnoses (past or current) in family members but 45.2% reported another current or past diagnosis in their families.

Predominant coping style. With respect to dispositional coping style, 36.1% (N = 43) of the sample reported predominant use of Distraction Coping, 27.7% (N = 33) reported predominant use of Task-focused Coping, 21% (N = 25) reported predominant use of Social Diversion Coping, and 15.1% (N = 18) reported predominant use of Emotion-focused coping. With respect to situational reports of coping, 42.9% (N = 51) reported predominant use of Task-focused Coping, 26.9% (N = 32) reported predominant

Table 3.

Descriptive statistics for all major study variables (N = 119).

Part 1: Initial Questionnaire Package	*Mean*	*SD*	*Range*
NEO PI-R Neuroticism	58.12	11.45	26 – 80
EDI-3 Eating Disorder Risk Composite	35.74	10.46	20 – 60
YA-FILES Stressors Past 6 Months[1]	21.86	9.82	2 – 52
CISS Coping			
Task Focused	54.06	9.23	25.0 – 74.0
Emotion Focused	50.42	10.66	28.0 – 74.0
Distraction	55.81	9.46	32.0 – 75.0
Social Diversion	52.74	9.42	26.5 – 67.0
Part 2: Daily/Situational Reports	*Mean*	*SD*	*Range*
Mean # Stressful Events (over 14 days)	8.52	4.99	1 – 24
Mean Stress Rating per Event (1-100)	56.31	21.98	3.67 – 99
Daily (Situational) Coping			
Task Focused	16.66	10.30	1.04 – 64.58
Emotion Focused	15.41	11.20	0.00 – 59.38
Distraction	10.29	9.48	0.00 – 42.86
Social Diversion	13.70	10.93	0.00 – 46.36
Change in Eating Habits	2.42	1.87	0 - 10

[1] $N = 115$

use of Emotion-focused Coping, 21% (N = 25) reported predominant use of Social Diversion Coping, and 9.2% (N = 11) reported predominant use of Distraction Coping. Predominant dispositional and predominant situational coping style matched for only 37.8% of the sample (N = 45); the remaining 62.2% (N = 74) of participants reported a predominant dispositional coping style that differed from their situational reports of coping style.

Preliminary Correlational Analyses

The correlation matrix showing Pearson product-moment correlation coefficients for Part 1 study variables is presented in Appendix I. The correlation matrix for Part 2 study variables is presented in Appendix J. The correlations between retrospective/dispositional and daily/situational measures are found in Appendix K.

Retrospective and daily stressful events. Daily and retrospective reporting of stressful events were moderately correlated (r = .383, p < .001). Retrospective reporting of stressful events was positively correlated with Eating Disorder Risk (r = .296, p < .01), Neuroticism (r = .224, p < .05), dispositional Emotion-focused Coping (r = .291, p < .01) and situational Emotion-focused Coping (r = .202, p < .05), whereas daily reporting of stressful events did not relate significantly to Eating Disorder Risk, Neuroticism, or any of the coping measures.

Dispositional and situational coping style. Mean scores of dispositional and situational coping styles were positively correlated for Emotion-focused Coping (r = .433, p < .001) and Distraction Coping (r = .200, p < .05). Dispositional and situational

reports were not significantly correlated for either Social Diversion Coping ($r = .177$, $p = .054$) or Task-focused Coping ($r = .117$, $p > .05$).

Eating disorder risk and situational change in eating habits. Eating Disorder Risk was positively correlated with situational reports of changes in daily eating habits ($r = .301$, $p < .01$). Both Eating Disorder Risk ($r = .420$, $p < .001$) and reports of change in daily eating habits ($r = .358$, $p < .001$) were correlated with situational use of Emotion-focused Coping.

Perceived Stress. Participants' perception of how much stress they experienced during each stressful event was correlated with relatively few of the other variables. It was not correlated with the number of stressful events recalled (retrospective) or reported (daily), but it was positively correlated with the amount to which their daily eating habits changed as a result of the stressful event ($r = .369$, $p < .001$). Participants' perceived amount of stress was also positively correlated with situational emotion-focused coping ($r = .249$, $p < .01$).

Hypothesis Testing

Hypothesis 1. Neuroticism will be positively correlated with Eating Disorder Risk, retrospective and daily reports of stressful events, degree of stress reported for daily stressful events, and use of Emotion-focused and Distraction Coping strategies. As predicted, the Neuroticism Domain of the NEO PI-R was positively correlated with the Eating Disorder Risk Composite of the EDI-3 ($r = .532$, $p < .001$), and with retrospective reporting of stressful events on the YA-FILES measure ($r = .224$, $p < .05$). Contrary to expectations, Neuroticism was not correlated with the number of daily

stressful events reported (r = .019, p > .05), or with degree of stress reported for daily stressful events (r = .052, p > .05). Neuroticism was positively correlated with Emotion-focused Coping for both dispositional (r = .793, p < .001) and situational (r = .425, p < .001) coping. Neuroticism was also positively correlated with Distraction Coping, again for both dispositional (r = .254, p < .01) and situational (r = .214, p < .05) coping.

Hypothesis 2. Neuroticism will be negatively correlated with Task-focused and Social Diversion Coping strategies. As predicted, Neuroticism was negatively correlated with both dispositional (r = -.368, p < .001), and situational use of Task-focused Coping (r = -.193, p < .05). Neuroticism was also negatively correlated with dispositional use of Social Diversion Coping (r = -.215, p < .05) but not situational use of Social Diversion Coping (r = .020, p > .05).

Hypothesis 3. Eating Disorder Risk will be positively correlated with retrospective and daily reports of stressful events, degree of stress reported for daily stressful events, and with use of Emotion-focused and Distraction Coping strategies. Eating Disorder Risk was positively correlated with retrospective reporting of stressful events (r = .296, p < .01), but not with daily reports of the average number of stressful events (r = .040, p > .05), or degree of stress associated with daily stressful events (r = .138, p > .05). Eating Disorder Risk was positively correlated with dispositional and situational use of Emotion-focused Coping (rs = .543 and .420, respectively, p < .001), and with dispositional and situational use of Distraction Coping (rs = .420 and .310, respectively, p < .01).

Hypothesis 4. Eating Disorder Risk will be uncorrelated with reported use of Task-focused and Social Diversion Coping strategies. Unexpectedly, Eating Disorder

Risk was negatively correlated with dispositional use of Task-focused Coping (r = -.200, p < .05), but not with situational use of Task-focused coping (r = -.110, p > .05), and not with either dispositional (r = -.072, p > .05) or situational use of Social Diversion Coping (r = .037, p > .05).

Hypothesis 5. Testing the Personality-Induced Hyperactivity Model; stress will mediate the relationship between Neuroticism and Eating Disorder Risk. Three separate multiple regression analyses (MRAs) were planned to assess the meditational effects of stress as measured by (a) retrospective reports of stressful events on the YA-FILES, (b) average number of stressful events in reports made daily over 14 days, and (c) average ratings of stress for stressful events reported daily over 14 days. All the assumptions necessary to conduct MRA were met[10] for Hypothesis 5a.

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[10] In order to use MRA, the size of the sample must allow for at least 15 observations for each predictor variable. As there are two predictor variables in the equation (Neuroticism and YA-FILES), 30 observations are required to run MRA. As there are 115 usable observations in this analysis, this assumption has been met.

In order to determine that there were not any unusual observations exerting undue influence on the results, outliers on Y, outliers on X, and influential observations were examined. Using standardized residuals, which have a cut-off value of 2.5, no observations were determined to be outliers on Y. In addition, three observations were found to be outliers on X, using hat elements with a leverage value of 0.026. Using both Cook's Distance, with a cut-off value of 1, and DfFITs, with a cut-off value of |2|, no influential observations were found. The outliers on X were left in the analysis because they did not appear to be influential. Thus, no observations were removed from the analysis.

To check for multicollinearity and singularity, the correlation matrix was examined first. The correlation between the predictors was not large (r = .224, p < .05). Next, the collinearity diagnostics were inspected. As the Tolerance values were much greater than 0.1, and the Variance Inflation Factor (VIF) values were much smaller than 10, there is no multicollinearity or singularity.

