NEUROTICISM, DAILY HASSLES, AND DEPRESSIVE SYMPTOMS:

AN EXAMINATION OF MODERATING

AND MEDIATING EFFECTS

By

JAMES HUTCHINSON

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Chair

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Abstract

by James Hutchinson, M.S.
Washington State University
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Chair: Paula G. Williams

This study examined potential moderation and mediation in the relationships between the personality trait neuroticism (N), as measured by the NEO-FFI, daily hassles (DH) as measured by the Inventory of College Students' Recent Life Experiences, and depressive symptoms (DS) as measured by the Beck Depression Inventory - II. 77 college undergraduates at Washington State University completed self-report questionnaires at 3 time periods over the course of the academic year. The primary analysis utilized multiple regression to examine whether N moderates the relationship between DH and DS, both concurrently and prospectively. Consistent with predictions, both sets of analyses found high-N individuals more likely than low-N individuals to develop DS when exposed to a wide range of DH. The second analysis used a 4-step regression procedure to probe whether DH concurrently and prospectively mediate the relationship between N and DS. As was hypothesized, in both instances DH were found to partially mediate this relationship. These results suggest that individuals possessing high levels of N have a significantly elevated risk of developing DS when exposed to DH, possibly through a heightened sensitivity to DH as well as through and a tendency to select themselves into more hassle-filled environments. Potential pathways for these effects are discussed, as are clinical implications.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER ONE

INTRODUCTION

Personality, Stress, and Depression

It has long been postulated that certain personality traits can increase or decrease the risk of depressive symptom (DS) development by affecting the manner in which individuals react to or cope with stress. This view holds that individual differences in cognitive, affective, or physiological response to events in the surrounding environment can predispose some individuals to experience psychological distress. In support of this belief, personality traits have been shown to be important factors in the development of psychiatric illness (Kendler, Kessler, Neale, Heath, & Eaves, 1993).

The most popular framework used to explain the relationship between personality and psychopathology is the epidemiological model. With this approach, there are proposed to be two groups of factors that play a role in the development of mental illness: a) vulnerability factors, and b) provoking factors. Vulnerability factors are relatively stable attributes of certain individuals that make them more susceptible to the development of mental illness. Personality traits are hypothesized to fall within the category of vulnerability factors. Provoking factors are more transient components of the environment such as stressful events that can elicit the body's adaptive stress response and challenge coping resources. In the epidemiological model, the presence of both vulnerability factors and provoking factors is necessary for depressive symptoms to develop, as the two types of factors interact with one another to produce distress. Thus, being at risk for the development of DS requires the existence of a sufficient vulnerability and the presence of the appropriate provoking stimuli (Ormel, Stewart, & Sanderman, 1989).

Neuroticism

Neuroticism (N) is an empirically derived, higher-order personality dimension that was first isolated via factor analysis by Hans Eysenck (Eysenck & Eysenck, 1991). N is one of five factors that represent the most general tier in the hierarchy of personality dimensions. N and the traits Extraversion, Agreeableness, Openness to Experience, and Conscientiousness form the basis of the five-factor model of personality (FFM). The FFM serves as a conceptual framework for organizing and comparing personality traits. This five-factor structure has been isolated numerous times in a wide variety of populations of different ages and cultures, and has consistently emerged in factor analyses of personality ratings and surveys (Costa & McCrae, 1992; McCrae et al., 2004).

Much of the research has presented N as being both heritable (Kendler et al., 2003a) and relatively stable over time (McCrae & Costa, 1992). The test-retest reliability over a 1-month interval has been measured at 0.86 (Eysenck & Eysenck, 1991). The most common instruments used to measure N are the Revised Neuroticism, Extraversion, Openness Personality Inventory (NEO-PI-R; Costa & McCrae, 1992), and the Eysenck Personality Inventory (EPQ; Eysenck & Eysenck, 1991). In the manual for the (NEO-PI-R), Costa & McCrae (1992) define N as "an individual's tendency to experience psychological distress." N has also been conceptualized as a sensitivity to aversive stimuli that serves to increase an individual's propensity for experiencing a range of negative moods and emotions (Watson & Clark, 1984). According to Costa & McCrae (1992), people scoring high in N have a tendency to worry and experience negative affects such as fear, sadness, and guilt, to cope poorly with stress, to think irrationally, and to display poor impulse control. A number of other factors have been associated with N, including negative

cognitions, negativistic appraisal of self, pessimism, low self-esteem, and feelings of life dissatisfaction (Watson & Clark, 1984).

Neuroticism and Depressive Symptoms

Consistent with the belief that personality style can influence the risk of developing psychopathology in response to stress, numerous studies have shown N to be related in a number of ways with the different manifestations of depressive illness, with more supporting evidence of this effect than for any other personality factor (for an overview, see Enns & Cox, 1997).

Akiskal, Hirschfeld, & Yerevanian (1983) reviewed the available literature on the link between personality and affective disorders and put forth several models that potentially explain the relationship between N and the development of depressive symptoms.

Their first model derives from the "continuity hypothesis," in which personality characteristics are seen as an attenuated expression of the disorder itself. In this case, N and depression are viewed as being different levels of the same fluctuating variable, with DS only being expressed at the more extreme end of the continuum. Little evidence has been found to support this view.

The second model presented by Akiskal et al. (1983) is in line with the "pathoplasty hypothesis" wherein personality has the capability of affecting the expression of a disorder. From this perspective, N may or may not be a significant factor in the etiology of depressive illness, but it has its greatest influence in its ability to influence the course and severity of the illness once it occurs. High N levels have been associated with depression chronicity and increased time to remission, and are predictive of poor prognosis (Andrew, Hawton, Fagg, & Westbrook, 1993; Hirschfeld, Klerman, Andreasen, Clayton, & Keller, 1986; and Paykel, 1974). O'Leary & Costello (2001) conducted a study using participants fitting ICD-10 criteria for depressive

episode or recurrent depression. It was found that high N scores correlated significantly with longer times to remission onset. Scott, Mark, Williams, Brittlebank, & Ferrier (1995) investigated the same question using participants who had previously received a DSM-III-R diagnosis of Major Depression (MD) and had completed an antidepressant treatment program. N scores were obtained after completion of the treatment, and significant correlations were found between those values and the length of index of depressive episode.

The third model presented by the authors is consistent with the "complication hypothesis." It posits that higher N scores found in individuals experiencing a depression are fully or partly symptomatic of the depression itself, i.e., that the depressed mood actually elevates N levels as part of a unidirectional or bi-directional relationship. One explanation proposed for why this may occur is that the feelings of insecurity, demoralization, pessimism, and failure that often accompany a depressive episode can increase the level of neurotic qualities in the patient (Clark, Watson, & Mineka, 1994). Debate also exists over whether these elevated N levels in depressed patients return to normal levels after remission. This idea of N being influenced by mood state is a contentious one, as N is widely perceived to be a stable personality trait. If N levels were to fluctuate in response to depressive symptoms, this would make N at least in part a state variable.

