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HUMOR AS A MODERATOR OF NEUROTICISM'S EFFECT ON
PSYCHOPATHOLOGY AND LIFE SATISFACTION

A thesis submitted in partial fulfillment
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MASTER OF ARTS

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ABSTRACT

HUMOR AS A MODERATOR OF NEUROTICISM'S EFFECT ON PSYCHOPATHOLOGY AND LIFE SATISFACTION

Adir Pinchot

Previous research studies evaluated self-enhancing humor (also referred to as coping humor) as a coping strategy that enables an individual to better manage the negative emotions elicited by external stressors. Research has not, however, adequately considered the role that humor may play for neurotic individuals who are characterized by a propensity to experience stress and negative emotions and are, therefore, more susceptible to developing depression, anxiety, and low life satisfaction. Nor has research adequately explored how self-enhancing humor interacts with the maladaptive form of self-directed humor, namely, self-defeating humor. This study attempts to address these lacunae by analyzing whether self-enhancing humor and self-defeating humor serve as moderators of the relationships between neuroticism and aversive outcomes, such as depression, anxiety, and low life satisfaction. The study sample included 206 total participants, comprised of 99 adults from the general population and 107 college undergraduate students. Hierarchical regression analyses revealed that self-enhancing humor moderated the impact of neuroticism on life satisfaction, regardless of the level of self-defeating humor. Highly neurotic individuals who used high levels of self-enhancing humor maintained higher ratings of life satisfaction than highly neurotic individuals who

used low levels of self-enhancing humor. The regression analyses also indicated that the use of self-enhancing humor mitigated the impact of neuroticism on anxiety, but only for individuals who used low levels of self-defeating humor. In contrast, the use of both self-enhancing and self-defeating humor compounded the impact of neuroticism on anxiety. Neither humor style significantly moderated the relation between neuroticism and depression. These results indicate that self-enhancing humor mitigates the effect of neuroticism on certain negative outcomes, that the two self-directed humor styles interact and should both be considered in any study of self-directed humor, and that the overall amount of self-directed humor an individual uses may be a crucial factor in determining whether humor will mitigate or compound the impact of neuroticism.

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I would also like to express my gratitude to Dr. Ernest Hodges and Dr. Bill Chaplin. In addition to teaching me the “ins and outs” of moderation analyses as a teacher and research mentor, Dr. Hodges provided insightful feedback as the official “reader” of this manuscript. Dr. Chaplin also played an important role in this research project, serving as the statistics consultant and providing clear explanations of the complicated interactions.

Lastly, I would like to thank my family, specifically my parents and wife. My parents have supported me throughout my educational journey and provided the initial inspiration for this thesis by modeling the elevating power of self-enhancing humor. My wife, Ahava, has supported and encouraged me in my educational pursuits since the day we met. Fortunately, I have absorbed just enough of her discipline and dedication to complete this thesis.

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INTRODUCTION

In his account of life as a concentration camp prisoner, Viktor Frankl describes humor as “another of the soul’s weapons in the fight for self-preservation” (Frankl, p. 43). The field of psychological research has long conceptualized and studied humor as a means of reducing the negative emotions elicited by external stressors. Research has not, however, adequately considered the role that humor may play for individuals characterized by a propensity to experience stress and negative emotions. Within the Five Factor Model of personality, which dominates the current landscape of personality trait research, this propensity to experience negative emotion is known as neuroticism (Lucas & Diener, 2015).

Neuroticism

Neuroticism has been a consistent feature of many of the most influential models of personality, including Eysenck’s PEN model (Eysenck & Eysenck, 1987), the Big Five Model (Digman & Takemoto-Chock, 1981; Peabody & Goldberg, 1989), and the Five Factor Model (McCrae & Costa, 1985, 1987). Despite being referred to as “emotional stability” in its original formulation (Norman, 1963), McCrae and Costa (1985, 1987) refer to it as neuroticism. This negatively charged label underscores the adverse impact of neuroticism, which is associated with a number of deleterious life outcomes.

Neuroticism’s Associations with Depression & Anxiety

Numerous studies have found neuroticism (also referred to as “negative affectivity”) to be associated with mental illness in general (e.g., Malouff, Thorsteinsson, & Schutte, 2005) and internalizing disorders in particular (e.g., Krueger, McGue, & Iacono, 2001; Watson, Gamez, & Simms, 2005). Generalized anxiety and depression

represent two internalizing disorders that are strongly linked, both theoretically and empirically, to neuroticism (Clark & Watson 1991; Clark, Watson, & Mineka, 1994). A meta-analysis conducted by Kotov, Gamez, Schmidt, and Watson (2010) analyzed effect sizes from 63 studies that correlated major depressive disorder (MDD) with neuroticism and 14 studies that correlated generalized anxiety disorder (GAD) with neuroticism. The researchers found that neuroticism was strongly associated with both MDD (Cohen's $d=1.33$) and GAD (Cohen's $d=1.91$).

Neuroticism's Association with Low Life Satisfaction

Neuroticism has also been linked to various measures of subjective well-being, including life satisfaction. Life satisfaction is defined as “a cognitive and global evaluation of the quality of one's life as a whole” (Pavot & Diener, 2008, p. 137). In a meta-analysis of the associations between the Big Five traits and subjective well-being, Steel, Schmidt, and Shultz (2008) found that, across 36 studies, neuroticism was moderately and inversely correlated with life satisfaction (average $r = .38$).

Life satisfaction evaluations represent valuable measures of subjective well-being and serve as indicators of vulnerability and risk. A longitudinal study of twins in Finland found that life satisfaction inversely predicted risk of suicide 20 years later, even after controlling for age, gender, baseline health status, physical activity, and substance use (Koivumaa-Honkanen et al., 2001). A meta-analysis by Chida and Steptoe (2008) indicated that life satisfaction, as well as other positive traits, predicted mortality even after controlling for negative affect.

A Causal Relationship

One's understanding of the relationship between neuroticism and the outcomes with which it is associated (i.e., depression, anxiety, and low life satisfaction) depends upon one's conceptualization of personality traits. McCrae and Costa's (2008) Five-Factor Theory (FFT) views personality traits, such as neuroticism, as basic, stable tendencies that constitute the "abstract underlying potentials of the individual" (p. 146). McCrae and Costa argue that traits have causal status, influencing people to engage in characteristic patterns of thinking and behavior. According to FFT, neuroticism can be viewed as a vulnerability that contributes to the development of psychopathology and dissatisfaction with life.

FFT assumes the basic tenet of trait theory: that "individuals can be characterized in terms of relatively enduring patterns of thoughts, feelings, and actions" (McCrae & Costa, 2008, p. 160). Since the development of the Big Five and Five Factor models, scholars have debated whether the five factors (i.e., neuroticism, openness, agreeableness, conscientiousness, and extraversion) can be conceptualized in this way (John, Naumann, & Soto, 2008). Trait theory has gained support from research demonstrating the relative stability of personality factors over time and the heritability and biological etiology of personality dimensions (Clark & Watson, 2008). Neuroticism and extraversion constitute the two factors with the most evidence in support of their genetic basis (e.g., Bouchard & Loehlin, 2001; Viken, Rose, Kaprio, & Koskenvuo, 1994) and biological substrates (e.g., Eysenck, 1997).