Next the residual plots were examined to ensure normality, linearity, and homoscedasticity of errors. As the data points were evenly scattered above and below the mean of zero on the scatter plot, and the data are curved very closely around the line in the normal probability plot, the normality assumption is met. Linearity was also checked using the residual plot. The data are not entirely linear, but this appears to be a mild departure to which MRA is robust. Finally, the residual plot was also used to verify that there was homoscedasticity of errors. As the residuals are evenly scattered around the predicted values, across the range of predicted values, this assumption has been met.

The final assumption is that the error terms are independent of one another. The Durbin-Watson value was 1.963, suggesting that we have independence of errors.

To test Hypothesis 5a, that perceived stress based on retrospective reports on the the YA-FILES would mediate the relationship between Neuroticism and Eating Disorder Risk, two methods were used. For the first method, bootstrapping macros were installed, and the Sobel command was used to test the significance of the indirect path from Neuroticism to Eating Disorder Risk through retrospective reports of stress. For the second method, the mediation analysis was analyzed manually using SPSS. For both methods, the path from Neuroticism to Eating Disorder Risk ($B = .473$, $p < .001$), the path from Neuroticism to retrospective reports of stress ($B = .192$, $p < .05$) and the path from retrospectively reported stress to Eating Disorder Risk ($B = .201$, $p < .05$) were all significant. When both Neuroticism and retrospectively reported stress were entered as predictors in the same equation, the path from Neuroticism to Eating Disorder Risk remained significant and barely decreased ($B = .434$, $p < .001$), indicating that Neuroticism exerts its own unique effect on Eating Disorder Risk, independent of retrospectively reported stress. The indirect path from Neuroticism to Eating Disorder Risk through retrospectively reported stress was nonsignificant ($B = .038$, $p > .05$), suggesting that Neuroticism mediates the effect of the perceived stress on Eating Disorder Risk, and not the other way around. To examine this alternative, the indirect path from perceived stress to Eating Disorder Risk through Neuroticism was tested ($B = .114$, $p < .05$); as the indirect path was significant, it suggests that although perceived stress has some unique effect on Eating Disorder Risk, some of the effect is mediated through Neuroticism.

A primary assumption of MRA is that the hypothesized mediating variable is correlated with both the predictor and the criterion variable. However, in the current data

set, the average number of stressful events reported daily over 14 days was uncorrelated with either Neuroticism ($r = .019$, $p > .05$) or Eating Disorder Risk ($r = .040$, $p > .05$) so Hypothesis 5b could not be tested. Similarly, the average level of perceived stress reported daily over 14 days was uncorrelated with either Neuroticism ($r = .052$, $p > .05$) or Eating Disorder Risk ($r = .138$, $p > .05$), so hypothesis 5C could not be tested. Testing these hypotheses even though a key assumption was violated would only increase the rate of Type I Error (i.e., that the hypothesis is supported when it should actually be rejected).

Hypothesis 6. Testing the Precipitators of Dangerous Behavior Model; dispositional and situational coping strategies will moderate the relationship between Neuroticism and Eating Disorder Risk. This hypothesis was tested using MRA, using the categorical variable of Predominant Coping Style. The assumptions of MRA were examined separately for dispositional and situational Predominant Coping Style. Separate MRAs were run for each of the four Predominant Coping Styles.

1. Dispositional Coping:

There were no serious violations of the assumptions of MRA[11] so the hypothesis that Predominant Coping Style would moderate the relationship between Neuroticism and

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[11] There are three predictor variables in the equation (Neuroticism, Predominant Coping Style, Interaction Term), therefore, 45 observations are required to run MRA. As there are 119 usable observations in this analysis, this assumption has been met.

In order to determine that there were no unusual observations exerting undue influence on the results, outliers on Y, outliers on X, and influential observations were examined for each analysis. Using standardized residuals, which have a cut-off value of 2.5, no observations were determined to be outliers on Y. In addition, four observations were found to be outliers on X, using hat elements with a leverage value of 0.087. Using Cook's Distance, with a cut-off value of 1, no influential observations were found. Then DfFITs were examined, which have a cut-off value of |2|, and one influential observation was found. The analysis was then run with and without the influential observation. As the influential observation did not appear to exert undue influence on the results, it was left in the analysis. The outliers on X were left in the analysis because they did not appear to be influential. Thus, no observations were removed from the analysis.

To check for multicollinearity and singularity, the correlation matrix was examined first. The correlations between predictors were not exceptionally large. Next, the collinearity diagnostics were

Eating Disorder Risk was tested. To test this prediction, several steps were followed. First, Neuroticism was centered, giving it a mean of zero. Predominant Coping Style was not centered, as it was unnecessary due to its categorical nature. After centering, four interaction terms were created for Neuroticism and each of the four coping styles. This was done to demonstrate the hypothesized combined effect of both Neuroticism and Predominant Coping Style. There was a separate interaction term for each coping style. Four MRAs were then run, each using the centered Neuroticism variable, one of the Predominant Coping Style variables, and the appropriate interaction term. These will be examined separately for each coping style.

The MRA examining the moderating effect of Predominantly Task-focused Coping Style was significant overall ($R^2 = .310$, $F(3, 115) = 17.232$, $p < .001$). This significant result, however, was courtesy of the effect of Neuroticism on Eating Disorder Risk ($B = .453$, $p < .001$), and the individual effect of Predominantly Task-focused Coping Style on Eating Disorder Risk ($B = -4.580$, $p < .05$). The interaction term did not account for a significant amount of the variance in Eating Disorder Risk ($B = -.121$, $p > .05$). Thus, possessing a dispositional coping style that is predominantly Task-focused does help predict a decrease in Eating Disorder Risk, but does not have an effect on the relationship between Neuroticism and Eating Disorder Risk.

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inspected. As the Tolerance values were much greater than 0.1, and the Variance Inflation Factor (VIF) values were much smaller than 10, there is no multicollinearity or singularity.

Next the residual plots were examined to ensure normality, linearity, and homoscedasticity of errors. As the data points were evenly scattered above and below the mean of zero on the scatter plot, and the data are curved very closely around the line in the normal probability plot, the normality assumption is met. Linearity was also checked using the residual plot. The data are not entirely linear, but this appears to be a mild departure to which MRA is robust. Finally, the residual plot was also used to verify that there was homoscedasticity of errors. As the residuals are evenly scattered around the predicted values, across the range of predicted values, this assumption has been met.

The final assumption is that the error terms are independent of one another. The Durbin-Watson value was 2.05, meaning there is independence of errors. All the assumptions of MRA were met.

The next MRA examined the moderating effect of Predominantly Emotion-Focused Coping Style. It was also significant overall (R^2 = .289, F(3, 115) = 15.568, p < .001). Again, this significant result was due to the effect of Neuroticism on Eating Disorder Risk (B = .517, p < .001). Neither the individual effect of Predominantly Emotion-Focused Coping Style (B = -1.909, p > .05), nor the interaction term (B = -.043, p > .05) accounted for a significant amount of the variance in Eating Disorder Risk. Thus, possessing a dispositional coping style that is predominantly Emotion-focused does not affect the relationship between Neuroticism and Eating Disorder Risk. It also does not help predict Eating Disorder Risk.

The next coping style analyzed using MRA was Predominantly Distraction-Focused Coping Style. Like the other dispositional coping styles, it was significant overall (R^2 = .304, F(3, 115) = 16.737, p < .001). Again, this significant result was due to the effect of Neuroticism on Eating Disorder Risk (B = .420, p < .001). Neither the individual effect of Predominantly Distraction-Focused Coping Style (B = 2.119, p > .05), nor the interaction term (B = .198, p > .05) accounted for a significant amount of the variance in Eating Disorder Risk. Thus, possessing a dispositional coping style that is predominantly Distraction-focused does not affect the relationship between Neuroticism and Eating Disorder Risk, nor does it exert a unique effect on Eating Disorder Risk.

