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Self-Monitoring, Binge Eating Disorder, Internalized WEight STigma and Neuroticism: A Moderated-Mediation Model

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SELF-MONITORING & BINGE EATING

SELF-MONITORING, BINGE EATING DISORDER, INTERNALIZED WEIGHT STIGMA
AND NEUROTICISM: A MODERATED-MEDIATION MODEL

by

Arielle Catherine Kantor

A thesis submitted to the Department of Psychology
in partial fulfillment to the requirements for the degree of

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Abstract

In the univariate model of self-monitoring, individuals are categorized as either high or low self-monitors. In the bivariate model of self-monitoring, individuals differ with respect to two dimensions, namely acquisitive and protective self-monitoring. Self-monitoring, in both conceptions, is related to physical and mental health characteristics including higher weight, external cue sensitivity, and neuroticism. The aforementioned characteristics are also present in individuals with binge eating disorder. We predicted individuals higher in protective self-monitoring and univariate high self-monitoring would exhibit greater binge eating disorder symptomatology than would individuals lower in both conceptions of self-monitoring. We also predicted internalized weight stigma would mediate this relationship and incorporated neuroticism as a control variable. Three mediation analyses (one for each of the conceptions of self-monitoring) were completed with self-monitoring as a predictor variable, internalized weight stigma as a mediator, binge eating as an outcome variable, and neuroticism as a control variable. Mediation was not found. In our exploratory analysis, we tested neuroticism as a moderator and discovered that there was moderated-mediation. As individuals' protective self-monitoring status increased, so did their propensity to binge eat as mediated by stigmatizing beliefs about their body size. This mediated effect was only true for individuals moderately or highly neurotic. Limitations (i.e., lack of causal inference, self-report) and future directions (i.e., longitudinal study, obtain sample from clinical psychologists) were discussed.

Self-Monitoring, Binge Eating Disorder, Internalized Weight Stigma, and Neuroticism: A Moderated-Mediation Model

Approximately 2% of the general population has binge eating disorder which makes it the most common eating disorder (Kessler et al., 2013). Significant co-morbidities, such as physical and mental diseases, occur with binge eating disorder (Burton et al., 2017). Binge eating disorder is the most common psychopathological co-morbidity related to obesity, which indicates the majority of individuals with this disorder experience societal stigmatization and discrimination for being in a larger body (Bulik & Reichborn-Kjennerud, 2003). There is still much to be gleaned with regard to the etiology of eating disorders (Peterson et al., 2010). We aim to investigate individual differences which may contribute to the etiology of binge eating disorder.

Self-Monitoring

Univariate Model

Self-monitoring is a stable individual difference in social responsivity and expression of social behavior (Gangestad & Snyder, 2000). In Snyder's univariate model, self-monitoring is conceptualized in terms of categorical differences between individuals. High self-monitors are motivated to acquire and maintain status. They are attuned to their social surroundings and gather social knowledge. High self-monitors are skilled in self-presentation and adjust their behavior according to their social context; therefore, their behavior tends to be very situationally specific. Low self-monitors are motivated to be self-congruent. They are internally focused,

acquire self-knowledge, and engage in self-verification to maintain behavioral consistency across different social contexts. Low self-monitor's behavior tends to be very cross situationally consistent. There is considerable empirical evidence consistent with these portrayals (see Fuglestad & Snyder, 2010, for a review of the literature).

There is evidence that self-monitoring differences are related to mental health outcomes. Snyder and Smith (as reported in Snyder, 1987) report events which triggered depression and coping strategies for depression differed according to individuals' self-monitoring status. Problems which involved personal incongruence (e.g., barriers to interacting with similar others, threats to consistency between attitudes and behavior) trigger depression in low self-monitors, whereas problems which involved self-presentation (e.g., being perceived as or actually failing to be the right person at the right place at the right time) trigger depression in high self-monitors. Low self-monitors use affiliative strategies, such as spending time with a friend or family member, to cope with episodic depression. High self-monitors use self-regulatory strategies, such as avoiding social situations that might exacerbate depressive symptoms, to cope with depression.

With regard to personality and psychopathology, self-monitoring is strongly related to Machiavellianism, narcissism, and psychopathy (Kowalski et al., 2018). Self-monitoring is positively related to repression which is a coping style defined by low anxiety and high defensiveness (Furnham & Traynar, 1999). In cognitive-behavioral treatment for Type A behaviors, individuals high in self-monitoring have less anxiety following treatment than do individuals who were low in self-monitoring (Kelly & Stone, 1987). The relationship between self-monitoring and satisfying interpersonal relationships is mediated by high authenticity (Pillow et al., 2017). When authenticity is relatively high, there is no connection between self-

monitoring and relationship satisfaction; When authenticity is relatively low, self-monitoring is positively correlated with relationship satisfaction (Ryff, 1989).

With regard to physical health correlates of self-monitoring, overweight individuals are significantly higher in self-monitoring compared to average weight individuals (Younger & Pliner, 1976). In comparison to their low self-monitoring counterparts, high self-monitors are especially responsive to situational cues (Fuglestad & Snyder, 2010). Situational responsiveness, as characteristic of high self-monitoring, may explain why obese subjects utilize external factors (e.g., time of day, rituals) to determine when and how much they ate instead of using internal eating cues such as satiety, desire, and satisfaction (Boggiano et al., 2014).

Bivariate Model

In contrast to Snyder's conceptualization, self-monitoring can also be conceptualized as a bivariate construct which contains two dimensions (Wilmot et al., 2017). Individuals differ in the extent to which they are acquisitive or protective self-monitors (see also Lennox, 1988). For different reasons, acquisitive self-monitors and protective self-monitors are believed to tailor their words and actions so as to create in the minds of others a particular image of themselves.

Acquisitive self-monitors are motivated to attain social (e.g., status) as well as nonsocial (e.g., wealth) goals such as acquiring social capital and gaining approval from others (Fuglestad et al., 2019). Consequently, these individuals engage in self-promoting behaviors (i.e., communicating their accomplishments or strengths) (Wilmot, 2015). In order to gauge social approval, they focus on other's social expressions (Wilmot, 2015). Acquisitive self-monitoring is related to traits such as extraversion, openness/intellect, assertiveness/ideas, and narcissism (Rauthmann, 2011; Wilmot et al., 2017). Acquisitive self-monitoring is positively related to authenticity (Renner et al., 2004).

Protective self-monitors are motivated to minimize or avoid social costs, such as disapproval from others or ostracism, and non-social costs such as the loss of a job or demotion in pay grade (Wilmot et al., 2017). These individuals present a conservative or reserved social orientation in an effort to prevent social losses (Renner et al., 2004). Protective self-monitors also focus on comparisons between themselves and others in social situations (Wilmot, 2015). Protective self-monitoring is related to neuroticism, self-consciousness, anxiety, depression, vulnerability, conscientiousness, Machiavellianism, and defensive pessimism (Polak & Prokop, 1989; Rauthmann, 2011; Wilmot et al., 2017). Protective self-monitoring is negatively related to authenticity (Renner et al., 2004).

Individuals high in protective self-monitoring are more likely than acquisitive self-monitors to engage in avoidant social behaviors which included inauthentic self-presentation, avoidant coping strategies and reduced engagement with their social surroundings (Renner et al., 2004). Susceptibility to normative influence is positively related to protective self-monitoring and negatively related to presentation of oneself in a differentiating manner (e.g., acquisitive self-monitoring traits) (Wooten & Reed II, 2004). Similarly, protective self-monitors are more likely than acquisitive self-monitors to acquiesce to hypnotic instructions (Levin et al., 2013). Both acquisitive and protective self-monitoring are reliably related to other forms of psychopathology such as psychopathy (Rauthmann, 2011).

As conceptualized by Wilmot and his colleagues, self-monitoring differences are related to a variety of health outcomes. Individuals diagnosed with anorexia nervosa score significantly higher on the other-directedness facet of self-monitoring and lower on the extraversion facet of self-monitoring than do individuals without a diagnosed eating disorder (Bachner-Melman et al., 2009). The other-directedness aspect of self-monitoring is related to the protective form of self-

monitoring, whereas the extraversion aspect of self-monitoring is related to the acquisitive form of self-monitoring (Wilmot, 2015).