The empirical literature also supports the view that neuroticism exerts a causal influence on the development of psychopathology and dissatisfaction with life.

Prospective studies of personality in never-depressed participants have shown that higher levels of neuroticism, as well as higher levels of traits that overlap with neuroticism, predict the subsequent onset of depressive episodes (Klein, Kotov, & Bufferd, 2011). The DSM V codifies this view, stating that “neuroticism (negative affectivity) is a well-established risk factor for the onset of MDD, and high levels appear to render individuals more likely to develop depressive episodes in response to stressful life events” (American Psychiatric Association, 2013, p. 166). Although there is less prospective evidence linking neuroticism with GAD, the correlations between the two are well-established (American Psychiatric Association, 2013, p. 224).

Personality traits in general and neuroticism and extraversion in particular represent the strongest predictors of perceptions of life satisfaction (Lucas & Diener, 2015). A longitudinal study of graduating medical students conducted by Tyssen et al. (2009) gathered data at the students’ graduation (T1) and at three follow up intervals: their first (T2), fourth (T3) and ninth (T4) postgraduate years. The regression analyses indicated that neuroticism at T1 inversely predicted Life Satisfaction at T4 ($\beta = -0.06, p = 0.02$). Furthermore, multilevel (mixed) linear repeated measures analyses indicated that neuroticism ($F = 52.2, p < 0.001$) had a significant fixed main effect on change in life satisfaction over the course of the study. These prospective and longitudinal studies of neuroticism as a predictor of psychopathology and life satisfaction provide empirical evidence supporting the view of neuroticism as a vulnerability that contributes to these outcomes.

According to FFT, neuroticism’s direct effect on the development of depression, anxiety, and low life satisfaction (through the individual’s heightened experience of

negative emotion) is compounded by the influence that neuroticism exerts on an individual's "characteristic adaptations." Whereas traits are "basic tendencies that refer to the abstract underlying potentials of the individual" (McCrae and Costa, 2008, p. 146), characteristic adaptations refer to a person's attitudes, goals, habits, and skills (e.g., coping strategies). Characteristic adaptations are developed in order to succeed in a particular context and can differ depending upon time, place, and role (McAdams, 1996). They are shaped by the interaction between one's basic traits and the environment and represent a distinct and relatively malleable level of personality (McCrae and Costa, 2008).

Neuroticism contributes to the development of depression, anxiety, and low life satisfaction because it increases an individual's experience of negative emotion *and* influences the characteristic adaptations that an individual acquires. People who are high in neuroticism tend to develop more maladaptive adaptations, which limit their ability to cope effectively with negative emotions and renders them more vulnerable to the outcomes associated with neuroticism. However, the malleability of characteristic adaptations opens the door for interventions that can buffer against the impact of trait neuroticism by altering an individual's adaptations. Hence, Lightsey et al.'s (2011) sentiment that "it is vital to ascertain whether malleable psychological characteristics may ameliorate the pernicious effects of trait negative affect" (p. 144).

Humor

One characteristic adaptation that may buffer against the effects of neuroticism is a sense of humor. Poets, philosophers, researchers, and clinicians throughout history have attempted to understand and explicate the nature of humor (Ruch & McGhee, 2014). No

single conceptualization of humor exists, as it “has been conceptualized as a temperament, coping strategy, ability, attitude, worldview, aesthetic judgement, character strength, and virtue” (Ruch & McGhee, 2014, p. 181). Accordingly, humor researchers have treated sense of humor, not as a single dimension, but as a multi-faceted construct that is “best viewed as a class of loosely related traits” (Martin, Puhlik-Doris, Larsen, Gray, & Weir, 2003, p. 49).

Freud (1928), Allport (1961), and Maslow (1954) all characterized humor as a healthy and adaptive means of coping with stress. Dixon (1980) theorized that humor evolved in humans specifically as a means of cognitively coping with the adverse, stressful events and situations that threaten well-being. Since the 1980s, research has focused on demonstrating and understanding the “potential beneficial effects of humor on physical and psychosocial health” (Martin et al., 2003, p. 49). The mounting evidence demonstrating humor’s positive impact led Peterson and Seligman (2004) to include humor as one of the 24 character strengths in their Values in Action (VIA) Classification.

However, the early theorists and researchers also acknowledged that “healthy psychological functioning is associated with distinctive uses or styles of humor (e.g., affiliative, perspective-taking humor) and that other forms of humor (e.g., sarcastic, disparaging, avoidant) may be harmful for well-being” (Martin et al., 2003, p. 50). Despite this recognition, many of the humor scales used in early research assessed only the adaptive aspects of humor (Martin et al., 2003). In contrast, more recent humor scales have adopted and reflect more nuanced conceptualizations of humor, distinguishing between its positive and negative forms (McGhee, 2010). Although clear distinctions between the different forms of humor are necessary for research purposes, most people

use humor in both adaptive and maladaptive ways “at different times and in different contexts” (Martin, 2007, p. 306)

Self-Enhancing Humor

Self-enhancing humor, which has also been referred to as coping humor, mature humor, and perspective-taking humor, describes the style of humor that most closely corresponds with the adaptive humor described by the early theorists as “non-hostile, philosophical, and self-defeating while remaining self-accepting” (Martin, 2007, p. 277). Freud understood it to be the “highest” of “defense processes” (1960, p. 233), which enables a person to override the negative affect elicited by an aversive situation while maintaining a realistic perspective (Freud, 1928). In shifting perspective on a stressful situation, “laughing at the fundamental incongruities of life, and diminishing threats by turning them into objects of non-serious play” (Martin, 2007, p. 19) a person feels “a ‘distance’ between one’s self and the problem” (May, 2009, p. 40) and adopts a “new and manageable perspective” on “an otherwise intolerable situation” (Allport, 1950, p. 104). Self-enhancing humor is the capacity and tendency to engage in this humorous perspective taking in order to regulate negative emotion (Martin et al., 2003). It represents a refusal to be “overcome by the people and situations, both large and small, that threaten our well-being” (Martin, 2007, p. 19).

Correlational research has shown that self-enhancing humor is associated with lower levels of depression (Nezu, Nezu, & Blissett, 1988; Deaner & McConatha, 1993; Martin et al., 2003; Kuiper et al., 2014) and anxiety (Martin et al., 2003; Lefcourt & Martin, 1986; Kuiper et al., 2014). Among the 24 VIA character strengths, humor

generally displays the seventh strongest correlation with life satisfaction (Ruch & McGhee, 2014)

Self-Defeating Humor

Psychological health is influenced not only by the presence of adaptive forms of humor, but also by “the absence of other, more unhealthy forms of amusement” (Martin, 2007, p. 277). In the context of self-directed humor, “there is an important distinction between self-defeating humor based on a fundamental sense of self-worth and excessively self-disparaging humor arising from a negative self-concept” (Martin, 2007, p. 283). This excessively self-disparaging humor, which is also referred to as self-defeating humor, refers to “making fun of oneself or having others laugh at oneself more than one feels comfortable with” (Ruch & Heintz, 2013, p. 2). It is often done impulsively (Ruch & Heintz, 2013) in an attempt to gain approval or acceptance from others (Martin et al., 2003). Self-defeating humor may also be used as a form of “defensive denial, to hide one’s underlying negative feelings or avoid dealing constructively with problems” (Martin, 2007, p. 211). Although this form of humor “may produce temporary feelings of well-being,” it comes at the cost of “less healthy functioning in the longer term” (Martin, 2007, p. 9).