The MRA examining the moderating effect of Predominantly Social Diversion-Focused Coping Style was also significant overall (R^2 = .294, F(3, 115) = 15.968, p < .001). This significant result, however, was courtesy of the effect of Neuroticism on Eating Disorder Risk (B = .518, p < .001). Neither the individual effect of Predominantly Social Diversion-Focused Coping Style (B = 1.969, p > .05), nor the interaction term (B

= -.149, $p > .05$) could account for a significant amount of the variance in Eating Disorder Risk. Thus, predominant use of Social Diversion Coping does not help predict Eating Disorder Risk or help to explain the relationship between Neuroticism and Eating Disorder Risk.

2. Situational Coping:

As there were no serious violations of the assumptions of MRA[12], the hypothesis that Predominant Situational Coping Style would moderate the relationship between Neuroticism and Eating Disorder Risk was tested. To test this prediction, the same steps were followed as for dispositional coping. Please see above for a review. The MRA examining the moderating effect of Predominantly Task-Focused Coping Style was significant overall ($R^2 = .289$, $F(3, 115) = 15.557$, $p < .001$). This significant result, however, was courtesy of the effect of Neuroticism on Eating Disorder Risk ($B = .510$, p

[12] As with dispositional coping style, there are three predictor variables in the situational equation (Neuroticism, Predominant Coping Style, Interaction Term); therefore, 45 observations are required to run MRA. There are 119 usable observations in this analysis, therefore, this assumption has been met. Please note that a separate MRA was run for each of the four predominant situational coping styles.

In order to determine that there were no unusual observations exerting undue influence on the results, outliers on X and influential observations were examined for each analysis. Outliers on Y were examined in the previous analysis. Using standardized residuals, which have a cut-off value of 2.5, no observations were determined to be outliers on Y. In addition, five observations were found to be outliers on X, using hat elements with a leverage value of 0.084. Using Cook's Distance, with a cut-off value of 1, no influential observations were found. Then DfFITs were examined, which have a cut-off value of |2|, and four influential observation was found. Two of the influential observations were also outliers on X. The analysis was then run with and without the influential observations. As the influential observation did not appear to exert undue influence on the results, they were left in the analysis. The outliers on X were also left in the analysis because they did not appear to be influential. Thus, no observations were removed from the analysis.

To check for multicollinearity and singularity, the correlation matrix was examined first. The correlations between predictors were not exceptionally large. Next, the collinearity diagnostics were inspected. As the Tolerance values were much greater than 0.1, and the Variance Inflation Factor (VIF) values were much smaller than 10, there is no multicollinearity or singularity.

Next the residual plots were examined to ensure linearity and homoscedasticity of errors. Normality was examined in the previous analysis. Linearity was checked using the residual plot, and the data appear fairly linear. Finally, the residual plot was also used to verify that there was homoscedasticity of errors. As the residuals are evenly scattered around the predicted values, across the range of predicted values, this assumption has been met.

The final assumption is that the error terms are independent of one another. The Durbin-Watson value was 2.015, meaning the error terms are independent. All of the assumptions of MRA have been met.

< .001). Neither the individual effect of Predominantly Task-Focused Coping Style on Eating Disorder Risk (B = -1.388, p > .05), nor the interaction term (B = -.076, p > .05) accounted for a significant amount of the variance in Eating Disorder Risk. Thus, possessing a situational coping style that is predominantly Task-focused does not have an effect on Eating Disorder Risk or on the relationship between Neuroticism and Eating Disorder Risk.

The next MRA examined the moderating effect of Predominantly Emotion-Focused Coping Style. It was also significant overall (R^2 = .284, F(3, 115) = 15.175, p < .001). Again, this significant result was due to the effect of Neuroticism on Eating Disorder Risk (B = .496, p < .001). Neither the individual effect of a Predominantly Emotion-focused coping style (B = .012, p > .05), nor the interaction term (B = -.041, p > .05) accounted for a significant amount of the variance in Eating Disorder Risk. Thus, having a predominantly Emotion-focused coping style does not predict Eating Disorder Risk, or affect the relationship between Neuroticism and Eating Disorder Risk.

The next coping style analyzed using MRA was Predominantly Distraction-focused Coping Style. Like the other situational coping styles, it was significant overall (R^2 = .302, F(3, 115) = 16.611, p < .001). As with previous analyses, this significant result was due to the effect of Neuroticism on Eating Disorder Risk (B = .469, p < .001). Neither the individual effect of Predominantly Distraction-focused Coping Style (B = 4.612, p > .05), nor the interaction term (B = .112, p > .05) accounted for a significant amount of the variance in Eating Disorder Risk. Thus, possessing a situational coping style that is predominantly Distraction-focused does not affect the relationship between

Neuroticism and Eating Disorder Risk, nor does it exert a unique effect on Eating Disorder Risk.

The MRA examining the moderating effect of Predominantly Social Diversion-Focused Coping Style was also significant overall (R^2 = .285, F(3, 115) = 15.249, p < .001). This significant result, however, was courtesy of the effect of Neuroticism on Eating Disorder Risk (B = .477, p < .001). Neither the individual effect of Predominantly Social Diversion-Focused Coping Style (B = -.464, p > .05), nor the interaction term (B = .098, p > .05) could account for a significant amount of the variance in Eating Disorder Risk. Thus, possessing a situational coping style that is predominantly Social Diversion-focused does not help predict Eating Disorder Risk or help to explain the relationship between Neuroticism and Eating Disorder Risk.

Hypothesis 7. Testing the Differential Exposure-Reactivity Model; the interaction between perceived stress and predominant coping style will mediate the relationship between Neuroticism and Eating Disorder Risk. As neither dispositional Predominant Coping Style, nor situational Predominant Coping Style affected the relationship between Neuroticism and Eating Disorder Risk, conceptually, it did not make sense to test this final hypothesis. Again, testing this hypothesis without reasonable cause to do so would only increase Type I Error, decreasing the validity of the results.

Discussion

The purpose of the present study was to begin to explain the relationship between neuroticism and eating disorder risk. It is commonly accepted that people who are high in neuroticism are more likely to develop psychiatric disorders than people who are low in neuroticism (Widiger & Trull, 1992), but little is understood about the mechanisms through which these disorders develop.

The current study looked specifically at eating disorder risk and took a broad view, including the presence of eating disorder symptoms but not requiring an actual eating disorder diagnosis. Stress and coping style were proposed as constructs that could potentially explain why highly neurotic individuals are also more likely to be at risk for an eating disorder. The goal of this study not only to confirm past findings about the relationships between neuroticism, stress, coping, and eating disorder risk, but also to explore potential mediators and moderators of the relationship between neuroticism and eating disorder risk.

Preliminary Analyses

Consistency of Coping Style. Descriptive statistics suggested that the coping style participants *believed* they used most was often different than the coping style they *actually* used most often. Only just over a third of the sample actually used the predominant coping style that they thought they did. This is in contrast to almost two-thirds of the sample who reported that they predominantly used one coping style, when in reality, they used another more often. This suggests that perhaps people are not as aware of their own actions as they might think. This could have implications for willingness to

change. If people think they are using adaptive coping strategies, but are actually using more maladaptive strategies, their ability to reduce distress by making use of more effective coping strategies may be hindered because they have convinced themselves that they are better at coping than they actually are.

Retrospective and Daily Stress. Retrospective reports of stress only moderately mapped onto daily reports of stress, although they were related. The more stressful events people reported over the past six months, the more stressful events they were likely to report over the past two weeks. One would think that if retrospective measures of stress are accurately tapping into an individuals' experience of stress, they would be much more highly correlated with daily measures, as the daily measures have a much shorter time lapse between the event and the report. It may be that daily stress is measuring something different than retrospective stress. A face comparison of both measures suggests that the retrospective account of stress was predominantly limited to major life events, whereas the daily account of stress included both major life events and daily hassles (e.g., "someone stole my parking space"). The two measures are also different because 'stressful' events on the YA-FILES were determined by a researcher (retrospective stress) and stressful events on the daily questionnaire were determined by the participant (daily stress). It is important to look at what each individual person considers to be stressful and not what a particular researcher considers to be stressful because what may be very stressful to one individual may not even register as a stressful event to another person. Other explanations for the moderate correlation between retrospective and daily stress include the influence of other variables on retrospective recall of stress (e.g., self-concept), and the non-overlapping time periods for both daily and retrospective stress. It

is, however, important to note that even when retrospective and daily measures overlap, there is still a significant portion of variance that is not shared between the two measures (Smith, Leffingwell, & Ptacek, 1999).