Some investigations have been able to provide information on the degree to which N levels are influenced by a depressed state. Bagby, Joffe, Parker, & Kelmba (1995), McCullough et al. (1988), McCullough et al. (1990), Kendler, Neale, Kessler, Heath, & Eaves (1993), Meyer & Shack (1989), Farmer et al. (2002), Hirschfeld, Klerman, Clayton, & Keller (1983), Hirschfeld, Klerman, Clayton, Keller, McDonald-Scott, & Larkin (1983) and Barnett & Gotlib (1988) all found some evidence to suggest that N is less stable than was commonly assumed under most

theories of personality. However, Santor, Bagby, & Joffe (1997) conducted a study that examined the issue of the stability of N and its potential to predispose a person to depressive illness. They found that although the absolute stability of N scores is low during and after an episode of depression, the relative stability of N (i.e., the degree to which the relative differences between individuals remains constant) is high. The investigators calculated that only about 12% of the variance in N score change from depressed state to remission was accounted for by variance in BDI change scores. Santor et al. (1997) concluded that "the relationship between change in personality and change in depressive symptomatology is at best moderate in depressed men and women." (p.1359).

The fourth model given by Akiskal et al. (1983) regarding personality and affective illness fits into the epidemiological model, and is best described as a "vulnerability hypothesis." In this approach, N levels are seen to be relatively independent of depressive symptom levels, with N elevations exerting an influence on symptoms through moderation of the effect of another variable (or variables). This approach fits with the proposal that a personality trait (such as N) can predispose one towards the development of psychological symptoms and/or mental disorders.

The majority of studies looking at the relationship between N and depressive symptoms have produced the finding that patients in the midst of an episode of depression show elevated N levels. Such investigations are incapable of lending insight into the validity of the vulnerability hypothesis because they involve the assumption that N levels are not affected by mood state. For example, Petersen, Bottonari, Alpert, Fava, & Nierenberg (2001) had subjects who met DSM-III-R or DSM-IV criteria for MD complete a personality inventory prior to participating in an antidepressant clinical trial. The researchers found that both male and female participants averaged approximately 1.5 SD above the mean on their N scores. However, such cross-sectional

studies cannot indicate whether or not elevated N scores predict the prospective development of depressive symptoms, nor can they provide insight into the nature of the relationship between N and these conditions. However, they do provide clear evidence of a strong association between N and DS.

There have been a number of longitudinal studies conducted that have examined the relationship between N and development of depressive symptoms. The bulk of these investigations have demonstrated that high premorbid levels of N do predict the onset of depression, both recurrent (Boyce, Parker, Barnett, Cooney, & Smith, 1991; Duggan, Lee, & Murray, 1990; Kendler, Neale, et al., 1993; Endler & Parker, 1990; Rovner & Casten, 2001) and first incidence (Clayton, Ernst, & Angst, 1993; Tokuyama, Nakao, Seto, Watanabe, & Takeda, 2003; Kendler, Kessler, et al. 1993; Hirschfeld et al., 1989; Angst & Clayton, 1986). Using data from 2163 female twin pairs, Roberts & Kendler (1999) found that the genetic factors that contribute to N accounted for close to half of the genetic variance of Major Depression, and they concluded that N is an expression of an underlying genetic vulnerability to MD.

Thus, the overall body of evidence on N and depressive symptoms suggests two things: a) high N levels predict the onset or exacerbation of DS and, b) the depressed state itself affects N levels, if only moderately. These findings suggest a compromise between the belief that high N levels predict DS in a one-way relationship and the belief that high N levels in depressed patients are merely symptomatic of the depression itself. In support of this bi-directional model, Harkness, Bagby, Joffe, & Levitt (2002) and Santor et al. (1997) found that although N scores do increase somewhat with the onset of depressive symptoms, individuals with high N scores in the absence of DS are more likely to develop these symptoms at a later time. In sum, individuals high in N do appear to possess a vulnerability for depression or depressed mood, and individuals experiencing

symptoms of depression are likely to report slightly higher N levels than would be the case prior to the onset.

There have been several ideas and theories put forth that attempt to explain the mechanisms by which N might contribute to the etiology of DS. Martin (1985) reviewed the literature dealing with cognitive processes related to N and the link between N, cognition, and depression. It was found that high levels of N are associated with increased recall of negatively-toned information, particularly negative information related to the self. Martin hypothesizes that people high in N may attend more to negative stimuli than to positive stimuli. This could lead to increased levels of distress, which in turn could result in an increase in depressive symptoms. More recently, Osorio et al. (2003) lent support to this hypothesis through implementation of a dichotic listening task. They found that N was associated with greater attention to stressful distractors in males, suggesting an attentional bias towards stressful stimuli.

Gray (1982) proposed a biological model suggesting that N levels are related to functioning of the Behavioral Inhibition System (BIS). This conceptual nervous system is believed to have its foundation in the septo-hippocampal system, Papez's circuit, and the noradrenergic projections from the locus ceruleus and the serotoninergic projections from the raphe nuclei. The BIS is proposed to be activated in the presence of threatening or conditioned aversive stimuli, novel stimuli, and perceptual cues signaling the absence of positive reinforcement. BIS activity is proposed to result in the initiation of passive-avoidant behaviors (Caseras, A'vila, Torrubia, & Farre, 2001). The BIS is conceptualized as the biological substrate of anxiety, with individual differences in activity being related to the level of trait anxiety. The Sensitivity to Punishment Scale (SP; Torrubia, Avila, Moltó, & Caseras, 2001) has been developed to measure BIS functioning, and scores on this instrument have been found to

correlate highly with N scores as measured by the EPQ. In addition, some studies have used N itself to measure the BIS. It is proposed that high N levels, reflecting a high level of BIS activity, can lead a person to exhibit a greater degree of vigilance towards threat or punishment cues and a slowed rate of habituation towards aversive stimuli. In essence, the BIS is proposed to make people high in N pay more attention to negative information, and have the tendency to become more distressed by such information for longer periods of time than those low in N.

Clark & Watson (1984) suggest that N may be the trait underlying one of the dominant dimensions of emotional experience, Negative Affectivity (NA). NA is a specific anxiety factor of autonomic hyperarousal that exerts its effect in the domains of biophysiology, affect, cognition, and behavior. Watson & Clark (1992) point to extensive evidence supporting the existence of NA as a general dimension composed of several specific negative emotional states including fear, anger, sadness, guilt, contempt, and disgust. The authors believe that NA serves as a genetic vulnerability towards the development of both anxiety and depressive disorders, possibly through the elevation of physiological reactivity to threatening or challenging environmental cues. In an investigation of the relationship between measures of affect and the Big-Five personality traits, Watson & Clark (1992) found that negative affectivity was strongly correlated with N, and that all four of the lower order affects associated with NA (fear, guilt, sadness, and hostility) loaded strongly on N as well. The authors concluded that "individuals high in N are generally predisposed to experience higher levels of negative affectivity, so that individual differences in negative emotional experience comprise a central defining feature of this personality dimension" (p. 469).

