

**INDIVIDUAL AND SPOUSAL NEUROTICISM ARE
DIFFERENTIALLY ASSOCIATED WITH DAILY AFFECT QUALITY
AND PHYSICAL SYMPTOMS IN OLD AGE**

by

JENNIFER CHRISTINA LAY

B.Sc., The University of Calgary, 2007

B.A., The University of Calgary, 2011

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

in

THE FACULTY OF GRADUATE AND POSTDOCTORAL STUDIES

(Psychology)

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

August 2014

© Jennifer Christina Lay, 2014

Abstract

Objective: Marriage partners exert a special influence on each other's health and wellbeing, potentially even more so in old age, when social networks shrink and spouses become ever more important resources for dealing with everyday problems. This study complements and extends past research by examining associations between older spouses' levels of neuroticism, a key trait tied to wellbeing and health, and everyday fluctuations in affect quality, physical symptoms, and responses to everyday problems.

Methods: Forty-nine wives and 49 husbands aged 60-83 years (*M* marriage duration = 42.5 years) first provided independent neuroticism self-report ratings. Spouses then completed up to 27 repeated daily life assessments (time-sampling), during which they simultaneously reported their affect quality, physical health symptoms, and everyday problems 3 times daily for 9 consecutive days on handheld computers.

Results: Hierarchical linear modelling results replicate past work by showing negative associations between individual neuroticism and overall affect quality and physical symptoms. Interestingly, spousal neuroticism, in contrast, was positively associated with affect quality and physical symptoms, but only when problems were present. Specifically, having a spouse higher in neuroticism was associated with more favorable problem-affect quality associations and problem-physical symptom associations, even when controlling for marital satisfaction, age, gender, and level of conscientiousness.

Conclusions: Findings are discussed in the context of the evolutionary psychology literature and may suggest that spousal neuroticism can serve adaptive functions by increasing vigilance and preparing older couples to deal with everyday problems.

Preface

This thesis is based on on secondary use of non-identifiable information from a study on collaborative problem solving in older couples that was funded through a National Institutes of Aging grant (AG11715) awarded to Fredda Blanchard-Fields. The study was ethics approved and conducted at the Georgia Institute of Technology, Atlanta, GA. The work presented henceforth constitutes a novel approach to the existing data set. My master's thesis work was supported by a Social Sciences and Humanities Council of Canada scholarship.

Dr. Hoppmann (my research supervisor) and I jointly identified the new research questions for my thesis and I conducted the appropriate statistical analyses. I composed first drafts of each thesis chapter, which Dr. Hoppmann then revised and edited. We developed the final manuscript collaboratively through an iterative exchange of drafts and revisions.

A shorter version of this manuscript, co-authored by myself and Dr. Hoppmann, has been accepted for publication:

Lay, J. C., & Hoppmann, C. A. (2014). Spousal neuroticism moderates everyday problem-wellbeing associations in older couples. *Health Psychology*.

Table of Contents

| | |
|--|-------------|
| Abstract..... | ii |
| Preface..... | iii |
| Table of Contents | iv |
| List of Tables | vi |
| List of Figures..... | vii |
| Acknowledgements | viii |
| Chapter 1: Introduction | 1 |
| 1.1. Neuroticism, Affect, and Health in Individuals | 2 |
| 1.2. Neuroticism, Affect, and Health in Older Couples | 5 |
| 1.3. Study Objective and Hypotheses..... | 8 |
| Chapter 2: Method..... | 10 |
| 2.1. Participants | 10 |
| 2.2. Procedure..... | 11 |
| 2.3. Measures..... | 11 |
| 2.4. Statistical Analysis | 13 |
| Chapter 3: Results | 15 |
| 3.1. Associations Between Individual Neuroticism, Everyday Problems, Affect Quality, and Physical Symptoms | 15 |

| | |
|--|-----------|
| 3.2. Associations Between Spousal Neuroticism, Everyday Problems, Affect Quality and Physical Symptoms | 16 |
| 3.3. Effect Size | 17 |
| Chapter 4: Conclusion..... | 18 |
| 4.1. Individual Neuroticism, Everyday Problems, Affect Quality, and Physical Symptoms | 18 |
| 4.2. Effects of Spousal Neuroticism on Individual Affect, Health, and Responses to Problems..... | 21 |
| 4.3. Influence of Covariates on Spousal Neuroticism, Affect Quality, and Physical Symptoms..... | 23 |
| 4.4. Limitations and Future Directions..... | 25 |
| 4.5. Closing Remarks | 28 |
| References | 32 |