Dispositional and Situational Coping Style. It is interesting to note that the two maladaptive coping styles seem to be the most consistent between dispositional and situational coping. The discrepancy appears to be with the adaptive coping styles: task-focused coping and social diversion coping. For the maladaptive coping styles, people believe that they use them and they actually do use them. Perhaps they are such pervasive ways of coping with stress that people who predominantly use emotion-focused and distraction coping are also acutely aware of how often they use them. For the adaptive coping styles, it seems that people may think they use them but actually do not. This suggests that perhaps another variable (e.g., social desirability or self-esteem) may be involved. For example, dispositional task-focused coping appears positive and socially desirable, and this may be accounting for people's responses. Perhaps people want to report that they use task-focused coping strategies more often because they seem like the more intelligent choice. When presented out of context (i.e., not in relation to a specific stressful situation), task-focused strategies seem like the obvious solution to any problem; therefore, people may be more likely to say they use them when, in reality, they may not.

Eating Disorder Risk and Situational Change in Eating Habits. Eating disorder risk and daily accounts of eating disturbances were positively correlated, meaning that the higher the eating disorder risk someone reported, the more likely they would also report that their eating habits had changed as a result of daily stress. Thus, risk of eating

disorders does appear to be related to the presence of actual daily disruptions in eating habits.

Perceived Stress. Perceptions of stress were positively correlated with daily change in eating habits due to stress and with situational emotion-focused coping. Therefore, the more stressful a participant perceived an event to be, the more likely she was to use emotion-focused coping to deal with said stress, and the more likely her eating habits changed as a result of the stress. Although amount of stress perceived is unrelated to eating disorder risk, it is associated with daily changes in eating habits due to stress.

Neuroticism

As predicted, people who scored highly on neuroticism were also more likely to be at risk for eating disorders, recalled more stressful events retrospectively, and reported that they used and actually did appear to use more maladaptive coping strategies (i.e., emotion-focused and distraction coping), and fewer adaptive coping strategies (i.e., task-focused and social diversion coping). This suggests that people who are high in neuroticism are likely to cope with stress in detrimental ways, choosing coping strategies that may be harmful more often than strategies that may be beneficial. These findings are consistent with a large body of previous research.

Contrary to expectations and inconsistent with past literature, participants' scores on neuroticism were unrelated to both the number of stressful events they reported over a two week period and how stressful they rated each event. There are several possibilities for why this hypothesis was not supported.

First, one important distinction between the present study and past literature is that neuroticism was used as a continuous variable in the present study, which is considered to be a more informative and valuable way of measuring constructs (Irwin & McClelland, 2003). Past literature has dichotomized people into a high or low neuroticism group prior to conducting any analyses (Bolger & Schilling, 1991; Bolger & Zuckerman, 1995; Gunthert et al., 1999). The relationship between neuroticism and daily reports of stress that has been reported in the literature may be partially an artifact of dichotomizing neuroticism.

Another possibility is that much past literature (e.g., Bolger and colleagues) has assessed stress by asking participants to select their stressor from a pre-determined checklist, consisting of events that are generally considered to be stressful. In the present study, participants were permitted to select their own stressor, which was thought to provide a more accurate picture of participants' stress instead of forcing them to choose their stressor from a list of what other people consider stressful.

Finally, past research has often explored stressors further by classifying them into various types. It has been reported that neuroticism is related to *interpersonal stress* (Bolger & Zuckerman, 1995; Gunthert et al., 1999), and the present study did not categorize types of stressful events. Examining these more specific types of stressors was not feasible within the time frame of the present study, but may be necessary to find support for the hypothesized relationships.

An explanation for why neuroticism was unrelated to the amount of stress perceived may be the difference between amount of stress perceived and amount of distress experienced. Past research has found that the higher someone scores on

neuroticism, the more distress he or she will exhibit in response to stressful events (Gunthert et al., 1999). For the purpose of the present study, it was thought that if high neuroticism participants reacted with more distress to a stressful event, they would also be likely to rate that event as more stressful, although actual "distress" levels were not measured. Perceptions of stress and reactions of distress may not be as closely related as previously assumed. It also may be that a basic rating scale of 1 to 100 is not an effective way to measure the amount of stress perceived for each stressful event.

Eating Disorder Risk

As predicted, people who were at increased risk for eating disorders recalled more stressful events retrospectively, and reported that they used and actually did use more maladaptive coping strategies (i.e., emotion-focused and distraction). This has been found extensively in past literature (Bennett & Cooper, 2001; Brytek, 2006; Freeman & Gil, 2004; Ghaderi & Scott, 2000; Troop et al., 1994; VanBoven & Espelage, 2006). As previously discussed, emotion-focused coping is maladaptive, and obviously eating disturbances are as well. Thus, it is not surprising that they are related. People who use more emotion-focused coping tend to experience more psychopathology (i.e., at increased risk for eating disorders). This finding not only supports previous literature but also suggests that simply believing that you typically use emotion-focused coping strategies is also related to eating disorder risk. As previously discussed, the coping style that individuals believe they predominantly use and the coping style that they actually use are not always the same.

Although a relationship was not anticipated, participants who reported using more task-focused coping strategies were at a lower risk for eating disorders. This finding is consistent with past literature, which has found that dispositional task-focused coping is used less often by people with current or past eating disorder diagnoses (Ghaderi & Scott, 2000; Yager et al., 1995). The present finding extends past results to a nonclinical population. In the present study, only 2.5% of the sample reported a past or current eating disorder diagnosis; thus, the majority of the sample possessed subclinical symptoms, if any. As suggested by previous literature, participants' risk for eating disorders was unrelated to their use of social diversion coping or situational task-focused coping.

Contrary to our hypothesis, the number of stressful events an individual reported over the past 14 days was not related to her risk for eating disorders. This is inconsistent with suggestions from past literature, as daily hassles (as assessed by the daily questionnaire) are thought to be better predictors of psychopathology than major life events (as assessed by the YA-FILES) (Pillow et al., 1996). Our failure to replicate this finding may be due to several factors. First, 14 days may not be a long enough period of time to get an accurate representation of the stress experienced by an individual. Second, previous studies have commonly measured daily stress using a checklist, and this particular account of stress asked participants to report their own stressful events to help ensure that all events reported by the participants were in fact perceived as stressful to them. Finally, this hypothesis was based on findings in past literature about the relationship between daily hassles and general psychopathology, not eating disorders specifically. There may be something different about the development and presentation of eating disorders that is less related to daily hassles than to major life events.

Another surprising finding was that amount of stress perceived by participants was unrelated to their eating disorder risk. As mentioned previously, it may be that the scale used was not sensitive enough or it may also be an artifact of our procedure. Scores on the EDI-3 are thought to be fairly stable over short period of time (i.e., two weeks) (Garner, 2005); therefore, we did not foresee any methodological issues in collecting eating disorder risk data before stress data. Perhaps we should have collected the daily data prior to the eating disorder risk data. The positive relationship between amount of stress perceived and daily change in eating habits suggests that perceptions of stress do have some sort of relationship with eating disturbances. Why, then, is it unrelated to a general measure of eating disorder risk? Perhaps the EDI-3 is not as stable over time as previously assumed. The test-retest reliability data presented for the EDI-3 in the manual is based on a small sample of 34 women who were diagnosed with eating disorders. The sample in the present study was a nonclinical sample. The test-retest reliability may be quite different with a university student population. Unfortunately, as the EDI-3 is a relatively new version of the EDI, additional studies examining the test-retest reliability of the EDI-3 were not found.