Measuring Stressful Life Events

Stress, when measured in terms of life events, is typically divided into two categories: Major Life Events (MLE) and Daily Hassles (DH). DH are by definition less severe than MLE, but occur much more frequently. While MLE are relatively rare, they tend to be large, life-changing occurrences (e.g., divorce, death of a close family member) that require a significant period of readjustment. On the other hand, daily hassles occur for most people on a fairly regular basis and are accepted as being a part of day-to-day life (e.g., interpersonal conflicts, financial difficulties). Kanner, Coyne, Schaefer, & Lazarus (1981) describe hassles as "the irritating, frustrating, distressing demands that to some degree characterize everyday transactions with the environment" (p.3). Measures of DH typically allow for the assessment of both objective experience (through the reporting of the frequency of each hassle) as well as subjective experience (through the reporting of the intensity of each hassle on a numerical scale). However, most measures of major life events only allow for the reporting of an objective measure of stressful events. This difference is an important one, because it means that MLE measures are incapable of accounting for the fact that a single event may be appraised as being significantly more or less threatening by separate individuals. Most studies have looked at the acute effect of MLE or DH by retrospectively estimating their aggregate sum over a period of typically a year or less, and evaluating the current and sometimes future level of depressive symptoms. The retrospective interval of evaluation is typically shorter for DH measures than for MLE measures.

Stressful Life Events and Depressive Symptoms

Thus far, the bulk of the research on psychological outcomes of stress has focused on major life events, and the results have shown fairly conclusively that the risk of depression is significantly increased following the occurrence of a MLE (for overviews, see Paykel, 1994;

Kessler, 1997). However, in recent years some researchers have drawn the focus away from major, infrequent events to the ongoing stresses and strains of daily living, and their potential impact on health and adjustment. Part of the reason for this shift is due to findings that daily hassles mediate the effect of MLE on affective state (Eckenrode, 1984), psychological symptoms (Wagner, Compas, & Howell, 1988; Kanner et al., 1981), and somatic symptoms (Delongis, Coyne, Dakof, Folkman, & Lazarus, 1982). Wagner, Compas, & Howell (1988) found that no path exists between MLE and psychological symptoms that cannot be explained by an increase in hassles. The findings of these researchers suggest MLE exert at least a part of their effect on mood and symptoms via the creation of daily hassles. Using a large sample comprised of parents who had experienced a MLE within the last 2 years, Pillow, Zautra, & Sandler (1996) tested several mediation models to determine which could best explain the relationship between MLE, DH, and psychological distress. The authors found that the most fitting one was a partially mediating effects model. Major life events were found to exert some direct effect on distress, but the majority of their impact was mediated through the production of DH. Delongis et al. (1982) suggest that daily hassles are more closely tied to mental and physical health outcomes than MLE because the former are proximal measures of stress, while the latter are distal measures of stress. Proximal events involve "here-and-now" transactions between the individual and their environment that have personal meaning and are appraised as being threatening. Distal events have no implication of any intrinsic functional significance for the individual experiencing them. MLE can often be categorized as being distal, whereas DH are almost always proximal because they serve as a measure of subjective distress. In addition, MLE can often result in the production of hassles related to the process of adjustment.

A substantial number of studies have found DH frequency and severity to be associated with depression or the depressed state. These results have been found in adults (Flannery, 1986), children (Kanner, Feldman, Weinberger, & Ford, 1987) adolescents (Sim, 2000; Klein, Lewinsohn, & Seeley, 1997; Dumont & Provost, 1999), college students (Blankstein & Flett, 1992; Lovejoy & Steuerwald, 1997), and the elderly (Musil, Haug, & Warner, 1998), as well as with several under-represented populations (Abouguendia & Noels, 2001; Jung & Khalsa, 1989). D'Angelo & Wierzbicki (2003) found college students' scores on the Inventory of College Students' Recent Life Experiences (ICSRLE; Kohn, Lafreniere, & Gurevich, 1990) General Social Mistreatment and Developmental Challenge subscales to be associated with higher scores on the Beck Depression Inventory - II (BDI-II; Beck, Steer, & Brown, 1996).

The preceding studies provide evidence to suggest that daily hassles and depressive symptoms are associated, but they do not answer the question of whether DH lead to the development of DS over time. It is highly possible that at least some of the correlation between DH and DS results from altered behaviors and cognitions related to depressed mood that affect the likelihood of experiencing a DH. A number of researchers have implemented longitudinal approaches to look specifically at the relationship between daily hassles and change in depressive symptoms and other psychological and health-related factors. They have shown that DH frequency and severity prospectively predict increases in psychological symptoms (Kanner et al., 1981; Monroe, 1983; and Lu, 1991), negative well-being (Zika & Chamberlain, 1987), internalizing problems in young adolescents (Compas, Howell, Phares, Williams, & Giunta, 1989), negative affect (Rowlison & Felner, 1988; Wolf, Elston, & Kissling, 1989), and somatic symptoms (DeLongis et al., 1982; Jandorf, Deblinger, Neale, & Stone, 1987). DH have also been shown to predict the onset of depressive symptoms (Lu, 1994; McIntosh, Harlow, & Martin,

1995; Dixon & Ahrens, 1992), even after the effect of prior DS have been partialled out (Cummins, 1990; Cheng & Lam, 1997).

What is less clear is what factors make a person vulnerable to developing depression in the face of hassles. Despite the strong link that has been found been daily hassles and depression, the majority of individuals exposed to a high frequency and intensity of DH do not experience a depressive episode. Therefore, other genetic or environmental factors must play a role.

Neuroticism, Stressful Life Events, and Depressive Symptoms

Kendler & Eaves (1986) proposed two main models by which environmental factors such as daily hassles and personality traits such as N might relate in affecting depressive symptoms.

The "additive" model posits that DH and N may work independently of each other to produce effects on DS. With this model, individuals high in N or low in N would have the same increase in risk of development of DS under exposure to the same frequency and intensity of DH. That is, N and daily hassles may both predict depression in their own right, but the two predictors do not interact to exert an effect. In a 6-year, large sample longitudinal study, Ormel & Wohlfarth (1991) found that N had a strong direct effect on psychological distress levels after controlling for stressful events. This effect may be due to a general distress proneness that occurs in high-N individuals across time, regardless of environmental events (Watson & Clark, 1984).