Aside from the aforementioned studies, there is little evidence concerning self-monitoring and eating disorders. More theoretical and empirical work is needed. There is virtually no empirical information about a connection, if any, between self-monitoring in its various forms and binge eating disorder.

Binge Eating Disorder

Binge eating disorder is the newest eating disorder diagnosis in the Diagnostic Statistical Manual of Mental Disorders-V (American Psychiatric Association, 2013). For individuals to receive a binge eating disorder diagnosis, they must engage in recurrent episodic binge eating at least once per week in addition to three or more of the following characteristics: unusually rapid eating, eating to the point of discomfort, feelings of guilt, distress or shame as a result of bingeing, eating large quantities of food in the absence of hunger, or bingeing in solitude (Pope et al., 2006). Binge eating disorder is the most common eating disorder; it affects 3.5% of all women and 2% of all men (Hilbert et al., 2014). Individuals typically develop binge eating disorder in early adolescence or young adulthood (American Psychiatric Association, 2013).

Individuals diagnosed with binge eating disorder suffer from several psychopathological and physiological co-morbidities. Bodily illness such as metabolic syndrome, cardiovascular disease, and diabetes often occur comorbidly with binge eating disorder (McElroy et al., 2016). Other psychopathological comorbidities include mood disorders such as generalized anxiety and clinical depression (Fontenelle et al., 2005). Attention deficit disorder (Forcano et al., 2009) and obsessive-compulsive disorder (McElroy et al., 2016) are also significantly comorbid with binge eating disorder.

There are several characteristics which are consistently found in individuals with binge eating disorder. Several of these attributes predispose individuals to developing an eating disorder. These include overvaluation of body image (Mitchison et al., 2018), dietary restraint or yo-yo dieting (Hagan et al., 2003), and negative affect and emotionality (Hagan, Chandler, Wauford, Rybak, & Oswald, 2003). Other individual differences found in binge eating disorder individuals are heightened sensitivity to sensory cues and information (Boggiano et al., 2014) and novelty seeking (Fassino et al., 2002).

Individuals with binge eating disorder often suffer from cognitive impairment and cognitive impulsivity (Aloi et al., 2015). Obese individuals diagnosed with binge eating disorder exhibit significantly greater harm avoidance characteristics (e.g., nervousness, passivity, insecurity) than do obese individuals without binge eating disorder. Compared to normal weight and obese individuals without binge eating disorder, individuals with binge eating disorder have significantly lower self-directedness (e.g., instability, impulsivity, interpersonal conflict) (Fassino et al., 2002).

Internalized Weight Stigma

Weight teasing and discrimination is significantly related to development of binge eating disorder in adolescents and adults (Libbey et al., 2008). Internalization of weight stigmatizing messages, conveyed through these experiences, mediates the relationship between eating disorder symptomatology and weight-related teasing (O'Brien et al., 2010). Therefore, internalized weight stigma is a potential catalyst for the development of eating disorders when individuals experience teasing and/or discrimination regarding their body size. Binge eating disorder is the eating disorder most strongly associated with internalized weight stigma (Almeida et al., 2011).

Internalized weight stigma refers to societal beliefs regarding weight and size which people internalize and incorporate into their self-concept (Durso & Latner, 2008). Societal beliefs about weight include attributing positive characteristics (e.g., responsible, attractive, healthy, desirable, intelligent) to people because they are thin and attributing negative characteristics (e.g., irresponsible, unattractive, unhealthy, undesirable and unintelligent) to people because they are not thin (Puhl & Brownell, 2013; Rudman et al., 2002; Walsh et al., 2018).

Internalized weight stigma is related to eating disorder diagnoses, metabolic risks associated with higher weight, body dissatisfaction, eating disorder diagnoses, exercise avoidance, weight-related teasing, and manifestations of negative affect (e.g., anxiety and depression); these phenomena are also associated with binge eating (Pearl & Puhl, 2018; Walsh et al., 2018). Public health campaigns which have stigmatizing messages (e.g., images of midriffs and legs, messages conveying the need to reduce caloric intake to promote health) regarding weight reduce overall self-efficacy in obese individuals compared to when these people view neutral messages about weight (e.g., including more fruits and vegetables in your daily life) (Puhl et al., 2013). In summary, weight shaming and stigmatizing messages decrease individual's self-confidence in their ability to successfully adopt health-promoting behaviors, thereby reinforcing their own weight stigmatization.

Hypotheses

Based on the literature regarding binge eating disorder and individual differences, we predicted self-monitoring as conceptualized in the univariate model would be reliably related to binge eating disorder. High self-monitors are attuned to external cues and driven to behave based on social circumstances; these characteristics coincide with the behavioral tendencies of binge

eating disorder individuals who are driven to binge or restrict food according to external events (e.g., time of day, emotional disturbance, stressful event). High self-monitors also utilize self-regulatory strategies to manage episodic depression, and binge eating is a readily available form of self-soothing or self-regulation. Higher weight is a bodily characteristic of some high self-monitors.

With regard to the bivariate model of self-monitoring, we predicted protective self-monitoring would be reliably associated with binge eating disorder. Harm avoidance is associated with both protective self-monitoring and binge eating disorder. The harm avoidance aspect of protective self-monitoring could predispose these individuals to developing binge eating disorder. Harm avoidance are efforts individuals take to avoid rejection and disapproval which causes them to experience heightened social stress (Peterson et al., 2010). To manage this social stress, protective self-monitors engage in passive coping mechanisms (Renner et al., 2004). Binge eating is a passive coping mechanism in which individuals eat large quantities of food to numb mental and physical effects of stress (Boggiano et al., 2014).

We further predicted internalized weight stigma would mediate the relationship between self-monitoring, in both the univariate and bivariate form, and binge eating disorder. A source of negative emotionality and negative experience for individuals who binge eat is often real or imagined weight stigma. Individuals who have internalized and experienced weight stigma are more likely to exhibit binge eating disorder symptomatology versus symptoms of other eating disorders (e.g., anorexia nervosa, bulimia nervosa) (Almeida et al., 2011). Because efforts at dieting are strongly related to binge eating symptoms and internalized weight stigmatization (Hagan et al., 2003), individuals will probably not exhibit binge eating symptoms without some level of internalized weight stigma. Therefore, we predicted weight stigma would determine the

presence of binge eating in individuals, and those higher in univariate and protective self-monitoring would be more likely to exhibit binge eating symptoms if they hold stigmatizing beliefs about their weight (e.g., their bodies are unattractive, undesirable, and unhealthy). We also included neuroticism as a control variable due to the relationship between protective self-monitoring and neuroticism (Polak & Prokop, 1989).

To summarize, self-monitoring as conceptualized by Snyder should be related to incidences of binge eating disorder. Compared to their low self-monitoring counterparts, high self-monitors should more often report that they engage in binge eating because individuals high in self-monitoring are especially sensitive to the external cues which promote this eating disorder. Similarly, due to negative affect and social stress associated with protective self-monitoring, we predict these individuals are also at a higher risk for developing binge eating disorder. In both cases, the connection between self-monitoring in binge eating will be mediated by internalized weight stigmatization. Because none of the attributes of acquisitive self-monitoring are correlated with binge eating disorder, there is no empirical basis for predicting a connection between this form of self-monitoring and this eating disorder.

Method

Participants

One hundred eighteen female participants, who indicated they were diagnosed with binge eating disorder, were recruited for our study titled “Individual Differences in Binge Eating Disorder.” Participants were recruited using Amazon’s Mechanical Turk and were compensated \$2.00 for their participation. Requirements for participation included being female, at least 18 years of age, and having been diagnosed with binge eating disorder. If participants did not meet one or more of these three requirements, they were taken to the end of the survey and, consequently, data was not collected from their participation.

Participants all identified as female (100%). Mean age of participants was 35.35 years ($SD=1.73$), and median age was 33 years. The majority of our participants identified themselves as White/Caucasian (80%).

We informed participants of their rights through informed consent documentation which required electronic signatures. We treated participants in accordance with the American Psychological Association guidelines for *Ethical Principles of Psychologists and Code of Conduct* (APA, 2015).