Correlational research has demonstrated that the use of self-defeating humor is related to higher levels of depression, anxiety, and negative affect (Martin et al., 2003; Kuiper, Grimshaw, Leite, & Kirsh, 2004), whereas less use of self-defeating humor is associated with healthier psychological functioning (Martin, 2007). Previous research has also provided evidence that men are more likely to use hostile, maladaptive forms of

humor in general (Crawford & Gressley, 1991) and self-defeating humor in particular (Martin et al., 2003).

Humor Research

Previous research on humor includes studies of moderation models, as well as experimental designs. Studies of humor as a moderating variable have largely focused on how humor buffers against stress (Larsen & Prizmic, 2008). Martin and Lefcourt (1983) conducted three studies utilizing either self-reports of humor or objective measures of humor production ability. They found fairly consistent evidence demonstrating that humor has “a significant moderating effect on the relation between negative life events and mood disturbance” (p. 1313). In other words, negative life events resulted in more mood disturbances for individuals who scored low on coping humor, compared with people who scored high on coping humor. Nezu et al.’s (1988) study, which used cross-sectional and prospective analyses, found a significant moderating effect of coping humor in predicting depression, but not anxiety. Although a number of rigorous investigations have supported the view that humor serves as a buffer against the harmful effects of stress, other research studies have failed to replicate their findings (Martin, 2007).

The moderation studies that support the stress-buffering view of humor gain additional support from experimental research demonstrating humor’s capacity to reduce the negative emotions that an individual experiences in response to stressful experiences. Lefcourt and Martin (1986) showed college students a gory and painful silent film and instructed them to create either a humorous narrative, non-humorous ‘intellectual’ narrative, or no narrative during the viewing. They found that, in females, creating a humorous narrative led participants to report less negative emotions and display fewer

behaviors associated with mood disturbance (e.g., averted gaze, grimacing, hand-rubbing). In contrast, the male participants did not display significant distress in any of the three conditions, suggesting that the film did not sufficiently affect their mood. A similar study by Newman and Stone (1996) instructed male college students to generate a humorous or serious monologue while watching a stressful film depicting lumber mill accidents. Compared to the production of a serious narrative, humor production led to “lower negative affect, lower tension, and reduced psychophysiological reactivity” (p. 101). This effect lasted up to 15 minutes after the film’s conclusion and applied to the entire sample, whether the participants scored high or low on trait humor. The results suggest that reframing an experience through humor production may serve as an effective coping strategy.

Humor Interventions

The view that humor buffers against stress has also engendered the development of an array of humor interventions, which differ in terms of their design (e.g., individual vs. group), administration (e.g., offline vs. online), and level of standardization (Ruch & Hoffman, 2017). In their review of the relevant literature, Ruch and Hoffman (2017) state that the research on the effectiveness of humor interventions confirms that humor can be trained, that the changes induced by training last for at least a few months, and that augmenting an individual’s capacity for humor leads to desirable outcomes (e.g., increases in positive affect, decreases in negative affect, and improved life satisfaction ratings).

The Present Study

Although research has begun to consider and evaluate humor as a characteristic adaptation that can be learned and used to effectively manage the negative emotions elicited by external stressors, the field has not considered whether humor can serve as a buffer against the pernicious outcomes associated with the trait of neuroticism.

Tangential support for the view that humor moderates the effects of neuroticism may be found in a study conducted by Olson, Hugelshofer, Kwon, and Reff (2005) who found that adaptive humor moderates the relationship between rumination, a tendency that is associated with neuroticism (John et al., 2008), and depression. Olson and her colleagues observed that the association between rumination and depression was significantly stronger in individuals who scored low on self-enhancing humor compared with those who scored high on self-enhancing humor. Olson et al.'s study suggests that humor buffers against the effects of personality tendencies that are closely associated with neuroticism (e.g., rumination).

Our goal is to test Allport's (1950) assertion that "the neurotic who learns to laugh at himself may be on the way to self-management, perhaps to cure" (p. 104), as well as the notion that "the absence of certain potentially detrimental uses of humor may be as important to psychological well-being as is the presence of more beneficial uses of humor" (Martin et al., 2003, p. 50). We will evaluate how the presence or absence of self-enhancing humor (an adaptive characteristic adaptation) and self-defeating humor (a maladaptive characteristic adaptation) impacts the relationship between neuroticism and the outcomes with which it is associated (i.e., depression, anxiety, and low life satisfaction). In statistical terms, we will assess whether self-enhancing humor and self-

defeating humor serve as moderators of the relationship between neuroticism and these negative outcomes.

Hypotheses

We hypothesize that self-enhancing humor and self-defeating humor will each prove to be significant moderators of the associations between neuroticism and the three outcome variables (i.e., depression, anxiety, and low life satisfaction). We expect that (H1) heightened use of self-enhancing humor will weaken the impact of neuroticism on depression, anxiety, and life satisfaction, whereas (H2) increased use of self-defeating humor will compound the impact of neuroticism. We also anticipate a three-way interaction, in which the moderating effect of one humor style will be altered by the presence of the other humor style. We will probe this interaction by comparing four groups: (1) those who are high on self-enhancing humor and low on self-defeating humor (referred to as the “self-enhancers”), (2) those who are high on both self-enhancing and self-defeating humor (referred to as the “humor of all kinds” group), (3) those who are low on both self-enhancing and self-defeating humor (referred to as the “no humor” group), and (4) those who are low on self-enhancing humor and high on self-defeating humor (referred to as the “self-defeaters”). We expect that the impact of neuroticism on depression, anxiety, and life satisfaction will be (H3) weakest for the self-enhancers, (H4) stronger for the humor of all kinds group (compared to the self-enhancers), and (H5) strongest for the self-defeaters. The hypothesized three-way interactions are depicted in Figures 1 and 2.