Personality-Induced Hyperactivity Model

On the basis of this model, it was predicted that the relationship between neuroticism and eating disorder risk would be mediated by stress, which was measured in three ways: retrospective recall of stressful events (i.e., YA-FILES), daily reports of stress (number of daily reported stressful events over 14 days), and amount of stress perceived (via the daily measure). This model was not supported, as none of the stress

variables helped to explain the relationship between neuroticism and eating disorder risk; however retrospective recall of stressful events did play an interesting role. Neuroticism seems to partially account for the relationship between retrospective recall of stress and eating disorder risk, which has not been found in past literature. This finding suggests that the number of stressful events recalled by an individual is affected by their level of neuroticism. Thus, being high in neuroticism may affect an individual's exposure to stressful events, which in turn, may exert an effect on eating disorder risk. People's level of neuroticism may affect how many stressful life events they recall, which affects the presence of eating disorder symptoms.

The Personality-Induced Hyperactivity Model also suggested that daily reports of stress would also serve to mediate the relationship between neuroticism and eating disorder risk. Unfortunately, due to the fact that the mediator (daily stress) was uncorrelated with the predictor (neuroticism) and the outcome variable (eating disorder risk), this analysis was not run. This also occurred for amount of stress perceived. As it was also uncorrelated with the predictor and outcome variables, this analysis was not run. Suggestions for why these variables are unrelated were previously discussed.

The purpose of this hypothesis was to test the Personality-Induced Hyperactivity Model, which suggested that certain personality characteristics, like neuroticism, cause people to be prone to exaggerated responses to stress, and as a result develop forms of psychopathology, like eating disturbances. Perhaps we did not find support for this model because we did not measure stress in the way the model intended. We measured the number of stressful events recalled and reported, as well as how stressful each event seemed, but not the amount of distress individuals experienced after the stressful event.

One could argue that eating disturbances are a reflection of the distress experienced by participants, but perhaps a more comprehensive measure of distress, which includes measures of depression and anxiety symptoms after the occurrence of a stressful event, may be more informative. This component may be necessary to find support for the Personality-Induced Hyperactivity Model.

Precipitators of Dangerous Behaviors Model

Based on the Precipitators of Dangerous Behaviors Model, it was hypothesized that predominant coping style would moderate the relationship between neuroticism and eating disorder risk. Both predominant dispositional coping style and predominant situational coping style were examined as moderators, and both were rejected. Thus, predominant dispositional coping style did not moderate the relationship between neuroticism and eating disorder risk, and neither did predominant situational coping style. It did not matter which coping style participants thought they used the most or which coping style they actually did appear to use most often; it had no effect on the relationship between neuroticism and eating disorder risk. Why might this be? Participants had scores on all four coping styles, and the coping style they used most often was considered their predominant coping style. It may be that they only used coping strategies from their predominant coping style slightly more than another style, and thus, their predominant coping style may not really have been that much more predominant than another coping style. It also may be that another way of assessing coping would make more sense. There are many ways of examining coping, and looking at task-, emotion-, and avoidance-focused coping styles is just one of them.

The purpose of this hypothesis was to test the Precipitator of Dangerous Behaviors Model, which posits that certain personality traits (i.e., neuroticism) may prompt people to engage in behaviours (i.e., choosing maladaptive coping strategies) that increase their risk of illness (i.e., eating disorders). Failing to find support for this model with the present study does not rule out the model completely. First, the model was created to explain the relationship between personality and illness, not neuroticism and eating disorder risk specifically. There may be other personality/illness combinations for which the model is supported. Second, this model asserts that certain personality traits may encourage people to engage in dangerous and risky behaviours. Choosing maladaptive coping strategies is only one such behaviour. Perhaps other behaviours may serve as moderators of the relationship between neuroticism and eating disorder risk.

Differential Exposure-Reactivity Model

The final hypothesis predicted that the relationship between neuroticism and eating disorder risk could be explained by a combination of or interaction between stress and predominant coping style. The purpose of this hypothesis was to test the Differential Exposure-Reactivity Model, which asserts that personality (i.e., neuroticism) affects both people's exposure to stressful events (i.e., number of events experienced) and their reactivity to those events (i.e., coping strategies selected). This prediction was dependent on the fifth and sixth hypotheses. After those hypotheses were rejected, it no longer made conceptual sense to test this model, and thus, analyses were not run. Perhaps if we had used the distress experienced by participants following the event as their "reactivity", instead of the coping strategies chosen, we may have had a different result.

Conclusions and Contributions

Findings from the present study helped to confirm past findings about the relationships between neuroticism and eating disorder risk in this at-risk population of female university students. We also added to the relatively small body of literature that examines distraction and social diversion coping separately, instead of combining them under the broader category of avoidance coping. Past research, as well as findings from the present study, suggest that the two subtypes of avoidance coping have very different effects on psychological well-being and should probably not be collapsed into one category.

Unfortunately, the models proposed to explain the relationship between neuroticism and eating disorder risk were not supported. This may be a reflection of study design or it may be that different variables are required to test the model. Both of these possibilities will be discussed shortly. The one unexpected, yet interesting finding that emerged from the model-testing was that neuroticism appears to partially mediate the relationship between stressful major life events and eating disorder risk. The role of neuroticism as a mediator should be further examined.

The present study also added to the body of literature examining the usefulness of long-term retrospective measures. Comparing retrospective and daily measures of stress permitted a cursory examination of the accuracy of retrospective measures. Although the retrospective and daily measures of stress were related, they were only moderately correlated. It seems that retrospective and daily measures may not be tapping into exactly the same construct or we would expect much higher correlations. This further corroborates the claims of past literature that researchers should exercise caution when

using retrospective measures as they may not be the most accurate means of collecting data.

We were also able to compare dispositional and situational coping styles. This allowed us to investigate differences between how people *believe* they deal with stress and how they *actually* deal with stress. Surprisingly, the type of coping strategies people believe they use and the type they actually use are often different. This further questions the validity of using general retrospective measures (like the dispositional coping measure) to assess certain characteristics. It seems that the dispositional coping measure may have been tapping into people's perceptions of themselves, as opposed to their actual coping style. This finding suggests that when attempting to improve coping skills, interventions should begin with daily assessments of current coping strategies and not retrospective questionnaires.

In the present study, stress was measured by asking participants to report events that *they* considered stressful, and not by assuming that everyone would consider the same events stressful. Objective measures of stress that are used with everyone seem counterintuitive. It seems much more informative to allow individual differences in what events are reported as stressful. Interestingly, different results were obtained for participant-selected stressors and researcher-selected stressors, suggesting that past relationships established with researcher-selected stressors may be reflective of something other than participants' level of stress.

Limitations and Future Research

Although the present study attempted to improve on the methodological flaws of past literature, there were limitations that can be improved upon for future research. First, there were several variables that, in retrospect, should probably have been included in the present study. Both self-esteem and social support have been found to be strongly related to eating disturbances. Including measures of these variables may have helped to clarify the existing relationships. Future research should include self-esteem to see how it interacts with or accounts for other relationships. As previously mentioned, self-esteem may help to explain why dispositional task-focused coping was negatively related to eating disorder risk yet situational task-focused coping was unrelated. Self-esteem may have influenced coping strategy selection.

It also may be important for future research to examine whether participants believed the stressful event was within their control. Past literature has suggested that people tend to use more task-focused coping when they think there is something that can be done about a situation and more emotion-focused coping when they think that the situation is out of their control (Carver et al., 1989). It could be that the amount of control perceived in a situation has an effect on the relationship between neuroticism and eating disorder risk. Neuroticism may affect how much control someone believes she has, which then has an influence on what coping strategy she chooses. Unfortunately, analyzing this piece of data was not within the scope of the present study.

Although the present study measured the number of stressful events experienced, as well as how stressful each event was perceived to be, it did not assess the amount of distress experienced by participants after each stressful event. The amount of distress

experienced may be the key to testing both the Personality-Induced Hyperactivity Model and the Differential Exposure-Reactivity Model. Including a comprehensive measure of distress, examining levels of depression, anxiety, and possibly even self-worth, following each stressful event may be important.