List of Tables

| | |
|--|----|
| Table 1: Means and Standard Deviations of the Central Study Variables for Wives and Husbands, and Variable Intercorrelations (N = 98) | 29 |
| Table 2: Hierarchical Linear Models Predicting Daily Affect Quality and Physical Symptoms From Situation-Level and Person-Level Characteristics Using Full Maximum Likelihood Estimation in HLM (N = 98) | 30 |

List of Figures

Figure 1: Positive affect (a), negative affect (b), and physical symptoms (c) as a function of number of problems, for different combinations of individual and spousal neuroticism. 31

Acknowledgements

I owe my deepest gratitude to Dr. Christiane Hoppmann for her guidance and unparalleled support at every stage of my graduate studies, and for continuously inspiring me in my research. I also owe particular thanks to Dr. Anita DeLongis and Dr. Peter Graf for their indispensable insight and investment in my graduate endeavours. I am indebted to my fellow lab members and classmates at UBC for their wisdom, warmth, and inspiration. Finally, special thanks are owed to my family for their unwavering support.

Chapter 1: Introduction

Marriage is, for many people, the closest and most influential of all relationships in adulthood, with consequences for health and wellbeing (Kiecolt-Glaser & Newton, 2001). The marital relationship may become even more central in old age. As social networks shrink and priorities shift, older adults place increasing emphasis on their closest and most emotionally meaningful relationships (Antonucci, 2001; Carstensen, 1995; Lang, 2001). As a result, older adults may also be particularly likely to use their spouses as a resource for emotion regulation and collaborative problem solving when confronted with everyday stressors or problems (Carstensen, Graff, Levenson, & Gottman, 1996; Dixon, 1999; Hoppmann & Gerstorf, 2009; Rauters, Riediger, Schmiedek, & Lindenberger, 2011). To date, most research addressing the role of marital relationships in health and wellbeing in old age focuses on the individual as the unit of analysis. However, couple researchers are increasingly drawing attention to the unique insights that can be gained by examining how spouses shape each other's health and wellbeing, using information from both partners (Berg & Upchurch, 2007; DeLongis & Holtzman, 2005; Hoppmann & Gerstorf, 2009; Hoppmann & Gerstorf, 2013; Martire, Schulz, Helgeson, Small, & Saghafi, 2010). The present study extends past research by examining older, long-term married couples' levels of neuroticism, a particularly key personality trait that has been shown to be closely tied to health and wellbeing. Specifically, wives' and husbands' neuroticism self-reports are linked with daily fluctuations in affect quality, physical symptoms, and responses to everyday problems using up to 27 simultaneous daily life assessments from each of 98 spouses. This time-sampling approach allows detailed insight into underlying mechanisms while participants engage in their typical routines in their everyday environments.

In considering personality influences on health and wellbeing, this research makes use of Costa & McCrae's (1985) five-factor model (comprising Agreeableness, Conscientiousness, Extraversion, Neuroticism, and Openness to Experience). Therein, this study focuses on the neuroticism dimension, which encompasses such traits as negative affectivity, emotional reactivity, stress vulnerability, anxiety, and tendency to worry. Among the Big Five personality dimensions, neuroticism has demonstrated the most consistent links with poor health and wellbeing for individuals and their spouses (Karney & Bradbury, 1995; Lahey, 2009).

Previous research will first be reviewed to look at linkages between neuroticism, affect quality, physical health, and everyday stress and problems, as derived from studies of unrelated individuals. This will then lead to the question of how taking into account the perspectives of both members of a couple may advance scientific knowledge of the complex interplay between neuroticism and daily life fluctuations in affect quality, physical symptoms, and responses to everyday problems in older couples.

1.1. Neuroticism, Affect, and Health in Individuals

Research using samples of unrelated individuals indicates that neuroticism is associated with high negative affect, poor physical health, and maladaptive responses to everyday problems (Lahey, 2009). The negative mood and emotional instability associated with neuroticism can manifest in a broad spectrum of negative emotional indices including nervousness, short temper, and irritability, and, in some cases, mood and anxiety disorders (Caughlin, Huston, & Houts, 2000; Lahey, 2009; Malouff, Thorsteinsson, & Schutte, 2005). This link with negative affective outcomes is still visible in old age, even in the face of chronic functional impairment due to issues such as hearing loss (Staudinger, Freund, Linden, & Maas, 1999; Wahl, Heyl, & Schilling, 2012).