Self-Monitoring

There are 25 items in the Self-Monitoring Scale with *true* and *false* answer options (Snyder, 1974). Approximately half of the items (e.g., “I would probably make a good actor”) are worded such that an answer of *true* would be indicative of high self-monitoring; approximately half of the items (e.g., “I find it hard to imitate the behavior of other people”) are worded such that an answer of *false* would be indicative of high self-monitoring. All answers are scored so that higher scores are assigned to high self-monitoring answers. For the univariate model of self-monitoring, a total score is computed by summing the scores for answers to all 25

items. For this summation, high self-monitoring responses are assigned a value of 2 and low self-monitoring responses are assigned a value of 1.

Temporal reliability for the Self-Monitoring Scale is demonstrated by Snyder (1974) who administered the scale twice within one month and reported significant test-retest correlations ($r = .83$). Girvin, Weaver, and Snyder (2010) also reported significant test-retest correlations after administering the Self-Monitoring Scale twice within one month ($r = .72, .73$). Internal consistency for the Self-Monitoring Scale is demonstrated in several studies through Cronbach's alphas $\alpha = .73$ (Day et al., 2002), $\alpha = .71$ (Girvan et al., 2010), and $\alpha = .73$ (Leone et al., 2016). We omitted the Self-Monitoring Scale from statistical analyses due to low internal consistency ($\alpha = .28$).

Snyder (1974) demonstrates convergent validity for the Self-Monitoring Scale. Peer ratings of self-monitoring attributes and self-reported self-monitoring scores are reliably correlated ($r = .45$). Professional stage actors score significantly higher than non-actors on the Self-Monitoring Scale, $t(555) = 8.27, p < .001$, which is consistent with actors' ability to be situationally specific with their behavior. Psychiatric patients, who are behaviorally rigid and consistent, collectively score lower than college students on the Self-Monitoring Scale, $t(562) = 3.44, p < .001$. Self-monitoring scores are positively related to scores on measures of behavioral variability ($r = .39$), expressive control ($r = .26$), and interpersonal orientation ($r = .26$) (Gangestad & Snyder, 2000). These aforementioned measures reflect high self-monitoring attributes.

With regard to discriminant validity, scores on the Self-monitoring Scale are not correlated with cognitive ability scores ($r = .04$) (Wilmot et al., 2017). Scores on measures of agreeableness and self-monitoring are also unrelated ($r = -.08$) (Barrick et al., 2005). Scores on

the Self-Monitoring Scale are not correlated with scores on measures of emotional stability ($r = -.02$) (Wilmot et al., 2017).

Acquisitive and Protective Self-Monitoring

For the bivariate model of self-monitoring (for information about the selection of these items see Wilmot et al., 2017), scores for answers to six items on the 25 item Self-Monitoring Scale (e.g., “I can make impromptu speeches even on topics about which I have almost no information”) are summed to produce a total score for the acquisitive dimension of self-monitoring, and total scores for the protective dimension are produced from summing scores for answers to seven items (e.g., “My behavior is usually an expression of my true inner feelings, attitudes, and beliefs”). Higher scores on items within the subsequent subscale indicate increasingly higher protective or acquisitive self-monitoring.

It is worth noting that acquisitive and protective self-monitoring have been measured and conceptualized differently over the years. Earlier works, prior to Wilmot’s conceptualization, utilized similar terms such as perceptiveness and impression management to describe and measure acquisitive self-monitoring and social referencing and variability to describe and measure protective self-monitoring (Rauthmann, 2011). Therefore, when I refer to the validity and reliability of these two subscales, they are not necessarily the same subscales across studies.

The acquisitive and protective self-monitoring subscales are reliable. The acquisitive subscale is internally consistent with moderately high Cronbach’s alphas of .78 (Renner et al., 2004), .8 (Celuch & Slama, 1995), .88 (perceptiveness), and .8 (impression management) (Rauthmann, 2011). The protective subscale also has internal consistency with moderately high Cronbach’s alphas of .7 (Wilmot et al., 2017), .84 (Celuch & Slama, 1995), .85 (variability) and .81 (social referencing) (Rauthmann, 2011).

Within this study, responses to one item on the acquisitive self-monitoring subscale (e.g., “I have never been good at games like charades or improvisational acting”) was removed due to a negative item-total correlation ($r = -.02$). Reverse scoring this item did not improve this item-total correlation nor did it improve overall internal consistency. We found a moderate Cronbach’s alpha of .38 for the acquisitive subscale. For the protective subscale item 2 (e.g., “My behavior is usually an expression of my true inner feelings, attitudes, and beliefs”) had a negative item-total correlation ($r = -.22$). Subsequently, we reversed scored this item which positively impacted the scale’s internal consistency ($\alpha = .51$).

The acquisitive subscale has convergent and discriminant validity. Acquisitive self-monitoring scores are reliably related to scores on similar measures including extraversion ($r = .51$) (Wilmot et al., 2017), intellect ($r = .38$) (Wilmot et al., 2017), and narcissism ($r = .36$) (Rauthmann, 2011). Acquisitive self-monitoring scores are unrelated to scores on dissimilar individual difference measures including cognitive ability ($r = -.02$) (Wilmot et al., 2017), other-directedness ($r = .08$) (Bachner-Melman et al., 2009), and agreeableness ($r = -.04$).

The protective self-monitoring subscale also has convergent and discriminant validity. Protective self-monitoring scores are reliably related to scores on measures of similar individual differences including neuroticism ($r = .34$) (Wilmot et al., 2017), Machiavellianism [variability ($r = .32$), social referencing ($r = .36$)] (Rauthmann, 2011), and assertion ($r = -.26$) (Celuch & Slama, 1995). Protective self-monitoring scores are unrelated to scores on dissimilar individual difference measures including cognitive ability ($r = .04$) (Wilmot et al., 2017), sociability ($r = .01$) (Gabrenya et al., 1980), and openness ($r = -.05$) (Wilmot et al., 2017).

Eating Disorder Examination Questionnaire

There are 28 items and four subscales on the Eating Disorder Examination Questionnaire (Fairburn & Beglin, 2008). In order to exclusively evaluate binge eating symptoms we administered one out of the four subscales to participants. This subscale addressed eating concern (e.g., “have you had a definite fear of losing control over-eating?”) and contained 6 items. Participants are instructed to only refer to the past four weeks when answering all items. Items were accompanied by a 7-item forced choice response set (e.g., No days = 0, 1-5 days = 1, 6-12 days = 2, 13-15 days = 3, 16-22 days = 4, 23-27 days = 5, Every day = 6). Scores are derived from summing scores for answers to individual items. Higher scores indicate increasingly severe eating disorder psychopathology.

Luce and Crowther (1999) administered the Eating Disorder Examination Questionnaire to a sample of individuals twice, with two weeks between the first and second administration. Test-retest correlations from this sample indicate temporal reliability for the restraint subscale ($r = .84, .85$), shape concern subscale ($r = .93, .92$), weight concern subscale ($r = .89, .90$), and eating concern subscale ($r = .78, .81$). This scale was also administered twice to a sample of participants diagnosed with Binge Eating Disorder with 1-2 weeks between test administrations (Grilo et al., 2004). Test re-test correlations from this sample indicate temporal reliability for the scale in its entirety ($r = .72, p < .001, r = .71, p < .001$).

Internal consistency is evident for the restraint subscale ($\alpha = .84$), shape concern subscale ($\alpha = .93$), weight concern subscale ($\alpha = .89$) and eating concern subscale ($\alpha = .78$) (Luce & Crowther, 1999). The Eating Disorder Examination Questionnaire is internally consistent when administered to a sample of individuals diagnosed with eating disorders ($\alpha = .90$) and a sample of individuals without eating disorder diagnoses ($\alpha = .86$) (Byrne et al., 2010). Researchers report strong internal consistency for this scale in another study ($\alpha = .95$) (Aardoom et al., 2012).

In the current sample, there was a standardized alpha of .77 for scores on the Eating Disorder Examination Questionnaire.