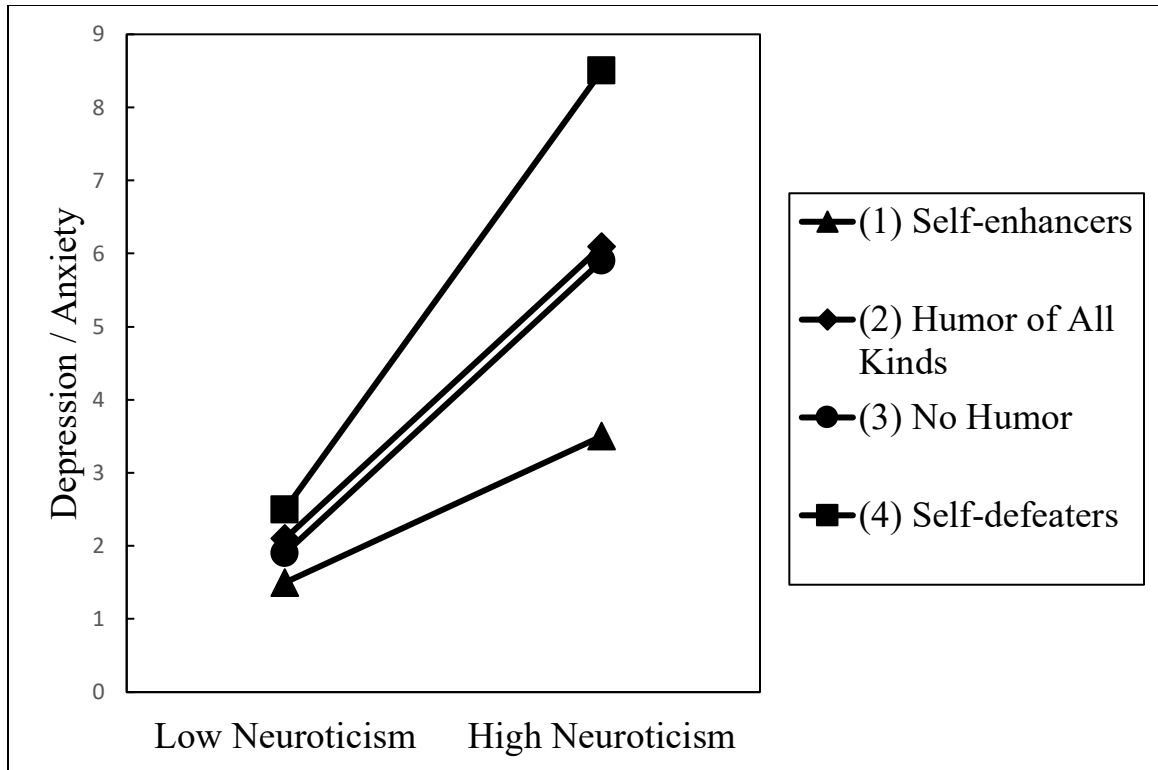


Figure 1. The hypothesized three-way interaction of neuroticism, self-enhancing humor, and self-defeating humor in predicting depression and anxiety.

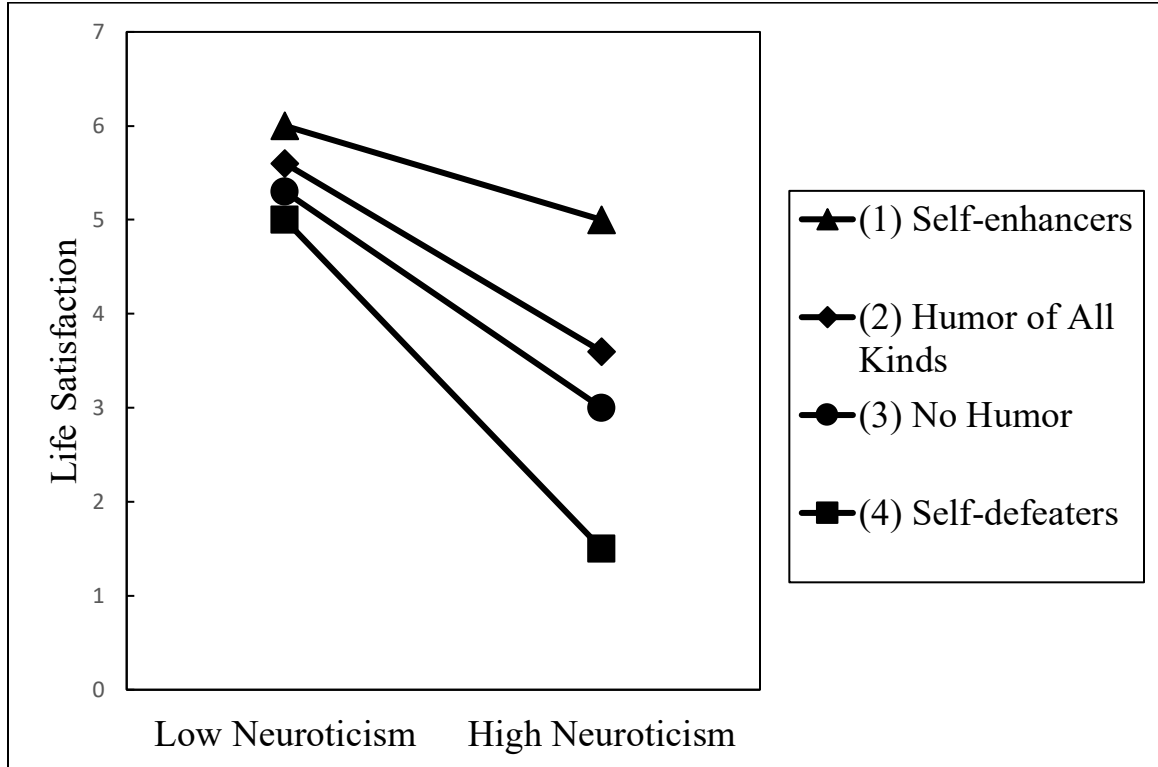


Figure 2. The hypothesized three-way interaction of neuroticism, self-enhancing humor, and self-defeating humor in predicting life satisfaction.

Method

Participants and Procedures

The data for this study was taken from a larger data set that was collected as part of a study conducted in 2015. The participants were recruited to complete online surveys of humor, personality, and psychiatric symptoms. The undergraduate sample was recruited from introductory psychology classes at St. John's University and was provided with class credit for participation. The adult sample was recruited from the general population through Qualtrics and was paid \$10 for participation. Prior to beginning the survey, the participants provided informed consent electronically.

All questionnaires were administered through the Qualtrics survey software. The questionnaires, which were administered in the same order for each participant, included a survey of demographic information, the Psychiatric Diagnostic Screening Questionnaire, the Humor Styles Questionnaire, the Big Five Inventory, and the Satisfaction with Life Scale. Two other measures were administered but were not included in this study.

The study sample included 206 total participants, comprised of 99 adults from the general population (37 men and 62 women) and 107 college undergraduate students (34 men and 73 women). The mean age of the adults was 44.81 ($SD = 16.48$), ranging from 18 to 83. The mean age of the undergraduates was 19.69 ($SD = 2.27$), ranging from 18 to 33. The racial/ethnic composition of the overall sample was as follows: 60.2% White/Non-Hispanic, 18.4% Hispanic/Latino, 12.6% Black/African American, 6.8% East Asian, 3.9% South Asian, 2.9% Pacific Islander, 1% American Indian/Alaskan Native, 1% Middle Eastern, , and 1.5% Other.

Measures

Humor Styles Questionnaire (HSQ). The Humor Styles Questionnaire (HSQ; Martin et al., 2003) is a 32-item, self-report measure that assesses an individual's use of humor in everyday life. The measure contains four dimensions (8 items each), which reflect the four humor styles: affiliative humor, self-enhancing humor, aggressive humor, and self-defeating humor. The present study utilized only the self-enhancing and self-defeating humor scales.

Each item on the HSQ is a statement about the participant, which the participant responds to on a seven-point Likert scale, ranging from 1 (Totally Disagree) to 7 (Totally Agree). Sample items include "I enjoy making people laugh" (affiliative), "Even when I'm by myself, I'm often amused by the absurdities of life" (self-enhancing), "If I don't like someone, I often use humor or teasing to put them down" (aggressive), and "I let people laugh at me or make fun at my expense more than I should" (self-defeating).