Furthermore, longitudinal research has demonstrated that neuroticism is associated with late-life detrimental changes in physical health, including reduced immune function, stroke, and death due to cardiovascular disease, even when controlling for depression, anxiety, social support, and other well-known risk factors (Bouhuys, Flentge, Oldehinkel, & van den Berg, 2004; Smith & Mackenzie, 2006). In addition to reducing longevity in the general population, neuroticism seems to be associated with higher morbidity and mortality in individuals with chronic diseases (Lahey, 2009; Smith & Mackenzie, 2006; Wilson et al., 2005).

What are the mechanisms underlying the link between neuroticism and poor health and wellbeing? The stress and coping literature suggests that high neuroticism may lead to elevated negative affect by increasing exposure to everyday stressors or problems and, more importantly, by heightening an individual's reactivity to this stress (Bolger & Schilling, 2006; Bolger & Zuckerman, 1995). Furthermore, individuals high in neuroticism have been found to make more frequent use of maladaptive coping strategies (e.g. confrontation, escape avoidance, self-blame), and less frequent use of adaptive strategies (e.g. problem-focused coping) when coping with a variety of everyday stressors (O'Brien and DeLongis, 1996). Hence, neuroticism may not only be associated with negative affect and physical symptoms in older adults' daily lives, but its effects may be partly accounted for by individual differences in stress exposure and responsiveness. This literature suggests that older adults high in neuroticism may experience elevated levels of negative affect and physical symptoms and more pronounced stress responses when they encounter everyday problems.

Interestingly, and despite the well-documented evidence regarding the ill effects of neuroticism on health and wellbeing, there are also accounts from evolutionary psychology suggesting that this trait is not all bad and that it can, in fact, protect individuals by keeping them

vigilant in the face of risks to health and safety (Nettle, 2006). From an evolutionary perspective, diverse personalities exist because there is no one optimal personality that was most adaptive in humans' ancestral environment (Nettle, 2006). Hence, neuroticism, like other personality traits, exists in some individuals because it provided survival advantages that outweighed its risks to health (Nettle, 2006).

Research on nonhuman animals indeed shows that vigilance and wariness are necessary to avoid predation and other dangers (Nettle, 2006). In addition, human research has demonstrated that anxiety enhances threat detection and responsiveness by improving attention, reaction time, and speed of interpretation of ambiguous stimuli (Bateson, Brilot, & Nettle, 2011; Mathews, Mackintosh, & Fulcher, 1997). Furthermore, individuals higher in neuroticism seem to use a "better safe than sorry" strategy in response to ambiguous threat signals (Lommen, Engelhard, & van den Hout, 2010). Outside the lab, it has been shown that being anxious about one's health earlier in life may lead to activities that keep an individual out of harm's way (Lee, Wadsworth, & Hotopf, 2006). Studies of mountain climbers (Egan & Stelmack, 2003; Goma-i-Freixanet, 1991) have found that these "extreme risk-takers" have unusually low levels of neuroticism, which also points to the possibility that neuroticism protects people from danger. These lines of research converge on the idea that there may be circumstances under which neuroticism, by virtue of its associated high vigilance and anxiety, benefits health by enhancing threat detection and by preparing an individual to adequately respond to problems.

Neuroticism may be especially protective for older adults because age-normative declines in physical health and functional capacity can leave them particularly vulnerable to accidents and escalating health conditions (Baltes & Smith, 2003). Interestingly, neuroticism also tends to be higher in individuals with physical illness and functional limitations (Costa &

McCrae, 1985). This poses the important question as to whether the increased vigilance and anxiety that are characteristic of neuroticism may in fact be adaptive in that they motivate older adults to adequately respond to risks and health issues. For example, hypervigilance may be crucial for older adults experiencing age-related hearing loss, who must be extra careful in order to, for example, safely cross a busy street. Similarly, a person with diabetes may benefit from a little bit of extra vigilance regarding blood sugar levels if it motivates the individual to always have a snack on-hand in case of sudden dizziness. Neuroticism has indeed been linked with earlier symptom detection, increased health care initiation, and more frequent physician visits, thereby contributing to disease management (Feldman, Cohen, Doyle, Skoner, & Gwaltney, 1999; Jerram & Coleman, 1999; ten Have, Oldehinkel, Vollebergh, & Ormel, 2005; Watson & Pennebaker, 1989). It has further been shown that, although neuroticism shows a general decline with age in adulthood, it actually starts to increase after age 70 (Steunenberg, Twisk, Beekman, Deeg, & Kerkhof, 2005). It may thus be speculated that, in moderation, neuroticism serves adaptive functions in old age to the extent that increased vigilance and anxiety regarding health and safety risks, which are characteristic of individuals high in neuroticism, help older adults detect and bounce back from everyday problems.