Scores on the Eating Disorder Examination are reliably correlated with scores on the Eating Disorder Examination Questionnaire ($r = .84, p < .001$) (Mond et al., 2004). The Eating Disorder Examination is the clinical interview format of the Eating Disorder Examination; therefore, the aforementioned correlation indicates convergent validity. There are positive correlations between scores on the Eating Disorder Examination dietary restraint subscale and scores on the Eating Attitudes Test dieting subscale ($r = .54, p < .05$) and scores on the Three-Factor Eating Questionnaire restraint subscale ($r = .48, p < .05$) (Loeb et al., 1994). Scores on the Body Shape Questionnaire are related to scores on the shape concern subscale ($r = .76, p < .05$) (Rosen et al., 1990). Researchers significantly discriminate between individuals with and without an eating disorder using a receiver operating characteristic analysis (AUC = .96) (Aardoom et al., 2012). By administering the Eating Disorder Examination Questionnaire, researchers are able to reliably differentiate between clinical and sub-clinical responses and thereby identify those with and without eating disorders.

Weight Bias Internalization Scale

There are 11 items on the Weight Bias Internalization Scale which measures the extent to which individuals believe negative stereotypes about obese individuals apply to them (e.g., unattractive, lazy, incompetent) (Durso & Latner, 2008). Items are accompanied by 7-point scales with endpoints labeled *strongly disagree* and *strongly agree*. Global scores are derived from summing and averaging item scores. Items “As an overweight person, I feel that I am just as competent as anyone” and “I am OK being the weight I am” are positively worded such that scores to these items were reversed. The remaining 9 items are negatively worded (e.g.,

“Because I’m overweight, I don’t feel like my true self”). Higher scores indicate increasingly greater internalized weight stigma. A stipulation for taking this assessment was that participants had to identify themselves as obese. Twenty-two people from our sample did not identify as being obese and were therefore not required to complete this measure.

The Weight Bias Internalization Scale is internally consistent with Cronbach’s alphas of .90 (Durso & Latner, 2008), .86 (Douglas & Varnado-Sullivan, 2016), and .86 (Vartanian et al., 2016). We found a moderately high Cronbach’s alpha of .79 for this scale which indicated the scale had internal consistency. Convergent validity is evident for the Weight Bias Internalization Scale through a strong negative relationship between internalized weight bias scores and quality of life scores ($\beta = -.50$) (Walsh et al., 2018). Internalized weight stigma scores are also negatively related to scores on several of the quality of life measure subscales, including self-esteem ($\beta = -.70$), sexual life ($\beta = -.40$), work ($\beta = -.40$), and public distress ($\beta = -.33$).

Scores on the Depression Anxiety Stress Scale are positively related to scores on the Weight Bias Internalization Scale ($\beta = .49$) (Durso & Latner, 2008). Internalized weight stigma scores are positively related to scores on the drive for thinness subscale ($r = .47$) and binge eating episodes ($r = .3$) and negatively related to scores on the self-esteem subscale ($\beta = -.64$). Ethnic background is unrelated to internalized weight stigma scores ($R^2 = .01, p > .01$) (Walsh et al., 2018).

Ten-Item Personality Inventory: Neuroticism

Protective self-monitoring is also related to neuroticism (Wilmot et al., 2017). Neuroticism is associated with negative affect and negative emotionality, which are significantly present in individuals with binge eating disorder (Zander & De Young, 2014). Individuals higher in neuroticism tend to have lower levels of body satisfaction, negative attitudes towards higher

weight individuals and their own bodies, higher fat phobia and discrimination based on body size (Allen & Walter, 2016; Frederick et al., 2016; Sutin & Terracciano, 2019; Swami et al., 2013).

These aforementioned traits are predictive of binge eating disorder development. Such information lends us to hypothesize neuroticism will be a potential third variable in the relationship between self-monitoring and binge eating disorder.

To measure neuroticism, we used the Ten-Item Personality Inventory (Gosling et al., 2003). This scale measures the Big 5 personality traits (openness, conscientiousness, extraversion, agreeableness, and neuroticism). For the purpose of our research, we used items from the neuroticism subscale exclusively. Answers to items “anxious, easily upset” and “calm, emotionally stable” indicate the extent to which individuals possess trait neuroticism.

Participants referred to the instructions “I see myself as:” when responding to both items.

Responses are on a 7-point scale with endpoints labeled *disagree strongly* and *agree strongly*.

Responses indicate the extent to which the listed traits apply to them. Higher scores, derived from summing both item scores, indicate greater application of trait neuroticism to participants.

The Ten-Item Personality Inventory is internally consistent with Cronbach’s alphas of .71 (Verduyn & Brans, 2012), .43 (Chiorri et al., 2015) and .87 (Berenbaum et al., 2016).

Researchers completed test-retest correlations on inventory global scores, with two weeks in between the first ($r = .72$) and second test ($r = .80$) sessions, and thereby demonstrate temporal reliability for this scale (Gosling et al., 2003). Reliability information is not available for the neuroticism subscale because it consists of only two items. In our sample the correlation between scores on these two items was $+.24$ ($p = .011$).

Convergent validity is also indicated for the neuroticism subscale. There is a significant relationship between responses on neuroticism items on the Big Five Inventory, an extended

version of the Ten-Item Personality Inventory, and responses on the neuroticism subscale for the Ten-Item Personality Inventory in the seminal article ($r = .81, p < .01$) (Gosling et al., 2003) and later research ($r = .55, p < .001$) (Chiorri et al., 2015). Neuroticism scores are negatively correlated with scores on measures of conscientiousness ($r = -0.36, p < .001$), openness ($r = -0.25, p < .001$), and agreeableness ($r = -.024, p < .001$) (Oyibo & Vassileva, 2019).

Scores on measures of frequency of negative emotions ($r = .48, p < .01$) and duration of negative emotions ($r = .32, p < .01$) are positively related to neuroticism scores (Verduyn & Brans, 2012). Neuroticism scores are correlated to negative affect scores ($r = .42, p < .001$) and negatively correlated to positive affect scores ($r = -.30, p < .05$) (Chiorri et al., 2015). In regard to discriminant validity, neuroticism scores are unrelated to scores on measures of extraversion ($r = -.03$), enjoyment of spiritual activities ($r = .03$) and enjoyment of intellectual activities ($r = .03$) (Berenbaum et al., 2016; Chiorri et al., 2015).

Results

Preliminary Analyses

Descriptive Statistics

To ensure our data was ready for statistical analyses, we completed and evaluated descriptive statistics. Mean, standard deviation, skewness, range, and kurtosis are displayed for all measures in Table 1. For all measures, coefficients of skewness ranged from -0.73 to 0.74 and

coefficients of kurtosis ranged from -0.00 to 0.13. These values are indicative of a normal distribution and therefore met assumptions for completing further statistical analyses (Tabachnick & Fidell, 2007).

Table 1

Descriptive Statistics for Predictor, Mediating, Outcome, and Control Variables.

Measure	Mean	SD	Skewness	Range	Kurtosis
EDE-Q	+66.09	+48.36	+0.74	+161	-0.68
SMS	+37.74	+2.71	+0.10	+14	-0.002
SMS-A	+7.67	+1.26	-0.26	+5	-0.23
SMS-P	+11.75	+1.65	-0.54	+7	+0.13
TIPI-N	+12.25	+2.70	-0.73	+12	+0.10
WBIS	+80.70	+7.98	-0.58	+37	-0.26

Note: EDE-Q = Eating Disorder Examination Questionnaire, SMS = 25-item Self-Monitoring Scale, SMS-A = Acquisitive Self-Monitoring Subscale, SMS-P = Protective Self-Monitoring Subscale, TIPI-N = Neuroticism subscale of The Ten-Item Personality Inventory, WBIS = Weight Bias Internalization Scale.

Assessment of Multicollinearity

To assess multicollinearity, we ran zero-order correlations between all predictor (e.g., univariate self-monitoring, protective self-monitoring, acquisitive self-monitoring), mediating (e.g., internalized weight stigma), control (e.g., neuroticism), and outcome (e.g., binge eating) variables. There were several noteworthy aspects derived from this analysis.

First, although there is evidence that self-monitoring is related to both sex and age (See Day et al., 2002, for a meta-analysis), we did not factor sex into an assessment of multicollinearity because participants were required to be female. We calculated zero-order correlations between all self-monitoring indices and age. We found no significant relations

between these variables (Refer to column 1 of Table 2 for zero-order correlations between these variables).