The other model proposed by Kendler & Eaves (1986) is the "genetic control of sensitivity to the environment" model. This model holds that those high in N are more susceptible to developing depressive symptoms under exposure to stressors than are those low in N. This model suggests that N could act as a moderator that influences an individual's reactivity and negative affective response to daily hassles, leading to increased psychological distress and a greater likelihood of DS onset (Figure 1). Although no studies could be found that focus

specifically on the interplay between N and DH in the development of depression or depressive symptoms, there are some examples in the literature that look at N, DS, and various types of life events. As part of a large study involving female twins, Kendler et al. (1995) attempted to assess how "genetic liability" for depression (GL, defined as having a positive family history for major depression) and major life events interact in the etiology of MD. GL has been shown to be highly correlated to N. It was shown that these "genetically predisposed individuals" suffered a 2.4 times greater risk of onset of MD with exposure to a severe MLE. Analysis with linear regression did produce a significant positive interaction term. Using a prospective case-control design involving elderly subjects, Ormel et al. (2001) found that moderately severe MLE triggered episodes of MD only in the presence of high N levels and/or a long-term difficulty. In another prospective study, Ormel et al. (1989) found that N moderated the impact of life situation change on depressive mood. These findings lends some support to the idea that N serves as psychobiological vulnerability factor for the development of DS under exposure to stressors. Although daily hassles and major life events are qualitatively different phenomena, these results do suggest that N could play a similar role in the relationship between DH and DS.

An alternative to the models described above has N increasing an individual's likelihood of being exposed to daily hassles, in effect making DH a mediator between N and depressive symptoms (Figure 2). Kendler, Gardner, & Prescott, (2003) discovered that N "strongly predicted risk for marital problems, job loss, financial difficulties or problems getting along with people in their social network" (p.1199). There are several possible mechanisms through which high N scores might predict high DH scores. First, behaviors or coping strategies associated with N may lead an individual to associate with or create environments that put them at higher risk for experiencing hassles. Second, people high in N may be more likely to report an event as stressful

due to their heightened sensitivity to negative stimuli, or to some other personality-related bias. Third, another variable associated with mental state may influence both the reporting of N symptoms and the reporting of daily hassles. Lastly, there may be a reciprocal relationship between N and DH in which N increases DH exposure and DH increase N (Fergusson & Horwood, 1987).

Another model that could describe this relationship combines the "N moderation" and "DH mediation" models. That is, the model has N moderating the relationship between daily hassles and depressive symptoms, and DH mediating the relationship between N and DS. Evidence exists that support to this conceptualization. Kendler, Karkowski, & Prescott (1999) estimated that about one-third of the relationship between stress and depression is non-causal and results from self-selection into high-risk environments. The remaining two-thirds of the relationship could not be explained by self-selection processes. In a naturalistic study in which subjects completed a daily event diary over a 6-week period, Bolger & Schilling (1991) found that high-N individuals were exposed to slightly more hassles than those with low N levels. These results do suggest a mediating role for DH. However Bolger & Schilling (1991) also found that high-N subjects experienced significantly more event-related distress than did low-N subjects. This result suggests a moderating role for N. Overall, these researchers estimate that stressor selection processes are no more than half as important as reactivity processes in the relationship between N and distress. Bolger & Zuckerman (1995) tested this "differential exposure-reactivity" model, where N is seen to influence distress levels by increasing both exposure to, and reactivity towards, stressors. They found support for this model and estimate that for the depression-dejection portion of distress resulting from interpersonal conflict (a type of daily hassle), the differential reactivity effect was almost five times greater than the

differential exposure effect. Thus, it appears that reactivity processes play a much greater role than exposure processes in the relationship between N and distress.

Clinically Diagnosed Depression vs. Depressive Symptoms

The question remains whether studies employing self-report measures of sub-clinical depressive symptoms have relevant implications for clinically-diagnosed depression cases. More specifically, it should be asked: "Do subthreshold DS exist on a continuum with major depression, and do individuals experiencing either of these two conditions resemble each other on a significant number of dimensions? Are there qualitative differences between depressed mood and diagnosed clinical depression (the "categorical perspective"), or do these two phenomena differ only in degree and thus share important clinical correlates (the "continuity perspective")?" Although there has been little research conducted in this area, Lewinsohn, Solomon, Seeley, & Zeiss (2000) and Lewinsohn, Klein, Durbin, Seeley, & Rohde (2003) did find evidence to support the continuity perspective. Solomon, Haaga, & Arnow (2001) reviewed the available literature focusing on standardized clinical interviews and concluded that the "results of studies comparing the clinical correlates of sub threshold depression with diagnosable depression rather consistently support continuity" (p.504). Although the research is somewhat sparse at this time, what is available generally supports the idea of a continuum between depressive symptoms and diagnosed depression.

Purpose of Study

The purpose of this study is to examine the relationship between N, daily hassles, and depressive symptoms. Mood disturbances tend to be multifactorial, and thus proposed environmental risk factors (such as DH) and proposed genetic risk factors (such as N) may interact to produce symptoms in addition to any main effects these variables exert. A

longitudinal design was chosen in order to allow for the examination of any moderation or mediation effects that are exerted over time.

The first aim of this investigation is to determine if N serves to moderate the relationship between daily hassles and depressive symptoms, by determining if DH exert a varying degree of influence on DS at varying levels of N. Of additional interest is learning which (if any) specific categories of DH interact with N to exert an effect on DS. This part of the study will serve to test the vulnerability hypothesis and the genetic control of sensitivity to the environment hypothesis in regards to N, DH, and DS.

If it is shown that N predicts an increase in depressive symptoms, an additional procedure will be carried out to determine if daily hassles mediate this relationship. Evidence of such mediation would suggest that N influences selection into stressful environments or influences the perception of the stressfulness of a particular event.

In sum, this investigation seeks to examine two of the potential means by which N could exert an impact on depressive symptoms: a) by adversely affecting the way in which individuals react to daily hassles, and b) by directly increasing the number of hassles that individuals experience (or perceive experiencing).

It is hypothesized that N, as measured by the NEO-FFI Personality Inventory (NEO-FFI; Costa & McCrae, 1992), will be found to concurrently and prospectively moderate the relationship between daily hassles, as measured by the ICSRLE (Kohn et al., 1990), and depressive symptoms, as measured by the BDI – II (Beck et al., 1996). This hypothesis was made because of the evidence suggesting that N increases orientation towards stressors and amplifies reactivity and negative affective response. It is also hypothesized that daily hassles will be found to concurrently and prospectively mediate the relationship between N and depressive

symptoms. This hypothesis was made in response to the finding that individuals possessing high N levels have an increased likelihood of reporting exposure to DH. Because of the research that has shown reactivity processes to be from 3 to 6 times more influential than exposure/selection processes in the relationship between N and distress, it is also hypothesized that there will only be partial mediation of the effect of N on depressive symptoms by daily hassles. If both hypotheses are supported by the results, this will be interpreted as being consistent with the differential exposure-reactivity hypothesis.

CHAPTER TWO

RESEARCH DESIGN AND METHODS

Participants

The sample included 37 male and 40 female college students who were recruited from undergraduate psychology courses to participate in a longitudinal study examining factors related to the health of college students. The mean age of the participants was 19.5 years, with the majority of the sample being Caucasian. In terms of emotional health, one participant reported an anxiety disorder, one participant reported taking medication for major depression, and two participants reported taking medication for an eating disorder.