Martin et al. (2003) reported high internal consistency for each of the four scales. The Cronbach's alphas for the self-enhancing and self-defeating humor scales were .81 and .80, respectively. Our study yielded Cronbach's alphas of .84 for self-enhancing humor and .80 for self-defeating humor. Evidence in support of the construct validity, as well as the discriminant validity among the four scales, was initially presented by Martin et al. (2003) and has continued to emerge in the years following the scale's development (Martin, 2007). Heintz and Ruch's (2015) findings support the validity of discriminating between the four humor styles with the exception of affiliative and self-enhancing humor.

Big Five Inventory (BFI). The Big Five Inventory (BFI; John & Srivastava, 1999) is a 44-item inventory that measures an individual on the Big Five Factors

(dimensions) of personality. Extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience constitute the Big Five. Each trait is assessed by 8 to 10 items. The questionnaire is comprised of descriptive statements that begin with the phrase “I see myself as someone who...”. Participants rate these statements on a five-point Likert scale, ranging from 1 (Disagree Strongly) to 5 (Agree Strongly). Sample items include “I see myself as someone who is talkative” (extraversion), “I see myself as someone who is depressed, blue” (neuroticism), “I see myself as someone who has an active imagination” (openness), “I see myself as someone who is helpful and unselfish with others” (agreeableness), and “I see myself as someone who does a thorough job” (conscientiousness).

John and Srivastava (1999) reported high alpha reliabilities (ranging from .75 to .90 and averaging above .80) and three-month test-retest reliabilities (ranging from .80 to .90) for the BFI scales. They also reported high convergent validity between the BFI and other Big Five instruments and peer ratings. The present study utilized only the BFI neuroticism scale, which yielded a Cronbach’s alpha of .83.

Psychiatric Diagnostic Screening Questionnaire (PDSQ). The PDSQ is a 126-item, self-report questionnaire designed to screen for the DSM-IV Axis I disorders most commonly encountered in outpatient mental health settings, including major depressive disorder (MDD), bulimia/binge eating disorder, post-traumatic stress disorder (PTSD), panic disorder, agoraphobia, social phobia, alcohol abuse/dependence, drug abuse/dependence, generalized anxiety disorder (GAD), somatization disorder, hypochondriasis, and psychosis (Zimmerman & Mattia, 2001). The present study utilized only the MDD and GAD scales. The questionnaire presents participants with symptoms

and asks that they respond “Yes” or “No” to indicate whether they have experienced them within a given time frame. The sum of scores is calculated for each symptom cluster.

Zimmerman and Mattia (2001) established the reliability and validity of the PDSQ through two studies including more than 1,700 psychiatric outpatients. In the final validation study (N=994), Cronbach’s alphas for the MDD and GAD scales were .88 and .89, respectively. Test-retest reliability (participants completed the PDSQ prior to the diagnostic evaluation and then again after the intake appointment) was .92 for MDD and .79 for GAD. In this study, Cronbach’s alpha was .89 for the MDD scale and .90 for the GAD scale.

Satisfaction with Life Scale. Participants were administered the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen & Griffin, 1985). The scale consists of five statements assessing one’s global evaluation of their attitude towards life (e.g., “I am satisfied with my life”). Participants are asked to respond on a seven-point Likert scale ranging from “strongly disagree” (1) to “strongly agree” (7). Diener et al. (1985) reported a Cronbach’s alpha of .87 and a two-month test-retest reliability of .82 (Diener, Emmons, Larsen & Griffin, 1985). The Cronbach’s alpha in this study was .92.

Results

Initial Analysis

Analysis of missing data was conducted using Little's MCAR test. One participant did not answer any of the BFI or SWLS items. Three participants did not respond to any of the items comprising the HSQ. The responses to the PDSQ scales that were included in the study (i.e., the MDD and GAD scales) did not contain any missing data. Little's MCAR test was conducted for the scales with missing items. The results of the test were not significant and no data corrections were performed on the missing values.

All of the variables were examined for normality, linearity, and heteroscedasticity prior to the ANOVA, correlation, and hierarchical regression analyses. Potential outliers were identified through examination of box-plots and stem-and-leaf plots. Normality and linearity were assessed via the evaluation of P-P plots, Q-Q plots, histograms, studentized deleted residuals, Cook's Distance, leverage values, standardized DFBeta values, and standardized DFFits values. Heteroscedasticity was assessed by examination of tolerance and variable inflation factor multicollinearity statistics in the regression analyses. Skewness and kurtosis were assessed for all variables. Generally, a variable was identified as overly skewed or kurtotic if its z-value exceeded 1.96 (Cramer & Howitt, 2004). In this data, several zero scores influenced the overall distributions of the MDD and GAD scales. Thus, no winsorization was applied. Instead, a single square root transformation was applied to the MDD scale. All subsequent analyses include this single transformation.

Within group differences. A one-way ANOVA was conducted comparing the adult community and student samples on all independent, dependent, and moderating variables. The results indicated that the student sample scored significantly higher on neuroticism ($F = 7.46, p = .01$) and GAD ($F = 4.78, p = .03$). The student sample also scored significantly higher on depression ($F = 5.13, p = .03$), but only after the square root transformation was performed. The difference in the comparisons of the samples on depression before and after the square root transformation is likely due to the change in interval between scores after performing a transformation (Osborne, 2002) and must be interpreted with some caution. In order to control for the differences between the groups, the group variable was added to the regression analyses as a covariate. Descriptive statistics for all of the variables as well as the differences between the groups are reported in Table 1. Only the square root transformation is reported.

Table 1

Descriptive statistics of dependent and independent variable scales and tests of group differences

Variable	Undergraduates <i>M (SD)</i>	General <i>M (SD)</i>	<i>F (df)</i>	η^2
MDD	1.88 (1.26)	1.46 (1.41)	5.13 (1, 204)	0.31
GAD	4.10 (3.50)	3.05 (3.40)	4.78 (1, 204)	0.30
SWLS	4.52 (1.50)	4.41 (1.60)	0.22 (1,203)	0.07
Neuroticism	25.00 (6.89)	22.55 (5.95)	7.46 (1, 203)	0.38
SEH	37.23 (8.86)	35.59 (8.94)	1.73 (1,201)	0.18
SDH	26.51 (8.97)	27.55 (8.19)	0.74 (1,201)	0.12

* $p < .05$, ** $p < .01$

Note. η^2 = Cohen's effect size, calculated as sum of squares between / sum of squares total. MDD = major depressive disorder, GAD = generalized anxiety disorder, SWLS = satisfaction with life scale, SEH = self-enhancing humor, SDH = self-defeating humor.

Correlations. Correlations were computed in order to evaluate the relationships among the variables and ensure that they are consistent with past research. Pearson's r correlations are reported in Table 2. As expected, neuroticism, the independent variable was positively related to depression and anxiety and inversely related to satisfaction with life. Depression and anxiety were highly correlated with each other and negatively associated with life satisfaction. Self-enhancing humor was inversely correlated with neuroticism and positively correlated with life satisfaction. Self-defeating humor was positively correlated with neuroticism, depression, and anxiety. Despite their different patterns of correlations, the two humor styles were positively correlated with each other.