Second, to our surprise and not consistent with self-monitoring literature, neuroticism scores were correlated with acquisitive self-monitoring scores (Refer to row 3 of Table 2 for this correlation) (cf. Snyder, 1979; Rauthmann, 2011; Wilmot et al., 2017). Neuroticism scores were also related to scores for internalized weight stigma (Refer to the last row of Table 2) and scores for binge eating (Refer to the top of column 7 in Table 2). Because neuroticism was related to these three variables, we statistically controlled for neuroticism in our main analyses to avoid potentially confounding results.

Third, scores on our measure of internalized weight stigma and scores on our measure of binge eating were significantly related (Refer to row 1 of Table 2). These findings align with those of previous studies on relations between internalized weight stigma and binge eating (Almeida et al., 2011; Libbey et al., 2008; Pöttsch et al., 2018).

Table 2

Zero-Order Correlations Between Predictor, Mediating, Outcome, and Control Variables.

	Age	EDE-Q	SMS	SMS-A	SMS-P	TIPI-N	WBIS
EDE-Q			0.08	+0.15	+0.11	0.30***	0.28**
SMS	-0.06			+0.48***	+0.38***	0.11	0.01
SMS-A	-0.02				+0.10	0.24**	0.10
SMS-P	-0.05					0.01	0.16
TIPI-N							0.44***

Note: EDE-Q = Eating Disorder Examination Questionnaire, SMS = 25-item Self-Monitoring Scale, SMS-A = Acquisitive Self-Monitoring Subscale, SMS-P = Protective Self-Monitoring Subscale, TIPI-N = Neuroticism subscale of The Ten-Item Personality Inventory, WBIS =

Weight Bias Internalization Scale. * = statistical significance, * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Main Analyses

Mediation Model

Recall that there was no evidence of reliability for scores on the univariate index of self-monitoring. We modified our hypotheses and predicted individuals would increasingly engage in binge eating as their protective self-monitoring propensities increased. Additionally, we hypothesized that the connection between protective self-monitoring and binge eating would be mediated by internalized weight stigma. Last, we expected no relationship between acquisitive self-monitoring and binge eating.

To assess these predictions, we ran two mediation models using PROCESS (Hayes, 2013). Our predictor variables were protective and acquisitive self-monitoring and our outcome variable was binge eating. Internalized weight stigma was our mediator variable and we controlled for neuroticism in response to findings from our preliminary analysis. Following recommendations by Hayes (2013), unstandardized regression coefficients, standard error, 95% confidence intervals and other summary information were reported and are displayed in Table 3. Graphical representations of these two mediation models are displayed in Figures 1 and 2.

We found that as individuals were increasingly high in protective self-monitoring, internalization of negative beliefs about their body size also increased (See row 1 in the left-hand side of the upper panel in Table 3). Individual's protective self-monitoring tendencies did not affect how much they engaged in binge eating (See row 1 in the right-hand side of the upper panel in Table 3). Internalization of negative beliefs about their bodies did not significantly affect individuals' propensity to binge eat (Refer to row 3 within the first panel of Table 3). Last,

Estimates of direct and indirect effects of protective self-monitoring on binge eating can be found in Table 4. The extent to which individuals were higher in protective self-monitoring was unrelated directly to their tendency to engage in binge eating (See the first row of Table 4). There is also no evidence that internalized stigmatization concerning weight mediated the connection between protective self-monitoring and binge eating (See the second row of Table 4). Figure 1 demonstrates these results graphically. However, there is a trend consistent with our hypotheses that protective self-monitoring is related to binge eating through internalized weight stigmatization. Because scores on the protective self-monitoring subscale were reliable, we are somewhat confident in the association between protective self-monitoring and binge eating despite lack of statistical significance for these effects.

Table 4

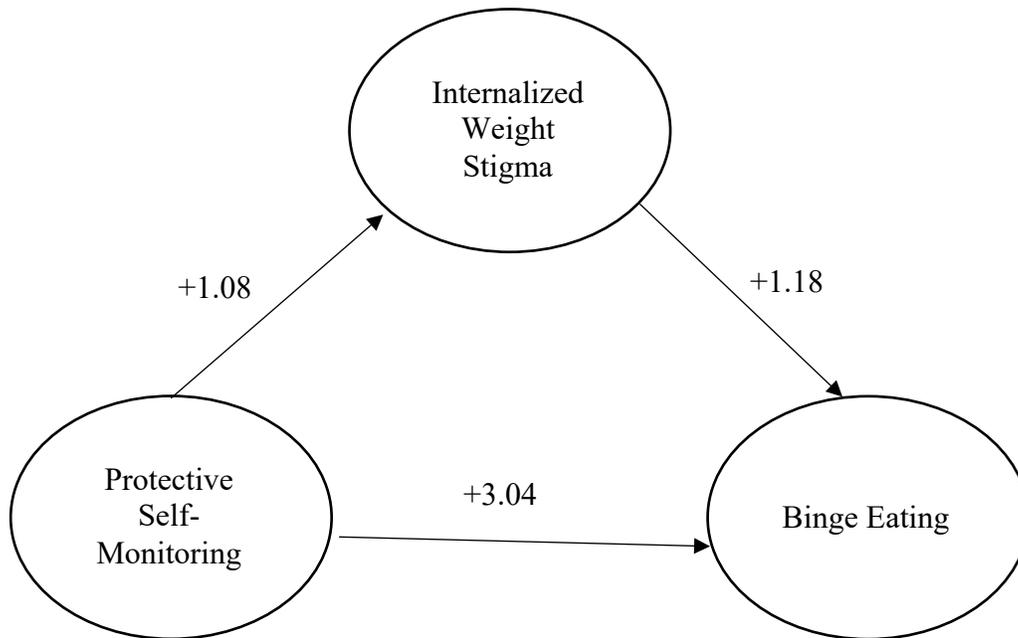
Direct and Indirect Effects of Protective Self-Monitoring on Binge Eating with Internalized Weight Stigma as a Mediator Variable, and Neuroticism as a Control Variable.

	<i>b</i>	SE	95% CIs
Direct Effect	+3.04	+3.05	-3.02, +9.10
Indirect Effect - WBIS	+1.28	+1.05	-0.04, +4.35

Note: WBIS = Weight Bias Internalization Scale

Figure 1

Direct and Indirect Effects of Protective Self-Monitoring on Binge Eating with Internalized Weight Stigma as a Mediator Variable, and Neuroticism as a Control Variable.



Results from our second mediation model, which included acquisitive self-monitoring as a predictor instead of protective self-monitoring as a predictor, were similar to results from our first mediation model. As anticipated, the extent to which individuals were high in acquisitive self-monitoring was unrelated to how much they engaged in binge eating (See row 1 of the second panel of Table 3). Individual's levels of acquisitive self-monitoring were also unrelated to the extent they internalized negative beliefs about their bodies (See row 1 of the second panel within Table 3). As in our first mediation model, as individuals were increasingly neurotic, the extent to which they internalized demoralizing beliefs about their bodies increased (See row 2 within the second panel of Table 3). Individual's internalization of negative beliefs about their

body size did not significantly correspond with how much they engaged in binge eating behaviors (Refer to the third row within the second panel of Table 3).

Estimates of indirect and direct effects using acquisitive self-monitoring as a predictor, binge eating as an outcome, and internalized weight stigma as a mediator are located in Table 5. A direct effect of acquisitive self-monitoring on binge eating was not found (See the first row in Table 5). Acquisitive self-monitoring did not indirectly relate to binge eating through internalized weight stigma (See the second row in Table 5). See Figure 2 for a graphical representation of these results.