Procedure

Participants completed three assessments (baseline, 2 months, and 6 months) during the course of the 2001-2002 academic year. During the initial assessment at the beginning of the fall semester, participants completed measures of N and DS via computer in an individual laboratory session. Following baseline, participants were contacted by telephone or email to schedule the other assessment for approximately 2 months later (late fall 2001 semester) and 6 months later (late spring 2002 semester), at which times they completed measures of DS and DH. Participants received course credit for completing the first two sessions and were paid a $20.00 gratuity for completing the final session.

Due to reasons of attrition and absenteeism during scheduled experimental sessions, there were missing data for some participants. Of the 77 participants who completed the questionnaires during the initial assessment, 67 completed these same measures during the second assessment period, and 51 during the final assessment. The main reasons for attrition included dropping the course for credit during the fall semester, leaving or transferring to another academic institution,

or the experimenter being unable to successfully contact participants during follow-up. Statistical analyses were conducted to examine whether data were missing for random or systematic reasons.

Measures

NEO-FFI Personality Inventory – Form S (NEO-FFI; Costa & McCrae, 1992). The NEO-FFI is a brief, self-report measure designed to assess each of the five major domains of personality including Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. The scale is comprised of 60 items, with five, 12-item subscales that measure each personality construct. Scores for each subscale are interpreted on a continuum, with higher scores indicating that the individual has a greater probability of exhibiting characteristics associated with that personality trait. The NEO-FFI has demonstrated good internal consistency, with alpha levels ranging between .86 (Neuroticism) and .68 (Agreeableness). Convergent correlations of the NEO-FFI scales with each of the personality domains of the NEO PI-R ranged from .56 to .62.

Beck Depression Inventory - II (BDI-II; Beck et al., 1996). The BDI-II is a self-report measure designed to assess the presence and severity of depressive symptomatology. The scale contains 21 items reflecting common symptoms associated with depression that are rated on a 4-point score ranging from 0-3. For each item, respondents are required to indicate the statement that best describes his or her feelings over the past two weeks. Summing the ratings across all items, with potential scores ranging from 0-63, derives a total BDI-II score. Higher scores reflect a greater degree of depressive symptomatology. This scale has been demonstrated to have high internal consistency in both psychiatric (alpha = .92) and nonpsychiatric (alpha = .93) populations, as well good construct and discriminant validity (Beck et al., 1996).

Inventory of College Students' Recent Life Experiences (Kohn et al., 1990). The ICSRLE is comprised of 49 items that reflect everyday stressors or hassles that are commonly experienced by college students. For each item, respondents rate the intensity of their experience with the stressor over the past month on a 4-point scale, with options ranging from 1 (not at all part of my life) to 4 (very much part of my life). Exploratory factor analysis has supported the existence of seven subfactors: Developmental Challenge, Time Pressure, Academic Alienation, Romantic Problems, Assorted Annoyances, General Social Mistreatment, and Friendship Problems. The ICSRLE has demonstrated high reliability in two college samples (alpha = .88 and .89).

Analytic Strategy

Zero-order relations between measures of N, DH, and DS will be assessed by computing Pearson product moment correlation coefficients. Multiple regression will be performed next to examine for any moderational or mediational relationships.

Both the moderation and mediation analyses will be divided into concurrent and prospective sections. The prospective analysis will test for rank-order change in DS by including prior DS levels in the first step of the regression equations.

To examine whether N moderates the relationship between DH and DS, a regression model will be analyzed with N, DH, and the N x DH interaction term as predictors of DS levels:

$$DS = b_1DH + b_2N + b_3DH(N) + b_0$$

If there is moderation, the interaction between DH and N should be a significant predictor of self-reported symptoms of depression when controlling for the main effects of DH and of N on level of DS. Baseline levels of DS will be controlled for in the prospective portion of the analysis by entering prior DS as the first predictor in the equation.

A significant interaction will be probed by recasting the regression equation to express the regression of DS on DH at levels of N:

$$DS = (b_1 + b_3N)DH + (b_2N + b_0)$$

The slope of the interaction will be conditioned on high and low values of N (i.e., 1 standard deviation above and below the sample mean) as recommended by Aiken & West (1991).

If the zero-order correlations indicate a significant relationship between N and DH, and if N and DH are both shown to predict either concurrent or prospective change in DS, it will be further examined whether DH mediate the relationship between N and DS. If, when N and DH are both included in the regression equation, the effect of N on DS drops to a lower level of significance while the effect of DH on DS remains relatively unchanged, it will be taken as evidence of a mediator role for DH in the relationship between N and DS (Baron & Kenny, 1986). If the effect of N on DS drops to 0, this will be taken as evidence of full mediation. If the effect drops to a lower level of significance, this will be taken as evidence of partial mediation. In either case, determination of whether the indirect effect of N on DS via DH is significantly different from zero the Goodman (I) version of the Sobel test for mediation will be implemented (Baron & Kenny, 1986).

CHAPTER THREE

RESULTS

Descriptive and Correlational Analyses

Means, standard deviations, and zero-order correlations between N, daily hassles, and depressive symptoms are shown in Table 1. N was significantly related to total DH score (measure at Time 1 and Time 2), and to DS score (measured at Times 1, 2 and 3). DH scores were significantly related to each other. Both DH scores were significantly related to all three measurements of DS, but DH at T_2 correlated less with DS at T_3 than with DS at T_2. DS scores at all three time points were strongly related.

Regression Analyses

Simple regression models were run to examine the questions of moderation and mediation. All variables were standardized and centered to minimize mulicollinearity. With the prospective analysis, rank-order change in depressive symptoms was examined by entering prior levels of DS first into the regression equation.

It was deemed appropriate to use daily hassles measured at the same time point as the criterion depressive symptom score to test whether DH prospectively predict DS, since the ICSRLE (Kohn et al., 1990) requires subjects to report all the hassles that they have experienced during the previous 30-day period whereas the BDI-II (Beck et al., 1996) requires subjects to report symptoms experienced in the previous 2 weeks. As well, the BDI-II serves as a relatively subjective measure of current depressed state. DH_{T2} did not significantly predict DS_{T3} with DS_{T2} partialled out (ß = -.065, p=.18), perhaps because of the longer time interval between the reported occurrence of DH and the measurement of DS.

Moderation

Regression analyses were conducted to test the hypothesis that N moderates the relationship between daily hassles and depressive symptoms. To probe significant interactions, regression equations were restructured so that the slope of the predictor variable was conditioned on high and low values of N (i.e., 1 standard deviation above and below the sample mean), an approach consistent with the recommendations of Aiken & West (1991).

Concurrent Analysis

The first step was assessing whether N moderated the concurrent relationship between DH and DS. This analysis allowed for the determination of whether N influences the development of DS in response to DH at a single point in time. To examine this, a regression model was tested with N, DH_{T2}, and the N x DH_{T2} interaction term as predictors of DS_{T2} score. Initial DS levels were not partialled out in the regression equation. There was a significant N x DH_{T2} interaction, such that the relationship between DH_{T2} and DS_{T2} was significant among high-N individuals, ß = .68, $p < .0001$, but nonsignificant among low-N individuals, ß = .092, $p = .48$. These results strongly support the premise that N moderates the relationship between DH and DS.