Regarding the covariates, positive correlations with the two categorical variables (gender and group) indicate that higher scores on the variable of interest are associated with being female and/or part of the student sample. Women tended to be higher on

neuroticism and men were more likely to engage in self-defeating humor. Neuroticism, depression, and anxiety were inversely related to age, but these associations may simply be reflections of the aforementioned group differences.

Table 2
Summary of correlations among negative personality domains, humor styles, and covariates

(N=206)	1	2	3	4	5	6	7	8	9
1. MDD69**	-.33**	.58**	-.09	.26**	-.01	-.20**	.16*
2. GAD	-.23**	.60**	-.05	.25**	.13	-.19**	.15*
3. SWLS	-.29**	.20**	-.06	.04	-.09	.03
4. Neuroticism	-.24**	.25**	.19**	-.28**	.19**
5. SEH20**	-.08	-.12	.09
6. SDH	-.26**	-.08	-.06
7. Sex	-.11	.06
8. Age	-.74**
9. Group

Note. * $p < .05$, ** $p < .01$

Regression Analyses

Three hierarchical regression models were analyzed, one for each of the three dependent variables, to examine the moderating influence of the self-directed humor styles on the relationships between neuroticism and the outcome variables (i.e., depression, anxiety, and life satisfaction). The hierarchical regressions each consisted of four steps: the covariates of gender, age, and group (Step 1), the main effects of neuroticism, self-enhancing humor, and self-defeating humor (Step 2), the three two-way interaction terms (Step 3), and the three-way interaction term (Step 4). Significant three-way interaction terms were then further probed through PROCESS (Hayes, 2012) using model 3 (Figure 3).

Model 3

Conceptual Diagram

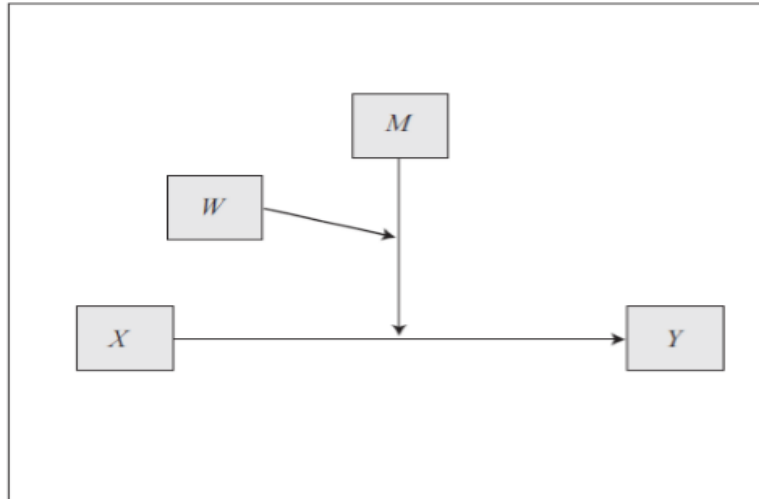


Figure 3. Hayes' (2012) conceptual diagram of two moderating effects

A number of general patterns are worth noting. The covariates alone (step 1) were significant in predicting depression and anxiety but not life satisfaction. The introduction of the main effect variables (Step 2) introduced significant change across all three regressions (Average $\Delta R^2 = .27$). However, the regression analyses with depression and anxiety as the dependent variables displayed larger increases in predictive power with the introduction of the main effect variables (MDD $\Delta R^2 = .34$; GAD $\Delta R^2 = .31$), compared with the analysis predicting life satisfaction ($\Delta R^2 = .13$). Steps 3 and 4 introduced little to no addition in ΔR^2 when depression and anxiety were the dependent variables. When life satisfaction was the dependent variable, Step 3 introduced a .07 increase in R^2 from the previous model. Table 4 displays the ΔR^2 statistics, standardized regression coefficients, and total R^2 for the three regression analyses.

Depression. Neuroticism was the only significant predictor, had a positive regression weight, and remained significant through the first three steps of the regression analysis. None of the two-way or three-way interaction terms were significant, indicating that the relationship between neuroticism and depression was not moderated by self-enhancing or self-defeating humor.

Anxiety. Neuroticism was the only significant predictor in the first three steps of the analysis and had a positive regression weight. In the fourth step, neuroticism, SEH, the two-way interaction between SEH and neuroticism, and the three-way interaction were significant predictors of anxiety. The three-way interaction was explored further via PROCESS using model 3 (Figure 4). Overall, the self-defeaters group (1 *SD* above the mean on self-defeating humor, 1 *SD* below the mean on self-enhancing humor) reported more anxiety than the self-enhancers group (1 *SD* above the mean on self-enhancing humor, 1 *SD* below the mean on self-defeating humor), but the impact of neuroticism on anxiety did not differ between the self-enhancers and self-defeaters. For both groups, the impact of neuroticism on anxiety was weaker than it was for the humor of all kinds (1 *SD* above the mean on both humor styles) and the no humor (1 *SD* below the mean on both humor styles) groups. The impact of neuroticism on anxiety was strongest for the humor of all kinds group. When members of this humor of all kinds group were low on neuroticism, they did not differ from self-enhancers and self-defeaters with low neuroticism. However, when high on neuroticism, members of the humor of all kinds group had significantly more anxiety than the highly neurotic members of the other groups.