1.2. Neuroticism, Affect, and Health in Older Couples

Most research linking neuroticism, health, and wellbeing across the adult lifespan has focused on the individual, which makes sense given the prominent role of neuroticism in influencing affective experiences and physical symptoms (Lahey, 2009; Malouff et al., 2005; Smith & Mackenzie, 2006). Yet, it is also well documented that both affect quality and physical health are to a great extent shaped by the marital relationship, with well-functioning marriages being associated with better outcomes (Glenn & Weaver, 1981; Hoppmann & Gerstorf, 2009;

Kiecolt-Glaser & Newton, 2001; Levenson, Carstensen, & Gottman, 1993). Given that individual and spousal neuroticism have emerged as robust predictors of marital dissatisfaction, instability, and failure, it may be fruitful to extend previous research examining the role of spousal personalities in shaping health and wellbeing outcomes for both partners (Buss, 1991; Gattis, Berns, Simpson, & Christensen, 2004; Karney & Bradbury, 1995; Kelly & Conley, 1987).

A number of possible mechanisms may underlie the links between neuroticism, negative affect, and physical symptoms in couples. For example, individuals whose spouses are high in neuroticism may be subject to emotional contagion (transfer of negative affect between spouses) or feel badly if they are unable to help their distressed partner (Caughlin et al., 2000). It has further been hypothesized that spouses' personalities may interact to influence the frequency and/or intensity of destructive exchanges in daily life (Davila, Bradbury, & Fincham, 1998; Donnellan, Conger, & Bryant, 2004). In the long term, neuroticism may also undermine both partners' wellbeing and health by increasing stress exposure and maladaptive stress response patterns in couples, including impaired marital interactions and inadequate support provision (Bolger & Schilling, 2006; Karney & Bradbury, 1995). In short, if one member of an older couple is high in neuroticism, poorer affect quality and physical health may be expected for both partners.

To date, the literature linking neuroticism to poor marital and health outcomes is predominantly based on younger couples and newlyweds, which poses the question as to if and how these findings may generalize to older, long-term married partners. Interestingly, the few studies that have included middle-aged and older couples seem to paint a more nuanced picture. For example, O'Rourke, Claxton, Chou, Smith, & Hadjistavropoulos (2011) propose that the detrimental effect of neuroticism on marital satisfaction may not extend to older, long-term

married couples. This may at least in part be due to selective mortality, as neuroticism has been linked to earlier death in older adults (Wilson et al., 2005). Sample selectivity may also play a role in such a way that couples who stay together for decades differ in important ways from those who divorced; for example, given that neuroticism is associated with higher divorce rates, long-term married spouses may be lower in this personality trait (O'Rourke et al., 2011).

Alternatively, the negative effects of neuroticism may be lessened in long-term marriages because spouses have successfully managed life challenges together, possibly including adaptation to one another's neuroticism (O'Rourke et al., 2011). Indeed, older spouses have been shown to positively misperceive each other's neuroticism to a greater extent and to interpret one another's behaviour more favourably, compared to their younger counterparts; perceptions that have, in turn, been linked to increased marital satisfaction (Claxton, O'Rourke, Smith, & DeLongis, 2012; Henry et al., 2007). Similarly, when discussing a marital problem, older couples (compared to younger couples) have been shown to exhibit more positive sentiment override, which involves interpreting one another's affiliative behaviour more favourably than do external observers (Story et al., 2007). Actual emotional responses to problems also seem to be more positive in older couples, who have been found to exhibit more positive affect (affection) and less negative affect (tension, domineeringness, and contempt) than their middle-aged counterparts when discussing marital conflicts (Carstensen, Gottman, & Levenson, 1995). Taken together, these findings suggest that older adults perceive their spouses in a more favourable light and have more moderate emotional reactions to marital conflict, both of which potentially contribute to improved affect quality, even in the face of high spousal neuroticism and the marital problems that this may bring.

Because of their selective focus on the positive in their spouses, older adults may not only

be less affected by the negative aspects of their spouse's neuroticism, but also be better able to capitalize on the benefits if they have a spouse higher in neuroticism and to harvest their spouses' higher vigilance or anxiety regarding threats to health and safety. Hence, an older adult whose spouse is moderately high in neuroticism may rely on their spouse's vigilance or anxiety to draw their attention to situations that are threatening or dangerous to health, thereby gleaning the health-protective benefits of their partner's neuroticism. In older couples, then, neuroticism may protect the health of not only the individual, but also of the spouse. This idea also reflects recent research demonstrating a relationship between moderate (but not high or low) levels of neuroticism and dyadic adjustment (Daspe, Sabourin, Péloquin, Lussier, & Wright, 2013).