Prospective Analyses

To examine whether N moderated the relationship between daily hassles at Time 2 (DH_{T2}) and rank-order change in depressive symptoms from Time 1 to Time 2, a regression model was tested with DS_{T1}, N, DH_{T2}, and the N x DH_{T2} interaction term as predictors of DS_{T2} score. Time 2 depressive symptoms (DS_{T2}) was chosen over DS_{T3} as the criterion variable of primary interest. This decision was made because it allowed for the use of a sample of larger size and because Time 2 coincided with the mid-term exam period, a considerably stressful time for most undergraduate students. In order to examine prospective change in depressive symptoms, initial

levels of DS were included in the regression analyses. As presented in Table 2, there was a significant N x DH_{T2} interaction, such that the relationship between DH_{T2} and DS_{T2} was significant among high-N individuals, ß = .38, $p < .0001$, but nonsignificant among low-N individuals, ß = .056, $p = .57$. Next, a similar analysis was conducted using DS_{T2}, N, DH_{T3}, and the N x DH_{T3} interaction term as predictors of DS_{T3} score, with DS_{T2} partialled out in the first step of the equation. This analysis allowed for the examination of the interaction between N and daily hassles at Time 3 on rank-order change in depressive symptoms from Time 2 to Time 3. Despite the smaller sample size that was available for this analysis, Table 3 shows that a marginally significant N x DH_{T3} interaction was found, such that the relationship between DH_{T3} and change in DS from Time 2 to Time 3 was significant among high-N individuals, ß = .37, $p < .0035$, but nonsignificant among low-N individuals, ß = .078, $p = .62$. These results are consistent with those of the concurrent analysis, and lend further support to the hypothesis that N moderates the relationship between daily hassles and depressive symptoms.

In order to examine which of the specific ICSRLE (Kohn et al., 1990) subfactors prospectively moderate the relationship between N and depressive symptoms this regression analysis was repeated seven times, each time with a different Time 2 daily hassles subfactor score substituted in place of the total hassles score. As displayed in Table 4, six of the seven DH subfactors significantly interacted with N in predicting rank-order change in DS, ßs = .22, $p = .014$, such that the relationship between the 6 subscales and DS was significant for high-N individuals, ßs = .36, $p = .0039$, but nonsignificant for low-N individuals, ßs = |-.20|, $p = .36$. The lone exception among the subfactors was 'Romantic Problems,' which did not display a significant interaction with N in predicting rank-order change in DS, ß = -.011, $p = .11$.

Thus, for all categories of DH except 'Romantic Problems,' scores were significantly predictive of rank-order change in DS in individuals high in N, but not in individuals low in N. These results suggest that in persons exposed to a variety of DH, high N levels serve as a vulnerability to the development of DS over time.

Mediation

Concurrent Analysis

To examine whether daily hassles concurrently mediate the relationship between N and depressive symptoms, separate regression analyses were conducted to test each component of the model according to the recommendations of Baron & Kenny (1986).

(a) N significantly predicted DS_{T2}, ß = .61, $p < .0001$;

(b) N was a significant predictor of $DH_{T2,}$ ß = .58, $p < .0001$;

(c) DH_{T2} was significantly predictive of DS_{T2} , ß = .76, $p < .0001$;

(d) When N and DH_{T2} were both included in the model predicting $DS_{T2,}$ the effect of N dropped in magnitude and significance, ß = .25, $p = .01$, while the effect of DH_{T2} remained significant, ß = .62, $p < .0001$;

and

(e) The Goodman (I) test of the indirect effect of N on DS via DH indicated that this effect was significantly different from zero, $p < .0001$.

The results of this concurrent analysis suggest that daily hassles partially mediate the relationship between N and depressive symptoms.

Prospective Analyses

To examine whether DH mediate the relationship between N and rank-order change in depressive symptoms from Time 1 to Time 2, a set of regression analyses were run in which prior DS were partialled out.

(a) When initial DS effects were entered first in the equation, N did not significantly predict DS_{T2}, ß = -.042, p = .62. That is, N did not predict rank-order change in DS from Time 1 to Time 2. Thus, no further prospective tests of mediation were completed using these time points. However, N did prove to be a significant predictor of rank-order change in depressive symptoms from Time 2 to Time 3, ß = .29, p = .012, when prior DS at Time 2 were partialled out. Thus, a prospective mediational model could be tested using time points 2 and 3;

(b) N was a significant predictor of $DH_{T3,}$ ß = .53, p = .0001;

(c) DH_{T3} was significantly predictive of DS_{T3} with DS_{T2} partialled out, ß = .35, p = .0036;

(d) when N and DH_{T2} were both included in the model predicting $DS_{T3,}$ and DS_{T2} was partialled out, the effect of N dropped to marginally significant levels, ß = .22, p = .059 while the effect of DH_{T3} remained significant, ß = .29, p = .02.;

and

(e) The Goodman (I) test of the indirect effect of N on DS via DH indicated that this effect was significantly different from zero, p = .015.

These results support the results from the concurrent analysis that suggest that daily hassles play a partially-mediating role in the relationship between N and depressive symptoms. It can be deduced that part of the means by which N scores can be used to predict rank-order

change in DS comes through the effect of N on either actual exposure to or perception of exposure to daily hassles.

CHAPTER FOUR

DISCUSSION

The goal of this study was to examine potential relationships between neuroticism, daily hassles, and depressive symptoms. The results obtained and their bearing on the validity of the hypotheses made are interpreted and discussed in turn.

Moderation of the Effect of Daily Hassles on Depressive Symptoms by Neuroticism

The results of this study suggest that N does significantly moderate the effect that a wide variety of daily hassles have on the development of depressive symptoms, both concurrently and prospectively. This appears to be a novel finding, as no previous studies could be found that have looked at this specific question. Post hoc analysis revealed that the interactions between N and all ICSRLE (Kohn et al., 1990) subfactors except 'Romantic Problems' were found to be significant predictors of depressive symptoms. This suggests that the occurrence of a variety of non-specific hassles puts high-N college students at increased risk for the development of depressive symptoms over time when compared with their low-N peers. The findings lend support to the genetic control of sensitivity to the environment model and the vulnerability hypothesis, such that the heritable personality trait N was shown to affect the degree to which individuals tend to develop depressive symptoms when exposed to daily hassles. The results of the moderation analysis indicate that clinicians treating apparent non-endogenous forms of depression in which daily hassles appear to be playing a significant role should consider assessing whether N may be contributing to the chronicity and severity of the depressive episode.

This investigation only provides evidence that the interaction between N and daily hassles has acute effects on the development of depressive symptoms, as the data in this case only took into account daily hassles that occurred within 30 days prior to the subjects' reporting

of depressive symptoms. The finding that the interaction between N and daily hassles at Time 2 did not significantly predict depressive symptoms at Time 3 allows for a further, tentative, interpretation to be made. These combined results suggest that individual daily hassles do not influence mood for an extended period of time, but instead exert a more transient effect that may be compounded when a number of other daily hassles occur together over a relatively short interval.