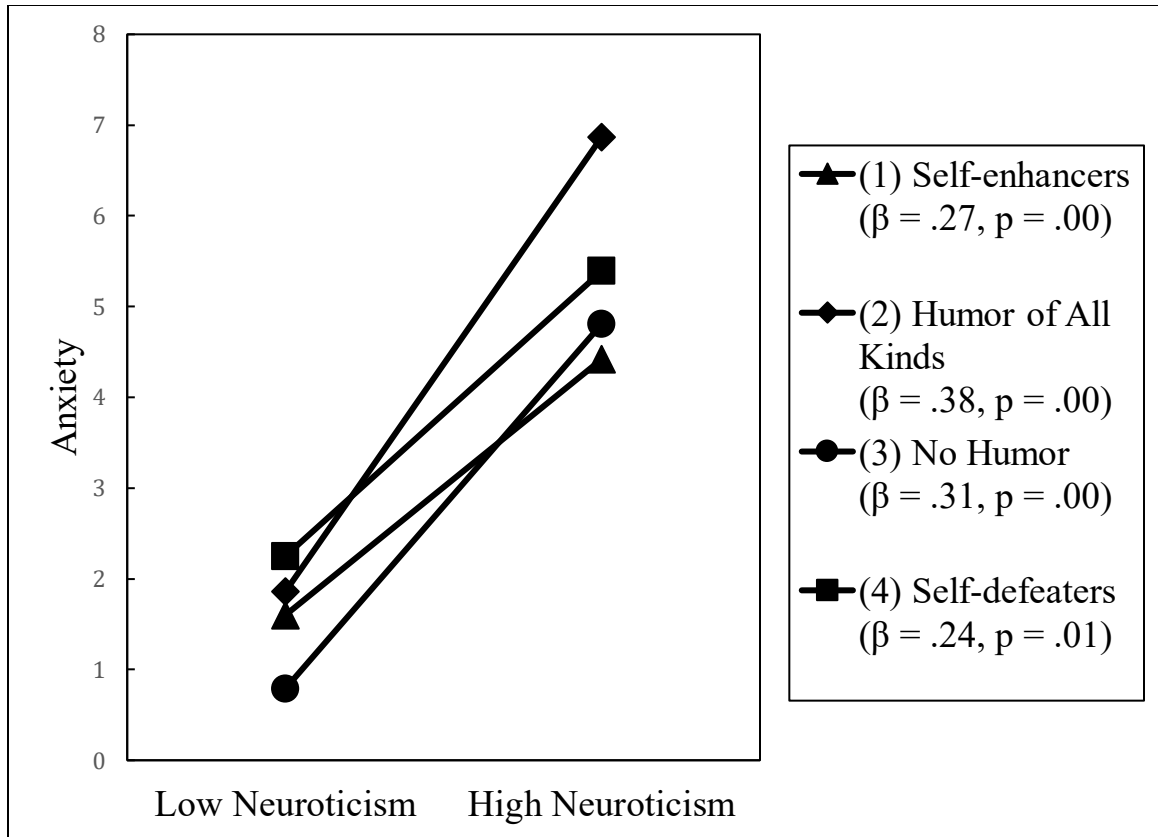


Figure 4. The three-way interaction of neuroticism, self-enhancing humor, and self-defeating humor in predicting anxiety.

Life Satisfaction. Neuroticism was the only significant predictor, had a positive regression weight, and remained significant across the first three steps. The two-way interaction between self-enhancing humor and neuroticism was significant, indicating that heightened use of self-enhancing humor mitigated the impact of neuroticism on life satisfaction. People who were low on neuroticism (1 *SD* below the mean) and engaged in high levels of self-enhancing humor (1 *SD* above the mean) reported slightly less life satisfaction than those who were low on neuroticism and engaged in low levels of self-enhancing humor (1 *SD* below the mean). In contrast, among people who were high on neuroticism (1 *SD* above the mean), those who engaged in high levels of self-enhancing

humor had significantly higher life satisfaction ratings than those who used low levels of self-enhancing humor. Exploring this two-way interaction in PROCESS (Figure 5) revealed that, in people who utilized high levels of self-enhancing humor, there was no significant association between their neurotic tendencies and their level of life satisfaction (Table 3). This suggests that heightened use of self-enhancing humor protected highly neurotic people from experiencing a decline in their life satisfaction, such that they were no more likely to report lower life satisfaction than those who were low on neuroticism.

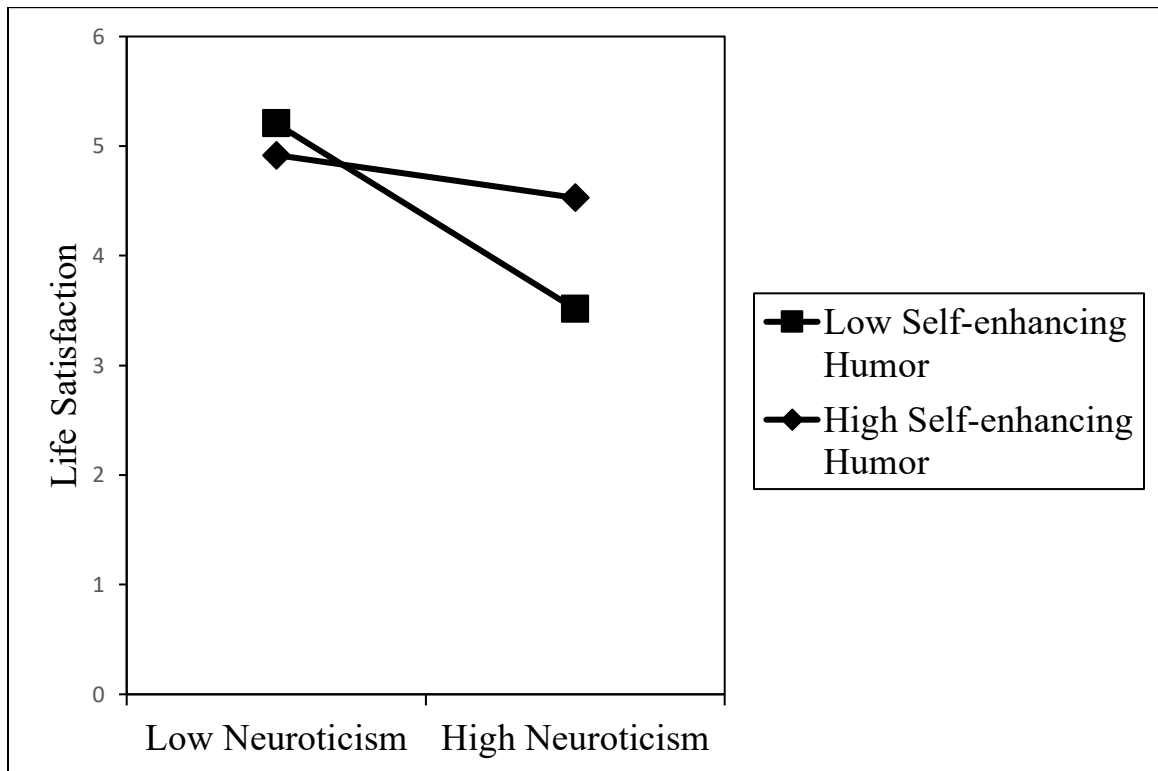


Figure 5. The two-way interaction of neuroticism and self-enhancing humor in predicting life satisfaction.

Table 3
Conditional effects of neuroticism on life satisfaction at different levels of self-enhancing humor.

Level of SEH	β	p
-1 <i>SD</i>	-.13	.00
<i>M</i>	-.08	.00
1 <i>SD</i>	-.03	.16

Note. SEH = self-enhancing humor.

Table 4
Regressions of humor styles with neuroticism, covariates, and the outcome variables

Predictor	Outcome Variable					
	Depression		Anxiety		Satisfaction with Life	
	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	.05*		.05*		.01	
Sex		-.04		.12		.03
Age		-.19		-.15		-.14
Group		.03		.04		-.07
Step 2	.34**		.33**		.13**	
Neuroticism		.59**		.57**		-.34**
SEH		.02		.07		.11
SDH		.08		.12		.00
Step 3	.01		.01		.07**	
SEH x SDH		.26		.28		.29
SEH x Neuroticism		-.31		-.24		1.13**
Neuroticism x SDH		.49		.40		-.37
Step 4	.00		.01*		.00	
SEH x SDH x Neuroticism		-.18		2.78*		.11
Total R ²	.40		.40		.21	
<i>n</i>		203		203		203

Note. * $p < .05$, ** $p < .01$

Discussion

Theory and research have illustrated how self-enhancing humor can serve as a powerful defense mechanism or coping strategy that enables individuals to overcome the negative emotion elicited by aversive, external events and situations. This study sought to expand this area of research in considering the role that humor might play in mitigating or compounding the impact of neuroticism on the development of depression, anxiety, and low life satisfaction. We theorized that neuroticism's causal influence on the development of depression, anxiety, and low life satisfaction stems not only from the neurotic individual's heightened experience of negative emotion, but also from the neurotic individual's tendency to use maladaptive rather than adaptive coping skills. We therefore anticipated that the absence or presence of self-enhancing humor, an adaptive coping skill, and self-defeating humor, a maladaptive coping skill, would influence the impact of neuroticism on depression, anxiety, and life satisfaction.