In retrospect, it seems as though perceived amount of stress should also have been measured for the retrospective questionnaire and not just daily stressful events. This would have allowed comparisons not only between the number of events reported retrospectively and daily, but also how stressful an event seems both several hours later and several months later. Including a way of measuring amount of stress for the retrospective measure would have helped make the checklist a more accurate reflection of participant's actual stress. This would have allowed us to exclude from the analyses any that participants experienced but did not consider to be stressful. At the present time, we have no way of knowing if the "stressful" events participants checked off on the retrospective questionnaire are *actually* something they found stressful.

Another potential limitation of the present study was the order in which the two parts were conducted. Perhaps instead of completing the retrospective questionnaires first and then completing the two weeks of daily data, the daily data should have been collected prior to the retrospective data. This would have allowed for an even closer comparison between the retrospective and daily data because, ideally, anything stressful that occurred over the two-week period would also have been checked off on the retrospective questionnaire. Collecting data in this order, however, may have made it more difficult to recruit participants, as they would not have met the examiner in person prior to starting the study. This may have led to more attrition.

Finally, future research should conduct additional short- and long-term test-retest reliability on the EDI-3 with a nonclinical sample. Presently, the only test-retest reliability that exists for this version of the EDI is a short-term reliability study with a very small eating disordered sample. Additional information on the reliability with subclinical populations, as well as whether the measure remains stable over time would be helpful.

In conclusion, the present study corroborated much of the past literature on the relationships between neuroticism, coping style, and eating disorder risk, but failed to find support for the three models tested. We also added to the growing body of literature finding that retrospective measures may be tapping into different constructs than daily assessment tools. Future research should examine how additional variables, such as self-esteem, social support, post-stress distress, and perception of control fit into the previously established relationships between neuroticism, stress, coping, and eating disorder risk.

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Appendix A

DSM-IV-TR Diagnostic Criteria for Eating Disorders (APA, 2000)

Anorexia Nervosa

A. Refusal to maintain body weight at or above a minimally normal weight for age and height (e.g., weight loss leading to maintenance of body weigh less than 85% of that expected; or failure to make expected weight gain during period of growth, leading to body weight less than 85% of that expected).

B. Intense fear of gaining weight or becoming fat, even though underweight.

C. Disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or denial of the seriousness of the current low body weight.

D. In postmenarcheal females, amenorrhea, i.e., the absence of at least three consecutive menstrual cycles. (A woman is considered to have amenorrhea if her periods occur only following hormone, e.g., estrogen, administration.)

Subtypes:

Restricting Type: during the current episode of AN, the person has not regularly engaged in binge-eating or purging behavior (i.e., the self-induced vomiting or the misuse of laxatives, diuretics, or enemas)

Binge-Eating/Purging Type: during the current episode of AN, the person has regularly engaged in binge-eating or purging behavior (i.e., the self-induced vomiting or the misuse of laxatives, diuretics, or enemas)

Bulimia Nervosa

A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:

    (1) 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 during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating).

B. Recurrent inappropriate compensatory behaviors in order to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, enemas, or other medications; fasting; or excessive exercise.

C. The binge eating and inappropriate compensatory behaviors both occur, on average, at least twice a week for 3 months.

D. Self-evaluation in unduly influenced by body shape and weight.

E. The disturbance does not occur exclusively during episodes of Anorexia Nervosa.

Subtypes:

Purging Type: during the current episode of BN, the person has regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas.

Nonpurging Type: during the current episode of BN, the person has used other inappropriate compensatory behaviors, such as fasting or excessive exercise, but has not regularly engaged in self-induced vomiting, or the misuse of laxatives, diuretics, or enemas.

Eating Disorder Not Otherwise Specified

The Eating Disorder Not Otherwise Specified category is for disorders of eating that do not meet the criteria for any specific Eating Disorder. Examples include:

1. For females, all of the criteria for Anorexia Nervosa are met except that the individual has regular menses.
2. All of the criteria for Anorexia Nervosa are met except that, despite significant weight loss, the individual's current weight is in the normal range.
3. All of the criteria for Bulimia Nervosa are met except that the binge eating and inappropriate compensatory mechanisms occur at a frequency of less than twice a week or for a duration of less than 3 months.
4. The regular use of inappropriate compensatory behavior by an individual of normal body weight after eating small amounts of food (e.g., self-induced vomiting after the consumption of two cookies).
5. Repeatedly chewing and spitting out, but not swallowing, large amounts of food.
6. Binge-eating disorder: recurrent episodes of binge eating in the absence of the regular use of inappropriate compensatory behaviors characteristic of Bulimia Nervosa.

Binge-Eating Disorder

A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:
    (1) 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 during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating).
B. The binge-eating episodes are associated with three (or more) of the following:
    (1) Eating much more rapidly than normal
    (2) Eating until feeling uncomfortably full
    (3) Eating large amounts of food when not feeling physically hungry
    (4) Eating alone because of being embarrassed by how much one is eating
    (5) Feeling disgusted with oneself, depressed, or very guilty after overeating
C. Marked distress regarding binge eating is present.
D. The binge eating occurs, on average, at least 2 days a week for 6 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

Participant Pool Advertisement

Female university students, aged 17 to 25 years, are invited to participate in a two-part study. The first part of the study will require 60 minutes (one hour) of your time, and will require you to complete five brief questionnaires about your personality and your eating patterns. You will be eligible to receive one credit point towards an applicable Psychology class for your participation. The second part of the study will require you to complete a brief questionnaire each evening for two weeks. The questionnaire will ask you to record any stressful events you experienced that day, as well as your strategy for coping with that stress. This will involve approximately ten to twenty minutes of your time each evening for the two-week period. For participating in this second portion of the study, you will be eligible to receive an additional two credit points towards an applicable Psychology class, one point for each week of participation. Should you complete the entire two-week period required for the second part of the study, you will also be entered into a draw for one of four $25 gift certificates from Devonshire Mall. If you are female, are between the ages of 17 and 25, and are interested in participating in the present study, please sign up in one of the time slots listed.

Appendix C

CONSENT TO PARTICIPATE IN RESEARCH

TITLE OF STUDY: Part One: Personality, Stress, and Eating Patterns.

You are asked to participate in a research study conducted by Vanessa A. Bruce, a graduate student, under the supervision of Dr. Cheryl D. Thomas, and Dr. Sylvia Voelker from the Psychology Department at the University of Windsor. The results of this study will contribute towards the Masters thesis of Vanessa A. Bruce.

If you have any questions or concerns about the research, please feel to contact either Dr. Cheryl D. Thomas, (519) 253-3000, ext. 2252, or Dr. Sylvia Voelker, (519) 253-3000, ext. 2249.

PURPOSE OF THE STUDY

The purpose of the present study is to examine the relationship between personality, stress, and eating patterns in female university students.

PROCEDURES

If you volunteer to participate in this study, you will be asked to complete five questionnaires, in random order. These questionnaires will ask about your eating habits, your daily stress, aspects of your personality, and your demographic information.

You will be asked to complete the questionnaires individually, in a classroom in the Psychology department at the University of Windsor. There will be other individuals in the classroom who are completing the same task as you. Your participation will require approximately sixty minutes (one hour) of your time. After you complete the questionnaires, the researcher will explain the second portion of the study to you. Should you consent to participate in the second half of the study, the researcher will provide you with the necessary materials and instructions.

POTENTIAL RISKS AND DISCOMFORTS

No risk, discomfort, or harm is anticipated by your participation in this study. You may find some of the questions to be of a personal nature. You are not required to respond to all questions, but the more information you provide, the better able

the researcher will be to use your data. Your responses on the questionnaires will be confidential and anonymous. No one will be able to connect you with the information you provide.

It is possible that the investigator may be the graduate assistant (G.A.) for a class you are taking. If this is the case, the investigator will inform you that she is your G.A. and you will have the option of choosing not to participate in the study, without penalty to you. Should you still decide to participate in the study, you can be assured that your responses will not be connected to your personal information and will not affect your grade in the course for which the investigator is a G.A.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

Results from this study may further clarify the link between personality and eating patterns in female university students.