Table 5

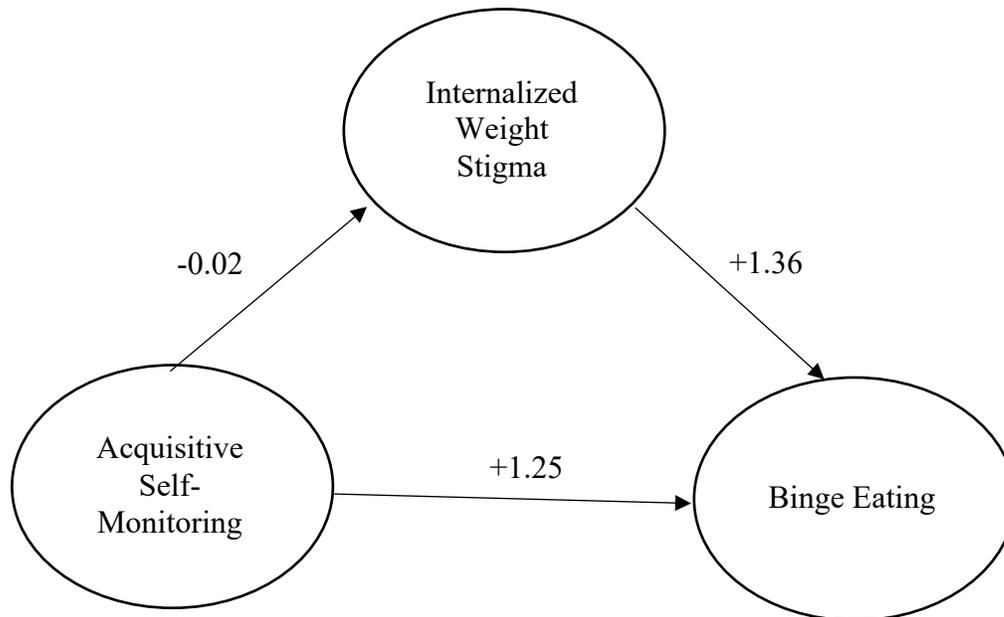
Direct and Indirect Effects of Acquisitive Self-Monitoring on Binge Eating with Internalized Weight Stigma as a Mediator Variable, and Neuroticism as a Control Variable.

	<i>b</i>	SE	95% CIs
Direct Effect	+1.25	+4.12	-6.95, +9.44
Indirect Effect - WBIS	-0.02	+0.92	-2.08, +1.75

Note: WBIS = Weight Bias Internalization Scale

Figure 2

Direct and Indirect Effects of Acquisitive Self-Monitoring on Binge Eating with Internalized Weight Stigma as a Mediator Variable and Neuroticism as a Control Variable.



Exploratory Analysis

Moderated Mediation Model

In our preliminary analysis, neuroticism was related to internalized weight stigma, binge eating, and acquisitive self-monitoring (See Table 2). Based on these results and that of previous literature (Rauthmann, 2011; Wilmot et al., 2017), we ran moderated-mediation models utilizing neuroticism as a moderator variable. All other variables in these models were unchanged.

Regression coefficients, standard errors, 95% confidence intervals, and summary information for these models are displayed in Table 6. Figures 3 and 4 include graphic depiction of these models. We used PROCESS (Hayes, 2013) to evaluate moderated-mediation models.

In line with results from our main analyses, the extent to which people were high in protective self-monitoring was unrelated to how much they engaged in binge eating (Refer to the

first row of the first panel within Table 6). Unlike results from our main analyses, protective self-monitoring status of individuals was not significantly related to their internalization of demoralizing beliefs about body size (Refer to the first row of the first panel within Table 6). Also contrary to what we found in our main analyses, as individuals held increasingly internalized negative beliefs about their body weight (e.g., mediator variable), their binge eating behaviors also increased (Refer to the fourth row of the first panel within Table 6). Finally, there was not a significant interaction between protective self-monitoring (e.g., predictor variable) and neuroticism (e.g., moderator variable) in terms of internalized weight stigmatization (Refer to the third row of the first panel within Table 6).

Table 6

Regression Coefficients, Standard Errors, 95% Confidence Intervals, and Summary Information for Moderated-Mediation Models Depicted in Figures 3 and 4.

Consequent						
<u>Antecedent</u>	<u>WBIS</u>			<u>EDE-Q</u>		
	<i>b</i>	SE	95% CIs	<i>b</i>	SE	95% CIs
PSM	+0.62	+1.92	-3.18, +4.42	+2.44	+3.05	-3.62, +8.49
TIPI-N	+0.84	+1.83	-2.81, +4.48			
P x N	+0.04	+0.15	-0.26, +0.34			
WBIS				+1.67	+0.65	+0.39, +2.95
	$R^2 = 0.23$			$R^2 = .09$		
	$F(3,90) = 9.19, p < .001$			$F(2,91) = 4.34, p = 0.02$		

Consequent						
<u>Antecedent</u>	<u>WBIS</u>			<u>EDE-Q</u>		
	<i>b</i>	SE	95% CIs	<i>b</i>	SE	95% CIs
ASM	-2.18	+2.74	-7.63, +3.27	+2.24	+4.08	-5.86, +10.34
TIPI-N	-0.10	+1.73	-3.54, +3.34			
P x N	+0.18	+0.23	-0.27, +0.63			
WBIS				+1.76	+0.63	+0.50, +3.01
	$R^2 = 0.19$			$R^2 = 0.08$		
	$F(3, 90) = 6.91, p < .001$			$F(2,91) = 4.16, p = 0.02$		

Note: *b* = unstandardized regression coefficients and 95% CIs = lower and upper bias corrected confidence intervals from 10,000 bootstrap samples. EDE-Q = Eating Disorder Examination Questionnaire, SMS-P = Protective Self-Monitoring Subscale, SMS-A = Acquisitive Self-Monitoring Subscale, TIPI-N = Neuroticism subscale of The Ten-Item Personality Inventory, WBIS = Weight Bias Internalization Scale.

We found no significant direct effects of protective self-monitoring on binge eating (See row 1 of Table 7). We found significant moderated-mediation using protective self-monitoring as a predictor variable (See Table 7 for indirect effects and Figure 3 for a graphical representation of this model). Specifically, the extent to which individuals were increasingly neurotic made it increasingly more likely that their level of protective self-monitoring would predict how much they internalized weight stigmatizing messages. This only held true when individuals were moderately or highly neurotic (See rows 3 and 4 within Table 7).

Table 7

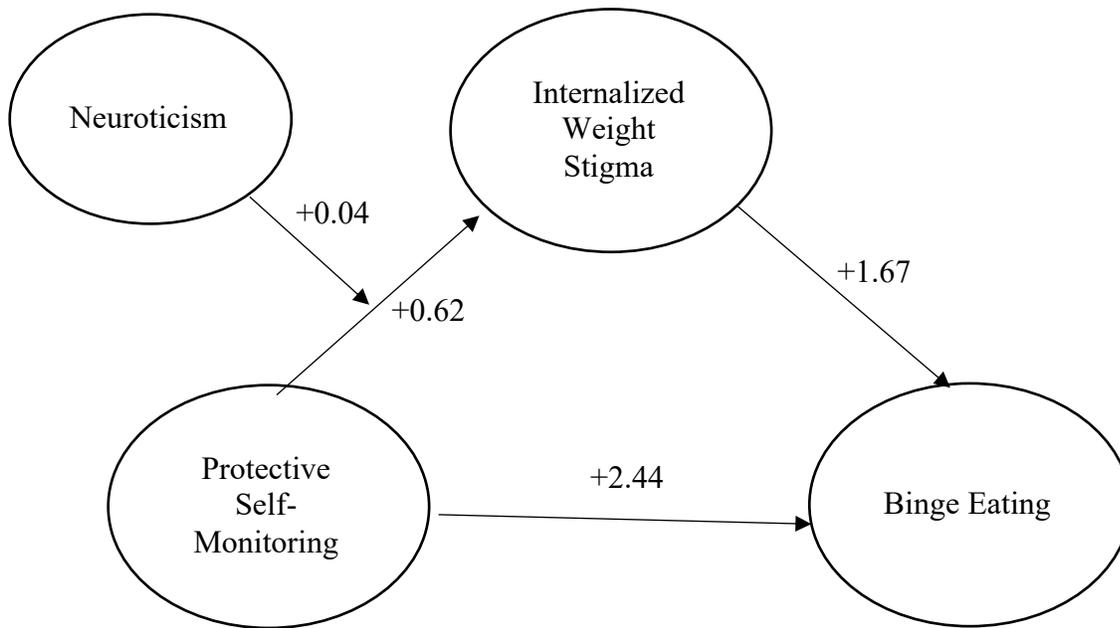
Direct and Indirect Effects of Protective Self-Monitoring on Binge Eating with Neuroticism as a Moderator Variable, and Internalized Weight Stigma as a Mediator Variable.