1.3. Study Objective and Hypotheses

The current study seeks a better understanding of how individual and spousal neuroticism are associated with daily affect quality, physical symptoms, and responses to everyday problems in older, long-term married partners. In doing so, this study goes beyond most previous marriage research by examining day-to-day fluctuations in affect and physical symptoms as they occur in everyday life. Dyadic data analysis is employed to disentangle individual and spousal influences on the central study variables.

In line with previous research, it was expected that neuroticism and everyday problems would both be negatively associated with affect quality and positively associated with physical symptoms at the individual level. Furthermore, it was hypothesized that, because neuroticism may put older adults in a state of readiness to act in response to threats, individuals high in neuroticism would show reduced responses to everyday problems, in terms of their affect quality and physical symptoms. For the same reason, due to the effects of personality on marital

dynamics, it was expected that this reduced responsiveness to everyday problems would also occur for individuals whose spouses were high in neuroticism.

To provide a meaningful interpretation of the proposed associations between neuroticism and affect quality and physical symptoms in couples, several additional factors need to be considered. Because relationship quality has been shown to moderate the effects of marriage on health and how couples respond to conflict, relationship satisfaction is included as a control variable (Kiecolt-Glaser & Newton, 2001; Smith et al., 2009; Story et al., 2007). Furthermore, conscientiousness is also positively associated with both individual and spousal health outcomes and has been shown to interact with neuroticism in a way that enhances the potentially protective effects of these personality traits for both spouses (Roberts, Smith, Jackson, & Edmonds, 2009). Because of the potential synergistic effects of neuroticism and conscientiousness on couples' health outcomes, conscientiousness is also included as a covariate in the study analyses. Finally, age and gender are controlled for in analyses to account for their influences on the main study variables.

Chapter 2: Method

This chapter describes the participant sample used in this study, the data collection procedure, the measures employed, and the statistical analysis methods used to answer the research questions. APA ethical guidelines for behavioural research were followed in conducting this study.

2.1. Participants

The sample consisted of 49 married couples that were recruited from the Atlanta metropolitan area (M age = 72.15 years, SD = 4.74; M marriage duration = 42.45 years, SD = 14.86). To be eligible, both spouses had to agree to participate, be at least 60 years of age, and be capable of reading newspaper size print. No prior computer experience was required. Most participants were Caucasian (91.8%) and some were African American (8.2%). Overall, the sample was highly educated, with 82.5 percent having at least some college-level education. Most participants (94%) were retired. Participants reported their health as being good (M = 3.51, SD = 0.99 on a 5-point self-report scale) and were cognitively fit (M Advanced Vocabulary score = 21.63; SD = 6.51; M Letter Sets score = 16.43; SD = 4.90; Ekstrom, French, Harman, & Derman, 1976). Couples reported high levels of marital satisfaction (M = 4.45 on a 5-point scale, SD = 0.54; Hendrick, 1988). Three couples were excluded because one spouse did not achieve a criterion score of 5 on the Vocabulary and/or Letter Sets tests. An additional five couples were excluded due to noncompliance of one spouse (N = 1), tactile difficulties of one spouse (N = 1), accidental device switches (N = 1), technical problems (N = 1), or one spouse having fallen asleep during the training session (N = 1). Each spouse received \$70 for participating in the study.

2.2. Procedure

After providing informed consent to participate in the study, each spouse received a mail-out package with several individual difference measures, including demographic variables, personality characteristics, health information, and relationship satisfaction. They then completed a two-hour in-lab session that included cognitive tasks and in-depth training in the use of the electronic diaries for the time-sampling phase of the study (using Palm Tungsten 5 pocket computers and the IzyBuilder Software Package). For the nine days that followed, spouses were simultaneously prompted to complete three questionnaires per day that were separated by approximately 5-hour intervals. At each daily assessment, spouses reported their affect quality, physical health symptoms, situational characteristics, and everyday problems. At the end of the time-sampling phase, participants provided feedback on the study procedures and returned their pocket computers (see Hoppmann & Blanchard-Fields, 2011 for more details).