PAYMENT FOR PARTICIPATION

Participants will be eligible to receive the value of one course credit towards an eligible Psychology course at the University of Windsor via the Psychology Participant Pool as compensation for participating in the study.

CONFIDENTIALITY

Any information that is obtained in this project and that can be identified with you will be kept in a secure and confidential location and will be disclosed only with your permission. Any information that includes your name will be kept in a separate locked location from the information you provide to the researchers.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so. Should you decide that you would not like the information you provide to be used in the present study, you may request that your data be removed from analysis.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE SUBJECTS

The results of this study will be available on the Study Results Page on the University of Windsor Research Ethics Board website (www.uwindsor.ca/reb) in the summer of 2009.

Web address: www.uwindsor.ca/reb
Date when results are available: Spring 2009

SUBSEQUENT USE OF DATA

With your permission, the investigator will be able to use the data you provide in subsequent studies.

RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. If you have questions regarding your rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF RESEARCH SUBJECT/LEGAL REPRESENTATIVE

I understand the information provided for the study 'Phase One: Personality and Eating Patterns" as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____
Name of Subject

_____ _____
Signature of Subject Date

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

_____ _____
Signature of Investigator Date

Revised February 2008

Appendix C

CONSENT TO PARTICIPATE IN RESEARCH

TITLE OF STUDY: Part Two: Stress and Coping.

You are asked to participate in a research study conducted by Vanessa A. Bruce, a graduate student, under the supervision of Dr. Cheryl D. Thomas, and Dr. Sylvia Voelker from the Psychology Department at the University of Windsor. The results of this study will contribute towards the Masters thesis of Vanessa A. Bruce.

If you have any questions or concerns about the research, please feel to contact either Dr. Cheryl D. Thomas, (519) 253-3000, ext. 2252, or Dr. Sylvia Voelker, (519) 253-3000, ext. 2249.

PURPOSE OF THE STUDY

The purpose of the present study is to examine how the stress you perceive and the coping strategies you use affect the relationship between your personality characteristics and your eating patterns.

PROCEDURES

If you volunteer to participate in this study, you will be asked to complete two brief online questionnaires each night for 14 days. These questionnaires will ask about any stressful events you experienced that day, as well as what coping strategies you used to cope with the stress.

After you consent to participate in Phase Two, the researcher will provide you with written instructions for completing the two questionnaires, as well as the address of the website where you will find the questionnaires. The researcher will send you an email each evening, reminding you to complete the questionnaires. You will be asked to complete both questionnaires each evening for 14 days, in the comfort of your own home. Your participation will require approximately ten to 20 minutes of your time each evening. Please ensure that you will be able to receive emails from eathabit@uwindsor.ca , and that they will not be stopped by your spam filter.

POTENTIAL RISKS AND DISCOMFORTS

No risk, discomfort, or harm is anticipated by your participation in this study. You may find that the questionnaires are more time consuming on certain days than

others. Your honesty and effort is appreciated, but the more information you provide, the better able the researcher will be to use your data. Your responses on the questionnaires will be confidential and anonymous. No one will be able to connect you with the information you provide.

It is possible that the investigator may be the graduate assistant (G.A.) for a class you are taking. If this is the case, the investigator will inform you that she is your G.A. and you will have the option of choosing not to participate in the study, without penalty to you. Should you still decide to participate in the study, you can be assured that your responses will not be connected to your personal information and will not affect your grade in the course for which the investigator is a G.A.

As individuals who participate in the entire 14 days of the study will be eligible for a draw (see Payment for Participation), the investigator will be recording the number of days of data you submit. Although she will be able to connect both your name and participant number in order to enter eligible participants into the draw, she will not be examining your responses to the questionnaires at this time. Participant names will not be connected to participant numbers when the information on the questionnaires is analyzed. The list connecting your name to your participant number will only be used to enter you into the draw, should you be eligible.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

Results from this study, in combination with results from Phase One, may further clarify the links between stress, coping, personality, and eating patterns in female university students. Understanding how these variables are related may allow for the development of specific treatment plans for female university students with disturbed eating patterns.

PAYMENT FOR PARTICIPATION

Participants will be eligible to receive the value of two course credits towards an eligible Psychology course at the University of Windsor via the Psychology Participant Pool as compensation for participating in the study. One course credit will be awarded for each week, or part of a week of participation. In addition, individuals who participate for the entire 14 days of this study will be entered into a draw for one of four gift certificates for Devonshire Mall, valued at $25.00 each.

CONFIDENTIALITY

Any information that is obtained in this project and that can be identified with you will be kept in a secure and confidential location and will be disclosed only with your permission. Any information that includes your name will be kept in a separate locked location from the information you provide to the researchers.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so. Should you decide that you would not like the information you provide to be used in the present study, you may request that your data be removed from analysis.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE SUBJECTS

The results of this study will be available on the Study Results Page on the University of Windsor Research Ethics Board website (www.uwindsor.ca/reb) in the summer of 2009.

Web address: www.uwindsor.ca/reb
Date when results are available: Spring 2009

SUBSEQUENT USE OF DATA

With your permission, the investigator will be able to use the data you provide in subsequent studies.

RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. If you have questions regarding your rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF RESEARCH SUBJECT/LEGAL REPRESENTATIVE

I understand the information provided for the study "Phase Two: Stress and Coping" as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____
Name of Subject

_____ _____
Signature of Subject Date

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

_____	_____
Signature of Investigator	Date

Revised February 2008

Appendix D
Instructions

Participant ID:_____

Thank you for consenting to participate in Part 2 of this research study. Part 2 will require you to take a few minutes of your time each evening and complete an online questionnaire about the stressful events you experienced that day and the way you reacted to that stress.

Please complete the questionnaire at the end of each day, even if you have no stressful events to report. You will receive email reminders each evening to complete the survey. You also will be notified by email when the 14 days of data collection are complete.

The study can be found at www.uwindsor.ca/eathabit

Please ***do not*** enter your own UWinID and password.
Instead, enter **UWinID:** eathabit, **Password:** windsor

Your Participant ID can be found at the top of this form.

Remember that by completing this part of the research study, you will be eligible to receive 2 additional credit points towards an applicable psychology course (beyond the 1 credit point you earned for the first part of the study), and you will be entered into a draw for one of four $25 gift certificates to Devonshire Mall.

If you have any questions, please contact Vanessa Bruce at eathabit@uwindsor.ca.

Thank you for your continued participation in this research study,

Vanessa A. Bruce, B.A. Honours
Master's Candidate, Clinical Psychology
University of Windsor

Appendix E
Reminder Email

This is a reminder to take a few minutes of your time this evening and complete the online questionnaire about the stressful events you experienced today and the way you reacted to that stress.

Please complete the questionnaire, even if you have no stressful events to report.

You will continue to receive email reminders each evening to complete the survey. You also will be notified by email when the 14 days of data collection are complete.

The study can be found at www.uwindsor.ca/eathabit

Please ***do not*** enter your own UWinID and password.
Instead, enter **UWinID:** eathabit, **Password:** windsor

Your Participant ID can be found at the top of the instruction page you were given when you met with the principal investigator.

Remember that by completing this part of the research study, you will be eligible to receive 2 additional credit points towards an applicable psychology course (beyond the 1 credit point you earned for the first part of the study), and you will be entered into a draw for one of four $25 gift certificates to Devonshire Mall.

If you have any questions, please contact Vanessa Bruce at eathabit@uwindsor.ca.