	Level of Neuroticism	<i>b</i>	SE	95% CIs
Direct		+2.44	+3.05	-3.62, +8.49
Indirect - WBIS	Below Average	+1.65	+1.54	-0.19, +5.89
	Average	+1.82	+1.26	+0.17, +4.99
	Above Average	+1.98	+1.60	+0.17, +6.93

Note: WBIS = Weight Bias Internalization Scale

Figure 3

Direct and Indirect Effects of Protective Self-Monitoring on Binge Eating with Internalized Weight Stigma as a Mediator Variable, and Neuroticism as a Moderator Variable.



In our second moderated-mediation model, the extent to which people were high in acquisitive self-monitoring was unrelated to how much they engaged in binge eating behaviors (Refer to the first row of the second panel within Table 6). Individual's acquisitive self-monitoring status and internalization of negative beliefs about body size were unrelated (See the bottom panel, first row of Table 6). Contrary to results obtained from our main analyses, individual's levels of neuroticism were unrelated to internalization of weight stigmatizing beliefs (See row 1 in the left-hand side of the upper panel in Table 6). As individuals held increasingly internalized negative beliefs about their body weight, they engaged in significantly more binge eating behaviors (Refer to the fourth within the second panel of Table 6). Finally, there was not a significant interaction between acquisitive self-monitoring and neuroticism in terms of internalized weight stigmatization (Refer to the third row of the second panel within Table 6).

In terms of moderated mediation, we did not find significant direct effects of acquisitive self-monitoring on binge eating (See row 1 of Table 8). Also, acquisitive self-monitoring did not indirectly relate to binge eating through internalized weight stigma (Refer to rows 3, 4, and 5 of Table 8). Finally, significant moderated-mediation using acquisitive self-monitoring as a predictor variable was not found (Refer to Table 8 for direct and indirect effects and Figure 4 for a graphical depiction of this model).

Table 8

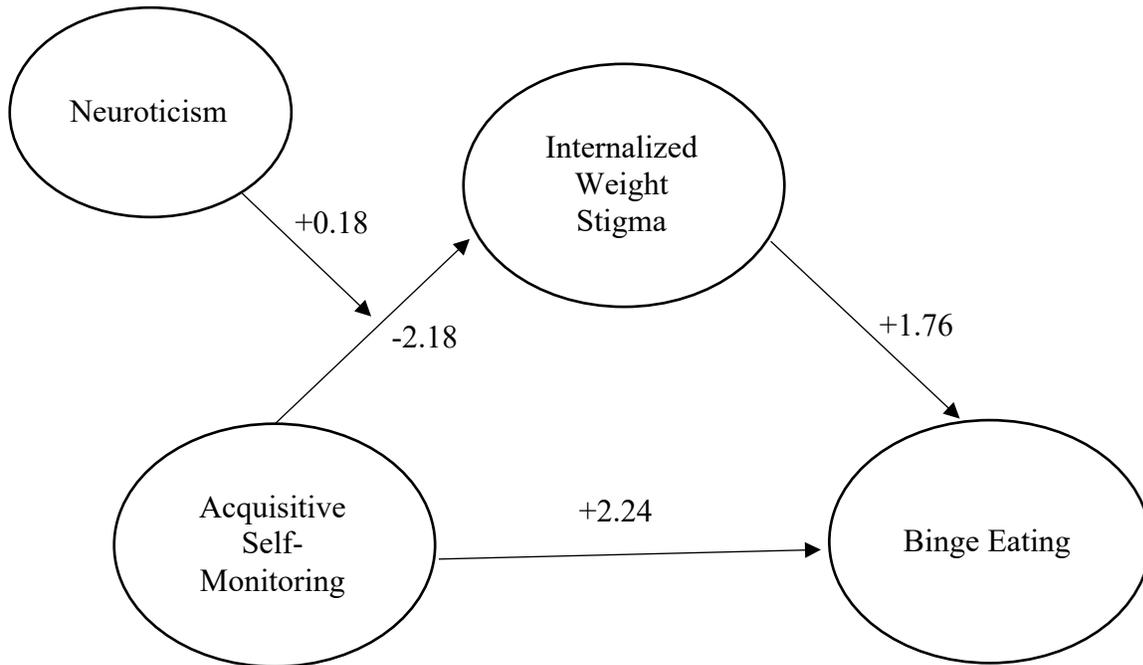
Direct and Indirect Effects of Acquisitive Self-Monitoring on Binge Eating with Neuroticism as a Moderator Variable, and Internalized Weight Stigma as a Mediator Variable.

	Level of Neuroticism	<i>b</i>	SE	95% CIs
Direct		+2.24	+4.08	-5.86, +10.34
Indirect - WBIS	Below Average	-0.68	+1.33	-3.61, +1.81
	Average	+0.16	+1.18	-2.10, +2.79
	Above Average	+1.00	+1.83	-2.50, +5.01

Note: WBIS = Weight Bias Internalization Scale

Figure 4

Direct and Indirect Effects of Acquisitive Self-Monitoring on Binge Eating with Internalized Weight Stigma as a Mediator Variable, and Neuroticism as a Moderator Variable.



Discussion

Summary of Results

Originally, we predicted that as individuals were increasingly higher in both the univariate conception of self-monitoring (i.e., management of social presentation to appropriately fit social situations) and bivariate conception of protective self-monitoring (i.e., management of social presentation to avoid loss of social status), their tendency to engage in

binge eating (i.e., overeat without compensatory behaviors such as vomiting or over exercise) would also increase. Furthermore, we predicted individuals' self-monitoring status, in both conceptions, would predict levels of binge eating through how much they internalized stigmatizing beliefs about their body weight (i.e., viewing larger bodies as inferior to smaller bodies). Acquisitive self-monitoring attributes (i.e., management of social presentation to acquire status) were not related to any attributes within binge eating disorder etiology. Therefore, we predicted acquisitive self-monitoring and binge eating would be unrelated.

Although we predicted that as individuals were increasingly higher in the univariate conception of self-monitoring their binge eating would also increase, the univariate conception of self-monitoring was not implemented into our analyses due to low reliability found in our preliminary analysis. Contrary to our hypothesis, individuals' protective self-monitoring status was unrelated to their propensity to binge eat both directly and indirectly through their levels of internalized weight stigmatization. However, the direction of the relations between protective self-monitoring and binge eating through internalized weight stigma was consistent with our hypotheses. Individuals' levels of acquisitive self-monitoring were unrelated to their propensity to binge eat both directly and indirectly through their levels of internalized weight stigmatization.

Contrary to results from previous investigations (Rauthmann, 2011; Wilmot et al., 2017) individuals' levels of trait neuroticism were unrelated to the extent to which they were high in protective self-monitoring. However, individuals' levels of neuroticism were related to the extent to which they were high in acquisitive self-monitoring. This relationship between acquisitive self-monitoring and neuroticism may be a sample specific error because researchers have previously found neuroticism and acquisitive self-monitoring to be unrelated (Wilmot et al., 2017). Consequently, we controlled for neuroticism in our primary mediation analyses. We also

found as people were increasingly higher in neuroticism, they also increasingly internalized negative beliefs about body size and engaged in more severe binge eating. These findings are consistent with prior investigations regarding positive relations between binge eating disorder, neuroticism, and internalized weight stigma (Kircaldy et al., 2008; Sutin & Terrecciano 2019; Swami et al., 2013).

Because individuals' tendency to be neurotic was related to the extent to which they binge ate and internalized negative beliefs about their bodies, we implemented trait neuroticism as a moderator variable. In particular, we included neuroticism as a moderator variable of individual levels of protective and acquisitive self-monitoring and their levels of internalized weight stigma in a set of exploratory moderated-mediation analyses. We found significant moderated-mediation. Specifically, we found that as individuals' tendency to manage their self-presentation to avoid social losses (e.g., protective self-monitoring) increased, their propensity to binge eat increased through their levels of heightened internalized weight stigma but only when they were highly or moderately neurotic. We also found that as individual's tendency to manage their social presentation to acquire status (e.g., acquisitive self-monitoring) increased, their propensity to binge eat did not significantly increase through their levels of internalized weight stigma even when accounting for their levels of neuroticism.