2.3. Measures

Everyday Problems. Spouses were asked at each measurement point whether they had encountered any problems or obstacles during the time since the last alarm. Problems and obstacles were described as situations that interfere with current plans or ongoing projects or that are experienced as disruptive¹ (Hoppmann & Blanchard-Fields, 2011). Spouses could record up to four everyday problems per measurement point. On average, this resulted in 7.67 problems

¹ Participants were given the option to leave the study if they encountered a severe problem (e.g. family death); because no participants took this option, it is likely that most, if not all, reports were of relatively mild, everyday problems.

($SD = 9.97$) over the nine-day study period (M number of daily problems = .82, $SD = 0.97$). This base rate is similar to other time-sampling studies (e.g. Almeida, Wethington, & Kessler, 2002).

Daily Affect Quality. Participants provided affect ratings at each measurement point by indicating the extent to which they were currently experiencing each of eight different affect states (1 = not at all to 5 = very much). Four of the eight items targeted positive affect states (happy, excited, content, calm), and four items assessed negative affect states (sad, irritated, frustrated, tired); items were selected to represent high and low arousal states of positive and negative valence (Tsai, Knutson, & Fung, 2006). Ratings of the four positive and the four negative items at each assessment were then aggregated, resulting in an overall positive affect score and an overall negative affect score at each measurement point. The mean positive affect score over the study period was 3.49 ($SD = .45$) and the mean negative affect score was 1.81 ($SD = .52$). Cronbach's alpha was 0.73 for the PA scale and 0.86 for the NA scale, indicating good internal consistency.

Daily Physical Symptoms. At each measurement point, spouses also rated the extent to which they had experienced each of four physical health symptoms (aches, eating or digestion problems, respiratory problems, and low energy; Brown & Moskowitz, 1997) since the last alarm (1 = not at all to 5 = very much). Physical symptom severity was computed by taking the average of the participant's four physical symptom ratings at each measurement point ($M = 1.74$ over the study period, $SD = .51$). Cronbach's alpha for this scale, at 0.68, was acceptable and reflected the broad spectrum of potential physical symptoms that were used to provide a comprehensive assessment.

Neuroticism. Neuroticism was measured using six items from the NEO-FFI (Costa & McCrae, 1989). In lieu of Costa & McCrae's (1989) standard 4-point scale, individuals rated

each item on a 5-point scale (1 = not at all to 5 = very much); this was done to reduce participant confusion by having a consistent response scale across all the different study questionnaires.

Participants responded to the items on a 5-point scale (1 = not at all to 5 = very much). Mean neuroticism was 2.27 ($SD = .69$), which is very similar to means obtained using the same set of items and rating scale in other samples of older adults (e.g. the Berlin Aging Study; Baltes, Freund, & Horgas, 1999). Cronbach's alpha of .79 indicated satisfactory internal consistency.

Covariates. To provide a meaningful interpretation of the proposed associations between neuroticism, affect quality, and physical symptoms in older couples, several additional factors were taken into account. Specifically, this study considered the influence of gender, age, relationship satisfaction, and conscientiousness when testing hypotheses. Participants each rated their relationship satisfaction on a 5-point scale using Hendrick's (1988) Relationship Assessment Scale ($M = 4.45$; $SD = 0.54$). Conscientiousness was measured on a 5-point scale using six items from the NEO-FFI (Costa & McCrae, 1989). The mean score across these six items was 3.83 ($SD = .49$), and Cronbach's alpha was .62. There is no documented validity for this shortened version of the conscientiousness scale.

2.4. Statistical Analysis

To test the study hypotheses, hierarchical linear modeling (HLM; Raudenbush, Bryk, Cheong, & Congdon, 2000) was employed, as this method accounts for the hierarchically nested data structure (Raudenbush & Bryk, 2002; Snijders & Bosker, 1999). The data have a three-level structure: The first level (the situation level) concerns moment-to-moment variability, the second level (the person level) between-person variability, and the third level (the couple level) variability between couples. Three specific measures were modeled: two affect quality measures (positive affect and negative affect) and the aggregate physical symptoms measure.