Of interest is gaining an understanding of specific cognitive factors associated with N that may produce a negative affective response to daily hassles exposure. There may well be specific behaviors or cognitive sets related to N that contribute to the development of depressive symptoms in relation to stressors. For example, the research suggests that the use of maladaptive coping mechanisms in response to stressors or uncomfortable situations may play an important role in this relationship. Uehara et al. (1999), Penley & Tomaka (2002), Endler & Parker (1990) David & Suls (1999) and Bolger (1990) all found that N was correlated with the use of emotion-focused coping techniques such as self-blame, wishful thinking, escapist fantasy, and passivity. Emotion-focused coping behaviors involve the induction of emotional responses, becoming self-occupied, and having fantasizing reactions in response to stressors. Such coping approaches have been found to be prevalent in individuals recovered from depressive illness (Bruder-Matson & Hovanitz, 1990). In addition, Roy-Byrne et al. (1992) found that personality-related factors were more predictive of coping style than were psychiatric factors after controlling for depressive symptoms severity. Thus, it may be that high levels of N increase the likelihood an individual will utilize emotion-focused coping methods in response to daily hassles, exacerbating the negative impact of the daily hassles by leading to outcomes more negative than would be the case if the hassles were dealt with in a more adaptive manner.

Related to the subject of coping strategies is the issue of cognitive appraisal of threat from environmental events. Appraisal involves a simultaneous assessment of environmental demands and of personal resources available to deal with those demands. Since an event has little meaning to a person without that person's subjective appraisal of its importance, it is clear that the degree to which one tends to negatively appraise events should play a role in how well that person copes with stressors such as daily hassles. Anxiety can occur when situational demands are perceived to be greater than what available coping resources can handle, since the individual may view those demands as being a threat to well-being or survival. Because of the evidence of a negative cognitive bias in individuals high in N, it is logical to hypothesize that such people might tend to appraise events as being more threatening. Hojat et al. (2003) found that subjects with higher N scores tended to appraise certain stressful events as having more of a potential adverse impact. Penley et al. (2002) produced the finding that N was associated with low perceived ability to cope with situational demands, indicating that individuals high in N tend to feel that environmental events are more threatening than do those low in N. Gallagher (1990) found that N was positively correlated with threat appraisals. In addition, Mak et al. (2004) revealed that higher levels of N were associated with both a greater degree of threat appraisal and a higher level of depressive symptoms.

There is neurobiological research that complements the findings on N, coping, and threat appraisal. It has been shown that high N is associated with greater affective reactivity to daily stressors (Bolger & Schilling, 1991). This reactivity may result in changes in activity of the hypothalamic-pituitary-adrenal (HPA) axis, the system that mediates the body's stress response via glucocorticoid regulation. Activation of this system results in behavioral arousal, increased cardiovascular and metabolic activity, and reduced engagement in neurovegetative functions

such as eating and sleeping (de Abreu, de Mello, de Mello, Carpenter, & Price, 2003). Depression has been linked with dysregulation of the HPA axis (Yehuda, Teicher, Trestman, Levengood, & Siever, 1996). Ohayon & Roth (2003) found that disruptions in sleep such as those found with HPA axis over-activity preceded the diagnosis of a mood disorder in more than 40% of cases, and preceded the recurrence of a mood disorder in 56% of cases. McCleery & Goodwin (2001) found that high-N individuals showed significantly lower cortisol response than low-N individuals. The researchers concluded that this decreased level of response may result from down-regulation of the HPA axis via negative feedback, which occurs to prevent bodily harm from overactivation. Thus, the vulnerability to depression found in individuals high in N may be related in part to increased reactivity to stressors, and to a pattern of heightened HPA axis activity that results in exhaustion from prolonged exposure to stress response hormones. Results from the threat appraisal and coping studies combined with information from research into HPA axis functioning suggest that people high in N tend to respond in a maladaptive manner to stressors such as daily hassles (both cognitively and physiologically), and are poorly equipped to adapt to those stressors over time. This information, alongside the evidence suggesting a link between N and emotional reactivity, provides insight into why people with high N levels tend to be more likely to develop depressive symptoms over time when exposed to daily hassles.

The "Hopelessness Theory of Depression" (Abramson et al., 1989) describes a form of depression which can arise in part due to a maladaptive pattern of cognitive response to environmental events. Two sufficient causes for depression in this theory are 'negative outcome expectancy,' and 'expectations of helplessness' about being capable of changing the likelihood that these outcomes will occur. In addition, according to Abramson et al. (1989), "negative events serve as 'occasion setters' for people to become hopeless," (p.361). The results of the

present study are in line with Hopelessness Theory if the literature on coping and appraisal is taken into account. It may be that individuals high in N tend to appraise daily hassles as being more severe than they are, and that they cope poorly with these stressors after the appraisal process has been made. If the number of daily hassles experienced over a particular time interval is high enough, this type of response pattern could hypothetically lead to the formation of feelings of hopelessness and, consequently, the development of depressive symptoms.

Clinically, the results of this study suggest that depressed patients high in N may be more resistant to treatments that disregard the manner in which the patients react to and cope with daily hassles. Cognitive-behavioral approaches designed to modify reaction to daily hassles could help to minimize the negative affective responses that may occur in high-N patients suffering from depression.

Mediation of the Effect of Neuroticism on Depressive Symptoms by Daily Hassles

The results obtained in this study suggest that daily hassles partially mediate the relationship between N and depressive symptoms, both prospectively and concurrently. The prospective mediation model could not be tested using data from Time 1 and Time 2 because this data did not reveal N to be a significant predictor of depressive symptoms. It was only through the use of data from Time 2 and Time 3 (which showed N to be a marginally significant predictor of depressive symptoms) that prospective mediation could be addressed. The findings of the present study are consistent with previous investigations that have found that high-N subjects tend to report experiencing more daily hassles than do low-N subjects. Whether high-N individuals actually experience more daily hassles or whether they simply are more likely to categorize events as hassles cannot be ascertained here. What can be concluded is that part of the means by which N exerts its effect on depressive symptoms appears to be through affecting the

degree to which individuals experience actual daily hassles, the degree to which they perceive experiencing daily hassles, or both. It is possible that high-N people tend to have a negative self-presentational style that leads them to characterize their lives as being more stressful or unpleasant than they actually are, perhaps for the purposes of gaining sympathy or attention. As well, a variable not considered in this investigation related to both N and the tendency to over-report daily hassles could potentially mediate the relationship between N and depressive symptoms, making it appear that daily hassles are serving as the mediator.

The results of the mediation investigation warrant that clinicians consider whether their depressed patients high in N may be creating additional stressors that could be exacerbating their illnesses, and that they pay heed to the possibility that such patients may be perceiving situations to be more threatening than other individuals who possess normal N levels. The conditions of high-N depressed patients may be exacerbated by daily hassles that are self-created through the use of maladaptive coping techniques or self-selection into stressful environments. The teaching of a more appropriate set of coping strategies for responding to unpleasant events could serve to help reduce the severity of depressive symptoms. As well, clinicians should be open to the possibility that high-N patients may be more likely to perceive a relatively neutral event as being a hassle, and that such patients could potentially benefit from treatment that focuses on reducing the severity of threat appraisals made in response to daily events.