Integration with Previous Theory and Research

We were unable to determine if self-monitoring in its univariate form was related to binge eating severity or internalized weight stigmatization. In our psychometric analyses, we found low internal consistency for scores on the univariate measure of self-monitoring (i.e., the 25-item Self-Monitoring Scale). We eliminated univariate self-monitoring from our main analyses because unreliable measures have been shown to negatively affect statistical validity

(Strickland, 2005). Lack of reliability scores on univariate measure of self-monitoring are inconsistent with findings in previous literature (see Day et al., 2002, for a meta-analysis).

Perhaps the lack of internal consistency of scores on the univariate index of self-monitoring are attributable to the nature of individuals with eating disorders. In particular, there are characteristics of individuals with binge eating disorder and internalized weight stigma which may inhibit their ability to form an accurate self-concept. In order to respond to items on the self-monitoring scale accurately, individuals need to be able to know reasons behind their behavior in social situations and how their behaviors are related to who they are (e.g., self-concept) (Day et al., 2002; Douglas & Varnado-Sullivan, 2016; Sawaoka et al., 2012; Snyder, 1974).

Characteristics of individuals with binge eating disorder such as negative affect, impulsivity, and inability to regulate emotions successfully negatively affect their ability to know who they are and what their motivations are during social situations (Kenny et al., 2017; Mason et al., 2018; Zander & De Young, 2014). Therefore, individuals who report binge eating tendencies could be responding inaccurately to items on the 25-item Self-Monitoring Scale as a result of inaccurate self-conception.

These aforementioned characteristics of individuals in our sample could explain lack of reliable responding on the self-monitoring scale. It could be that individuals in our sample were more intrinsically interested in items from measures of eating disorder traits and weight stigma than in items from a measure of unrelated individual differences (e.g., self-monitoring) (Boninger et al., 1995). Less intrinsic interest in items from the self-monitoring scale could have caused individuals to respond to items with less attention (Goodman et al., 2013).

It should be noted that a lack of internal consistency was, however, not a problem encountered with other measures in this study. These discrepant findings might be attributable to

procedural differences between these measures. For most if not all of the other measures, items were framed such that an affirmative response was indicative of more of the attribute being assessed. Higher scores on these measures might be indicative of more of the attribute in question or acquiescence response tendencies (Plieninger & Heck, 2018). In other words, acquiescence may have contributed to the relatively higher consistency of scores for other measures compared to scores on the self-monitoring scale.

Limitations

Due to the correlational nature of our research design, we were not able to infer causal inference (Kendall et al., 2017). Even if we had observed self-monitoring differences in binge eating disorder, we would not have been able to make definitive causal inferences. There are two problems associated with correlational research, namely temporal precedence and third variables (Hoyle & Leary, 2009)

Regarding the issue of ambiguous temporal precedence, even if we had obtained significant results for relations between self-monitoring and binge eating disorder (with and without internalized weight stigma as a mediator), we would be unable to identify which variable occurred first in individuals' lives (Kendall et al., 2017). Specifically, we would be unable to determine whether self-monitoring tendencies developed prior to binge eating disorder development or binge eating disorder developed prior to self-monitoring tendencies. Regarding the second problem with correlational research designs, potentially significant findings could be due to effects of third variables on internalized weight stigma and/or binge eating disorder for which we did not control for (Hoyle & Leary, 2006; Kendall et al., 2017; Lilienfeld et al., 2006; Zapf et al., 1996). Examples of third variables include correlates with self-monitoring such as narcissism and repression (Furnham & Traynar, 1999; Kowalski et al., 2017) and correlates with

binge eating disorder such as overvaluation of body image and negative emotionality (Hagan, Chandler, Wauford, Rybak, & Oswald, 2003; Mitchison et al., 2018). Therefore, if we had obtained significant results, it would be unclear whether self-monitoring propensities caused individuals to binge eat and develop internalized weight stigma.

A second limitation to our study included exclusive use of self-report measures. With regards to limitations due to self-report measurements, responses to these items were subjective and therefore vulnerable to participants' biases (Forbush & Berg, 2016). Responses are based on individuals' self-conceptions which, as previously mentioned, may not always be accurate especially in a population of individuals with binge eating disorder (Douglas & Varnado-Sullivan, 2016; Eichen et al., 2012; Heijens et al., 2012; Kenny et al., 2017).

A third limitation included participants' reliance on accurate recall of past behavior to answer eating disorder survey items. Responses obtained at one point in time, like what we gathered in our study, reflected only what participants could recollect in that moment (DeVries, 1992). Researchers have indicated in previous research that recall of past instances are not as accurate as reporting events daily after they have just happened (Csikszentmihalyi, 2014). Consequently, inaccurate recall of past instances of binge eating and experiences of weight stigma could have negatively affected statistical validity.

A fourth limitation to our study included using an unverified sample of individuals diagnosed with binge eating disorder. Although participants had to answer a screening question in which they acknowledged that they had been diagnosed with binge eating disorder, we had no method to verify if participants had actually been diagnosed with binge eating disorder by a mental health professional. Because this sample was not provided by a clinical psychologist, it is

possible that there were individuals who participated in this study despite not having received a diagnosis of binge eating disorder (Wessling et al., 2017).

Future Directions

In order to improve our ability to draw causal inferences between variables, we could adjust our research design. If we conducted a longitudinal study, we could better identify the order in which our variables of interest occurred. By establishing temporal precedence, we would strengthen our confidence in making causal inferences (Kendall et al., 2017). To ameliorate the second issue associated with correlational research, we could measure and control for potential third variables. Controlling for third variables could strengthen our ability to draw causal inferences between self-monitoring and binge eating disorder by eliminating effects of known influences on binge eating disorder and internalized weight stigma (Almeida et al., 2011; Haynos et al., 2017; Hoyle & Leary, 2006; Kendall et al., 2017; Lilenfeld et al., 2006). Known correlates with internalized weight stigma and binge eating disorder, which could be confounds (e.g., third variables), include body satisfaction, internalization, negative affect, emotional dysregulation, and weight teasing (Eichen et al., 2012; Heijens et al., 2012; Frederick et al., 2016; Kircaldy et al., 2008; Tylka, 2004).

To improve accuracy of participant responses, we could use a time-sampling method wherein individuals could record every occurrence of a specified behavior in real time (Csikszentmihalyi, 2014). By using a time-sampling method, participants could report their binge eating frequency and levels of internalized weight stigma day by day in a diary form (Clausen, 2008). Another way in which we could improve participant responses is by obtaining a data set from clinical psychologists who have diagnosed and treated individuals with binge eating

disorder. By using a sample of individuals provided by a clinician, we could improve response accuracy by having a sample of accurately diagnosed participants.

Although self-monitoring may not be related to binge eating, it may be related to other types of eating disorders. In the future, we could investigate potential relations between individual's self-monitoring status and other types of eating disorders (e.g., anorexia nervosa, bulimia nervosa, eating disorders not otherwise specified). In prior research, self-monitoring has been shown to be related to anorexia nervosa (Bachner-Melman et al., 2009) and obesity (Younger & Pliner, 1976).

Conclusion

The role of self-monitoring in binge eating disorder has not yet been fully examined. Utility of potential findings regarding self-monitoring and binge eating disorder could include suggestions for clinicians to evaluate patients for personality traits (e.g., self-monitoring and neuroticism) which could predispose patients to developing binge eating disorder especially when they also have internalized weight stigma. If patients do not quite meet the criteria for binge eating disorder but engage in binge eating and have related symptoms on a subclinical level, knowledge of risk factors like neurotic tendencies, self-monitoring status, and internalized weight stigma could be addressed in therapy. If clinicians help their clients reduce their internalized weight stigma and manage their neurotic and protective self-monitoring tendencies, they could potentially help prevent individuals with subclinical levels of binge eating from developing clinical binge eating disorder.

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