Our findings indicated that self-defeating humor was significantly related to depression and anxiety but not life satisfaction, whereas self-enhancing humor was significantly related to life satisfaction but not depression and anxiety. This pattern of correlations was unexpected, as previous research studies have generally indicated that the two self-directed humor styles are significantly related to the three outcome variables (Martin et al., 2003; Ruch & Heintz, 2013). However, the disappearance of the significant associations between the self-directed humor styles and the outcome variables after controlling for covariates was consistent with previous research, which has demonstrated low incremental validity of the humor styles in predicting outcomes, such as depression and life satisfaction, after controlling for personality traits (Ruch and Heintz, 2013).

Our findings also indicated that self-enhancing and self-defeating humor were positively correlated ($r = .20$). This result is in line with previous research studies, which reported small, positive correlations ranging from .04 (Martin et al., 2003) to .22 (Jovanovic, 2011). The positive association between self-enhancing and self-defeating humor likely reflects their common status as aspects of the broader construct of overall humor. Further research exploring the relationship between self-enhancing and self-defeating humor may help deepen our understanding of these two self-directed styles of humor and the distinctions between them.

Our regression analyses indicated that neuroticism was a significant predictor of depression, anxiety, and low life satisfaction, after controlling for age, sex, group, and the two self-directed humor styles. These results were consistent with prior research demonstrating that neuroticism is associated with and significantly predicts depression and anxiety (Clark & Watson 1991; Clark, Watson, & Mineka, 1994; Kotov, Gamez, Schmidt, & Watson, 2010; Klein, Kotov, & Bufferd, 2011; American Psychiatric Association, 2013), as well as life satisfaction (Steel, Schmidt, and Shultz, 2008; Tyssen et al., 2009; Lucas & Diener, 2015).

Previous research on self-enhancing humor as an independent predictor of depression and anxiety has been inconsistent. Some studies have found evidence that coping/self-enhancing humor significantly predicts depression (Nezu et al., 1988; Olson et al., 2005). We did not find self-enhancing humor to be an independent predictor of depression, anxiety, or life satisfaction after controlling for age, sex, group, self-defeating humor, and neuroticism. Our findings are consistent with Martin and Lefcourt's (1983) results, which indicated that coping humor did not significantly predict depression after

controlling for negative life events, as well as Nezu et al.'s (1988) finding that coping humor did not significantly predict anxiety after controlling for stress.

The results of our regression analyses also indicated that self-enhancing humor mitigated the impact of neuroticism on life satisfaction. We found that, among highly neurotic people, those who engage in high levels of self-enhancing humor maintain higher life satisfaction ratings than those who use less self-enhancing humor. In contrast, self-defeating humor did not alter the effect of neuroticism, nor self-enhancing humor's impact on neuroticism. These findings partially supported Hypothesis 1, but not Hypothesis 2. Self-enhancing humor's mitigating effect in this study resembles the buffering effect supported by previous moderation studies who found that coping or self-enhancing humor buffers against the negative effects of negative life events (Martin & Lefcourt, 1983), stress (Nezu et al., 1988), and rumination (Olson et al., 2005) on depression. However, this study differs from those previous studies in that it found self-enhancing humor to be an independent moderator of the effect of neuroticism on life satisfaction, but not the effect of neuroticism on depression.

Regarding neuroticism's impact on anxiety, our findings indicated that neuroticism's impact depended upon the individual's use of both self-enhancing and self-defeating humor, but not in the ways that we predicted in Hypotheses 3-5. The impact of neuroticism on anxiety did not differ between the self-defeaters and self-enhancers. In contrast, we found that the impact of neuroticism on anxiety was compounded for the humor of all kinds group. This finding has no parallel in previous studies, as no study to date has tested interactions among multiple humor dimensions. It suggests that using

humor in moderation may be the most important factor in reducing the impact of neuroticism on anxiety.

The question that emerges from these findings is why the patterns of interactions differed depending on the outcome variable. Self-enhancing humor mitigated the impact of neuroticism on life satisfaction, but not depression and anxiety. One explanation may be that, despite being both a *cognitive* and an *affective* process, self-enhancing humor does not alter the neurotic individual's experience of negative *affect* enough to mitigate their likelihood of developing a mood disorder, such as depression or anxiety. However, self-enhancing humor's impact on the way in which neurotic individuals *cognitively* process and remember their negative emotional experiences appears to limit the influence of such experiences on their *cognitive* evaluations of life satisfaction.

The use of both self-enhancing humor and self-defeating humor compounded neuroticism's impact on anxiety, but not depression and life satisfaction. A central feature of anxiety is avoidance. While self-enhancing humor may be adaptive, the use of humor can serve as a defense mechanism that generally does not directly address or resolve the problem in the individual's environment. Consequently, overreliance on humor in responding to aversive stimuli may serve as a means of avoidance for highly neurotic people and result in increased levels of anxiety.

The findings of our regression analyses must be interpreted with caution. The generalizability of the study is limited by the sample's composition. Our sample included more women than men (62.6% of the general population sample and 68.2% of the undergraduate sample were women) and a majority of white individuals (60.2% White/Non-Hispanic). Future research should seek more robust and diverse samples.

Future research studies should also consider the role of external life stressors in exploring the interactions between personality, humor, and life outcomes. Incorporating variables that reflect external life stressors within such a model will likely provide a more complete picture of the interactions between these variables. Additionally, future studies should analyze the other forms of humor and include a measure of overall humor use. This will enhance our understanding of the various forms of humor and evaluate the hypothesis that overreliance on humor in responding to aversive stimuli can compound the impact of neuroticism.

Lastly, experimental and longitudinal studies should be conducted to further explore the impact of humor use on neurotic individuals. Lefcourt and Martin's (1986) study, which showed college students a gory and painful silent film and instructed them to create either a humorous narrative, non-humorous narrative, or no narrative, is an experimental design that can be easily adapted to address this question. Another approach is to conduct a longitudinal study examining whether humor training programs can affect the impact of neuroticism on future outcomes, such as psychopathology and life satisfaction.

This study demonstrates that humor, in certain instances, alters the impact of neuroticism. Self-enhancing humor mitigated the impact of neuroticism on life satisfaction, regardless of the individual's use of self-defeating humor. It also mitigated neuroticism's impact on anxiety, but only for individuals who eschew self-defeating humor. Overall, we did not find self-defeating humor to compound the impact of neuroticism on depression, anxiety, or life satisfaction. However, we did find that the tendency to use both self-enhancing humor and self-defeating humor compounds the

impact of neuroticism on anxiety. This last finding suggests that, in addition to considering the types of humor people engage in, it is important to consider the extent to which people rely on humor in responding to aversive situations. Overuse of humor may become a means of avoiding stressors, making highly neurotic people more susceptible to anxiety.

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