Thank you for your continued participation in this research study,

Vanessa A. Bruce, B.A. Honours
Master's Candidate, Clinical Psychology
University of Windsor

Appendix F

Demographic Questionnaire

Please fill out the following information about yourself. If you are uncomfortable with a question, you may leave it blank. ***This information will be kept confidential and secure, and will only be used for research purposes. This information will not be connected with your name and identifying information.*** *Thank you for taking the time to fill out this questionnaire*

Participant ID:_____

Today's Date: _____/____/_____
YYYY MM DD

Birth Year: _____ Birth Month: _____

Height: _____

Weight: _____

Ethnicity (Please check one):

[ ] African-Canadian/Black
[ ] Asian or Pacific Islander
[ ] Caucasian/White
[ ] Latino/Latina
[ ] Middle Eastern
[ ] First Nations
[ ] Other (Please specify): _____

Year of Study (Please check one):

Undergraduate:
[ ] First
[ ] Second
[ ] Third
[ ] Fourth
[ ] Fifth
[ ] Other: _____

Graduate:
[ ] Masters
[ ] PhD
[ ] Other: _____

Relationship Status (Please check one):

[ ] Single
[ ] In a relationship (less than 6 months)
[ ] In a relationship (more than 6 months)
[ ] Engaged
[ ] Married
[ ] Divorced
[ ] Widowed

Living Situation (Please check one):

[ ] Alone
[ ] With Parents
[ ] In University Residence
If in residence, do you have a roommate? (Circle One): YES / NO
[ ] With Roommates (Please indicate how many): _____
[ ] With Significant Other
[ ] Other (Please specify): _____

Have **you *EVER*** been diagnosed with a psychological disorder/problem (e.g., depression, anxiety, substance-related disorder (e.g., alcohol, drugs), learning disability, Attention-Deficit/ Hyperactivity Disorder (ADD/ADHD), Schizophrenia, Anorexia Nervosa, Bulimia Nervosa, etc.)?

[ ] No
[ ] Yes (please specify): _____

Are **you *CURRENTLY*** diagnosed with a psychological disorder/problem (e.g., depression, anxiety, substance-related disorder (e.g., alcohol, drugs), learning disability, Attention-Deficit/ Hyperactivity Disorder (ADD/ADHD), Schizophrenia, Anorexia Nervosa, Bulimia Nervosa, etc.)?

[ ] No
[ ] Yes (please specify): _____

Have **any members of your family** been diagnosed with a psychological disorder/problem (e.g., depression, anxiety, substance-related disorder (e.g., alcohol, drugs), learning disability, Attention-Deficit/ Hyperactivity Disorder (ADD/ADHD), Schizophrenia, Anorexia Nervosa, Bulimia Nervosa, etc.)?

[ ] No
[ ] Yes (please specify): _____
Relationship to family member: _____

Have you participated in any groups with the Bulimia and Anorexia Nervosa Association (BANA)? _____
_____
_____

Appendix G
Daily Questionnaire

Please complete this questionnaire for each stressful event you experienced. Should you have experienced more than one stressful event today, additional questionnaires will be available after you complete the information for this event. Thank you for your time.

Event:_____
_____
_____

Why did you find this event stressful? _____
_____
_____
_____

On a scale from 1 to 100, how stressful would you rate the event? _____

Do you believe that the event was something you could control or that could be fixed?

Yes No

Do you believe the event was out of your control, or was something that you just had to endure? Yes No

[*Please note that the two previous questions were collected for future analyses and were not analyzed as part of the present study.*]

How much did this event affect your eating behaviour today? [*drop-down menu: 0-10*]

If your eating behaviour changed as a result of the stressful event, please explain: _____
_____
_____
_____
_____

CISS-CL

Please complete this checklist for each stressful event you experienced today. Please mark any activities you engaged in *during* or *after* the stressful event. Please select all that apply.

[*For copyright purposes, the checklist has not been reproduced. As discussed in the Method section, the checklist was a list of all coping strategies from the CISS with a check box next to each strategy*]

Appendix H

Author Permission to adapt CISS

Hi Dr. Parker,
My name is Vanessa Bruce, and I am currently in my second year of the Clinical Psychology program at the University of Windsor. For my Master's thesis, I intend to assess coping both retrospectively and through a daily process methodology. I will be using the CISS for the retrospective portion of my study, but I was hoping to adapt the CISS slightly to also use it during the daily process portion. For that section, participants will be reporting each stressful event they experience during the day, for a period of 14 days, and using a checklist of coping strategies to report which coping strategies they used to deal with each specific stressful situation. I was hoping that I could adapt the CISS, so that it appears in a checklist format. I understand that the CISS has a situation-specific format, however I intend to examine both subtypes of Avoidance coping, which doesn't appear possible when using the CISS:SSC. Also, the measure will be administered electronically, which I do not believe will be possible with the CISS:SSC. In summary, I am asking for permission to adapt the CISS slightly, so that it is appropriate for my Master's thesis project.
Thank you so much for your time,
Vanessa Bruce
M.A. Candidate, Child Clinical Psychology
University of Windsor

****

Hi:

Your project sounds interesting and I can see why you would need to modify the CISS.

Please consider this email formal permission to modify the CISS for your research project.

Cheers,

James D. A. Parker, Ph.D.,
Vice-President: Research, International & Strategic Enrolment Management; Canada Research Chair in Emotion & Health; & Professor of Psychology, Trent University

Appendix I

Correlations for BMI, Eating Disorder Risk, Neuroticism, and remaining Part 1 study variables.

					DISPOSITIONAL			
	BMI	EDR	NEUR	YA-FILES	T	E	D	SD
EDR	.432***							
NEUR	.082	.532***						
YAFILES	.019	.296**	.224*					
T	-.137	-.200*	-.368***	.065				
E	.015	.543***	.793***	.291**	-.206*			
D	.174	.310**	.254**	.026	-.146	.329***		
SD	.047	-.072	-.215*	-.112	.388***	-.022	.173	

* $p < .05$; ** $p < .01$; *** $p < .001$

BMI = Body Mass Index; EDR = Eating Disorder Risk; NEUR = Neuroticism; T = Task-focused Coping; E = Emotion-focused Coping; D = Distraction Coping; SD = Social Diversion Coping

Appendix J

Correlations for BMI, Eating Disorder Risk, Neuroticism, and remaining Part 2 study variables.

	# EVENTS	PERC. STRESS	SITUATIONAL				EAT CHANGE
			T	E	D	SD	
PERCEIVED STRESS	.112						
TASK	-.084	.017					
EMOTION	.088	.249**	.199*				
DISTRACTION	-.037	.071	.265**	.486***			
SOCIAL DIVERSION	.058	.218*	.207*	.261**	.270**		
EAT CHANGE	-.033	.369***	.064	.358***	.265**	.236*	
EDR	.040	.099	-.110	.420***	.275**	.037	
NEUR	.019	.053	-.193*	.425***	.214*	.020	
BMI	.021	-.021	.070	.088	.076	-.051	.009

* $p < .05$; ** $p < .01$; *** $p < .001$

EVENTS = Number of stressful events reported over 14 days; PERCEIVED STRESS = Average stress rating for daily stressful situations; EAT CHANGE = Change in eating habits due to stressful event; EDR = Eating Disorder Risk; NEUR = Neuroticism; BMI = Body Mass Index

Appendix K

Correlations between Retrospective/Dispositional Measures and Daily/Situational Measures

Retrospective and Daily Stress

	YA-FILES
# EVENTS	.383***

Dispositional and Situational Coping

		DISPOSITIONAL			
		TASK	EMOTION	DISTRACTION	SOCIAL DIVERSION
SITUATIONAL	TASK	**.117**	-.110	-.050	.104
	EMOTION	-.266**	**.433*** **	.227*	-.204*
	DISTRACTION	-.177	.185*	**.200***	-.222*
	SOCIAL DIVERSION	.024	-.002	.005	**.177**

Eating Disorder Risk and Eating Habit Change due to Stress

	EDR
EAT CHANGE	.301**

* $p < .05$; ** $p < .01$; *** $p < .001$

EVENTS = Number of stressful events reported over 14 days; EAT CHANGE = Change in eating habits due to stressful event; EDR = Eating Disorder Risk

VITA AUCTORIS

NAME:	Vanessa A. Bruce
PLACE OF BIRTH:	Halifax, Nova Scotia
YEAR OF BIRTH:	1984
EDUCATION:	Charles P. Allen High School, Bedford NS 1999-2002 Dalhousie University, Halifax NS 2002-2006 B.A. Honours University of Windsor, Windsor ON 2007-2009 M.A. Candidate
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