Limitations

Although the research design of this study was longitudinal, the effect of daily hassles on depressive symptoms appeared to be of too short duration to capture using data from separate time points for these two variables. Thus, despite its longitudinal nature, the design cannot be considered ideal for these purposes. Future research design considerations in this area should

place due emphasis on using time intervals that are spaced closely enough together that the effect of daily hassles can be captured, yet not so close as to limit prospective predictions.

Although most researchers consider N to be a stable trait, there remains some debate over the fluctuation of N with time or mood state. It will be of interest to see what future research suggests about the stability of N, as such studies may indicate that there is benefit to be gained from measuring personality at more points than simply baseline.

The use of self-report measures was the sole method utilized for quantifying the variables of interest in this study. Although the instruments chosen for use are considered to be valid and reliable tools, there still exists the possibility that considerable measurement error has occurred. For example, it is difficult to determine whether a subject's perception of daily hassles experienced is accurate. However, the use of respected measures such as the ones involved in this investigation helps to remove some of the risk that goes along with reliance on surveys for gathering data.

Directions for Future Study

Future studies should focus on determining how N exerts its moderating effect on the relationship between daily hassles and depressive symptoms. It would be useful for clinicians to gain an understanding of what exactly it is about individuals high in N that makes them more susceptible to becoming depressed in response to stressors. If the particular coping behaviors and cognitive patterns involved in this process can be isolated, it would provide therapists with greater insight into how to help treat depression in their patients who exhibit high levels of N.

Additional future study should be aimed at discovering the pathways by which individuals high in N create more daily hassles, or indeed if these individuals do in fact experience a higher level of daily hassles or rather simply tend to report more of them. The

distinction between these two possibilities is an important one at the clinical level, as each would require different approaches to reducing the development of depressive symptoms. Although N appears to have a stronger connection to depressive symptoms through moderation of the negative effect of daily hassles, practitioners could help their high-N patients by assisting them in either reducing their production of stressors, or in reducing their negative appraisal of more innocuous environmental events.

Concluding Statements

The findings of this study suggest that the personality trait neuroticism plays a significant role in the etiology and course of depressive symptoms that develop in response to exposure to daily hassles. Consistent with the differential exposure-reactivity model, N was shown to significantly influence both the likelihood that individuals will develop depressive symptoms in response to daily hassles, as well as the likelihood that individuals will report experiencing daily hassles and subsequently develop depressive symptoms from exposure to those hassles. Possible explanations for the moderating effect of N take into account the role of reactivity factors, threat appraisal factors, and coping factors. The apparent mediating effect of daily hassles on the relationship between N and depressive symptoms may result from the influence that N has on selection into stressful environments, or on the likelihood that an individual will report a situation as stressful.

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APPENDIX

Figure 1. Hypothesized Moderation of the Relationship between Daily Hassles and Depressive Symptoms by Neuroticism

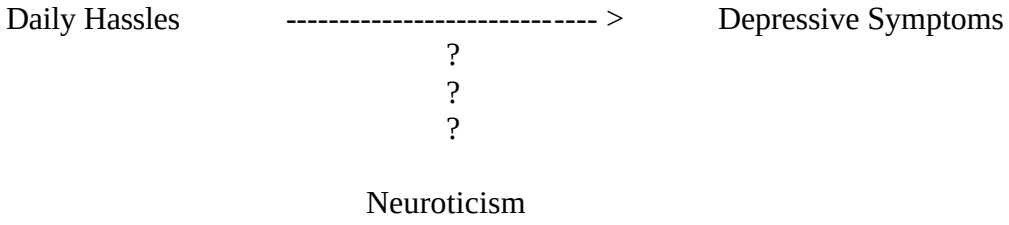

Figure 2. Hypothesized Mediation of the Relationship Between Neuroticism and Depressive Symptoms by Daily Hassles

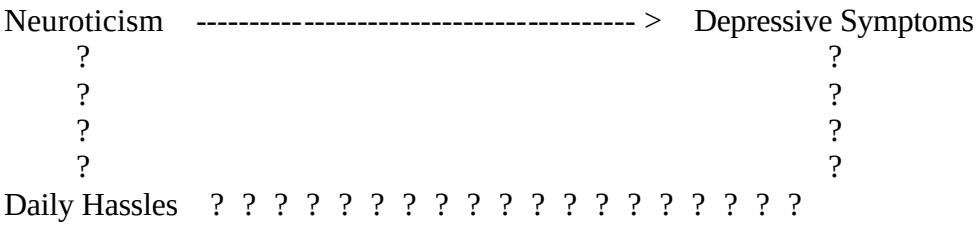

Table 1. Correlation Matrix for Neuroticism, Total Daily Hassles, and Total BDI Score at Three Time Points

Variable	1	2	3	4	5	6
1.Neuroticism	-	.57**	.51**	.71**	.60**	.59**
2.Hassles T2		-	.63**	.70**	.76**	.41*
3.Hassles T3			-	.53**	.61**	.66**
4.BDI T1				-	.88**	.71**
5.BDI T2					-	.73**
6.BDI T3						-
Mean	2.55	1.77	1.68	0.36	0.34	0.26
Stand. Dev.	0.71	0.41	0.34	0.37	0.44	0.32

Mean and standard deviation is per item

*p<.005 **p<.0001

Table 2. Regression Model Predicting Time 2 BDI Score from BDI T1 Score, Neuroticism, Time 2 Daily Hassles, and the Neuroticism x Time 2 Daily Hassles Interaction Term

Predictor	ß	t
BDI T1	.64***	7.24
Neuroticism	-.03	-0.36
Hassles T2	.22*	3.04
N X Hassles T2	.16**	3.48

*p<.005 **p<.001 ***p<.0001

Table 3. Regression Model Predicting Time 3 BDI Score from Time 2 BDI Score, Neuroticism, Time 3 Daily Hassles, and the Neuroticism x Time 3 Daily Hassles Interaction Term

Predictor	ß	t
BDI T2	1.12	3.25
Neuroticism	.24**	2.21
Hassles T3	.22*	1.93
N X Hassles T3	.15*	1.89

*$p < .10$ **$p < .05$ ***$p < .005$

Table 4. Prediction of Change in Depressive Symptoms from Time 1 to Time 2 from the N x Time 2 ICSRLE Subfactor Interaction Term

Predictor	ß	t
N x Developmental Challenge	.28****	3.68
N x Time Pressure	.26**	2.72
N x Academic Alienation	.22***	3.15
N x Romantic Problems	.11	1.64
N x Assorted Annoyances	.37***	2.91
N x General Social Mistreatment	.25**	2.73
N x Friendship Problems	.28*	2.54

*p<.05 **p<.01 ***p=.005 ****p=.0005