To examine possible associations between everyday problems and affect quality and physical symptoms, the number of problems participants reported since the last beep was modeled at the situation level, resulting in the following level 1 model:

$$\text{Pos. Affect/Neg. Affect/Physical Symptoms } s_{ij} = \beta_{0j} + \beta_{1j} (\text{Number of Problems}) + r_{ij}$$

To test whether affect quality and physical symptoms were associated with individual and spousal neuroticism, the respective neuroticism values were added as person-level predictors of the overall means and of the problem-affect and problem-physical symptom slopes. Models also included several covariates (gender, age, relationship satisfaction, and individual and spousal conscientiousness). This led to the following level 2 models:

$$\begin{aligned} \beta_{0j} = & \gamma_{00} + \gamma_{01} (\text{Individual Neuroticism}) + \gamma_{02} (\text{Spousal Neuroticism}) + \gamma_{03} (\text{Individual} \\ & \text{Conscientiousness}) + \gamma_{04} (\text{Spousal Conscientiousness}) + \gamma_{05} (\text{Gender}) + \gamma_{06} (\text{Age}) \\ & + \gamma_{07} (\text{Relationship Satisfaction}) + u_{0j} \end{aligned}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11} (\text{Individual Neuroticism}) + \gamma_{12} (\text{Spousal Neuroticism}) + u_{1j}$$

No couple-level variables were added to the model; hence, the level 3 model was empty:

$$\begin{aligned} \gamma_{00} = \delta_{00} + v_{00} & \quad \gamma_{01} = \delta_{01} & \quad \gamma_{02} = \delta_{02} & \quad \gamma_{03} = \delta_{03} & \quad \gamma_{04} = \delta_{04} & \quad \gamma_{05} = \delta_{05} \\ \gamma_{06} = \delta_{06} & \quad \gamma_{07} = \delta_{07} & \quad \gamma_{10} = \delta_{10} & \quad \gamma_{11} = \delta_{11} & \quad \gamma_{12} = \delta_{12} \end{aligned}$$

Chapter 3: Results

Table 1 displays the means, standard deviations, and intercorrelations of the central study variables and control variables. Overall, there were few gender differences, but husbands were older in age and higher in relationship satisfaction, whereas wives reported higher neuroticism.

The main purpose of this study was to examine the link between neuroticism and daily life fluctuations in affect quality, physical symptoms, and responses to everyday problems in older married couples. Analyses investigated the extent to which fluctuations in affect quality and physical symptoms might be associated with individual neuroticism, spousal neuroticism, and number of problems experienced. Specifically, the goal was to determine whether positive affect, negative affect, and physical symptom severity might be associated with: (a) individual neuroticism, (b) spousal neuroticism, (c) the number of problems experienced, (d) the interaction between number of problems and individual neuroticism, or (e) the interaction between number of problems and spousal neuroticism. Modelling results are shown in *Table 2*.

3.1. Associations Between Individual Neuroticism, Everyday Problems, Affect Quality, and Physical Symptoms

Findings regarding associations between individual neuroticism, affect quality, and physical symptoms (see *Table 2*) replicate previous research by showing that higher neuroticism was associated with lower overall levels of positive affect (-0.18 ; $SE = .07$; $p < .05$), higher levels of negative affect (0.36 ; $SE = .07$; $p < .01$), and increased physical symptom severity (0.23 ; $SE = .09$; $p < .05$). Furthermore, a higher number of problems since the last beep was associated with momentary decreases in positive affect (-0.16 ; $SE = .03$; $p < .01$), increases in

negative affect (0.15; $SE = .02$; $p < .01$), and elevated physical symptom severity (0.07; $SE = .02$; $p < .01$).

Models also controlled for several other variables that have been associated with daily affect quality and physical symptoms in past research. As can be seen in *Table 2*, age was positively associated with negative affect (0.02; $SE = .01$; $p < .05$). Higher relationship satisfaction was associated with higher positive affect (0.16; $SE = .08$; $p < .05$). Gender and conscientiousness did not emerge as significant predictors of any of the three outcome measures. Taken together, individual level findings are in line with a substantial body of research in pointing to the detrimental role of neuroticism and everyday problems on affect quality and physical symptoms in old age over and above several other potential predictors.

3.2. Associations Between Spousal Neuroticism, Everyday Problems, Affect Quality and Physical Symptoms

The main purpose of this study was to examine the link between spousal neuroticism and daily affect quality, physical symptoms, and responses to everyday problems. As can be seen in *Table 2*, there were no main effects for spousal neuroticism on affect quality or physical symptom severity. Interestingly, however, there is consistent evidence for the expected cross-level interaction between spousal neuroticism and number of problems on all three outcome measures. Specifically, spousal neuroticism was associated with more favorable problem-affect quality slopes (positive affect: 0.15; $SE = .04$; $p < .01$; negative affect: -0.12; $SE = .04$; $p < .01$), and less pronounced problem-physical symptom slopes (-0.07; $SE = .03$; $p < .05$). This means that having a spouse who is high in neuroticism reduces the unfavorable associations between

number of problems and daily affect quality and physical symptoms². This cross-level interaction is illustrated in Figure 1. It can be seen that when spousal neuroticism is high, this reduces the negative relationship between positive affect and number of problems (a), reduces the positive relationship between negative affect and number of problems (b), and reduces the positive relationship between physical symptom severity and number of problems (c). There were no interactions between individual neuroticism and number of problems in any of the three models.

3.3. Effect Size

The Pseudo R approach was used to determine the amount of variance in positive affect, negative affect, and physical symptom severity accounted for by the respective models (compared with unspecified models). Significant reductions in variance were obtained with all three models: positive affect (*Pseudo* $\Delta R^2 = 0.13$), negative affect (*Pseudo* $\Delta R^2 = 0.19$), and physical symptom severity (*Pseudo* $\Delta R^2 = 0.05$). The reduction in deviance, which is an index of model fit, was significant for all three models: positive affect ($\chi^2 = 92.98, p < .01$), negative affect ($\chi^2 = 98.67, p < .01$), and physical symptoms ($\chi^2 = 34.11, p < .01$).

² These relationships between spousal neuroticism and wellbeing measures are not reflected in the respective bivariate correlations (*Table 1*), revealing a suppressor effect (Paulhus, Robins, Trzesniewski, & Tracy, 2004).

Chapter 4: Conclusion

The objective of this study was to better understand, through dyadic analyses of daily diary data, how individual and spousal neuroticism shape daily affect quality, physical symptoms, and responses to everyday problems in older, long-term married couples. These analyses revealed that individual neuroticism and everyday problems were associated with poorer daily affect quality and elevated physical symptoms. There was no main effect of spousal neuroticism on daily affect quality or physical symptoms beyond the impact of individual neuroticism and everyday problems, but spousal neuroticism buffered the negative effect of everyday problems on affect quality and physical symptoms. These findings will now be discussed in the context of the social relationship, personality, and health literatures, looking first at how neuroticism and everyday problems contribute to daily life fluctuations in affect quality and physical symptoms on an individual level, and then turning to the special role that the spouse plays in these daily life processes. Finally, further steps for substantiating and expanding on this study's findings will be explored.

4.1. Individual Neuroticism, Everyday Problems, Affect Quality, and Physical Symptoms

In this study, older adults reported on their affect and physical symptoms three times daily, and it was hypothesized that high neuroticism would have a detrimental effect on individuals' reported affect quality and physical symptom severity. Individuals high in neuroticism reported, on average, lower positive affect, higher negative affect, and elevated physical symptoms in daily life than did individuals low in neuroticism. Findings are thus in line with previous work demonstrating the detrimental role of neuroticism on physical and mental health (Caughlin et al., 2000; Lahey, 2009; Malouff et al., 2005; Smith & Mackenzie, 2006). Specifically, findings pertaining to affect quality confirm the well-established link between

neuroticism and negative affect in general and specifically in old age (Caughlin et al., 2000; Costa & McCrae, 1985; Staudinger et al., 1999). Furthermore, the negative association between neuroticism and daily physical symptoms converges with previous observations regarding the robust link between neuroticism and poor physical health; this has been attributed to neuroticism's negative effects on physiological functioning (due to increased stress, negative affect, and emotional reactivity) and on health behaviours (Bouhuys et al., 2004; Smith & Mackenzie, 2006; Mroczek, Spiro, & Turiano, 2009). Moreover, findings dovetail with previous research suggesting that individuals high in neuroticism pay more attention to bodily symptoms such as pain, possibly contributing to the observed higher overall physical symptom reports in these individuals, as compared to individuals low in neuroticism (Costa & McCrae, 1987; Goubert, Crombeza, & Van Damme, 2004; Sullivan et al., 2001; Watson & Pennebaker, 1989). In short, individual effects of neuroticism on daily affect quality and physical symptoms replicate past research on neuroticism, affect, and health and extend it to older adults.

In addition to their affect and physical symptoms, the older adults in this study also recorded the number of problems or obstacles they had encountered since the last report. In line with the stress and coping literature, it was expected that problem reports would be linked to poor affect quality and elevated physical symptom severity (Almeida, 2005; Bolger & Zuckerman, 1995; Lazarus, 2007). Analyses confirmed these expectations: individuals reporting a larger number of problems at a given time also reported lower positive affect, higher negative affect, and more severe physical symptoms. Hence, even relatively low-level, omnipresent everyday problems exert a noticeable effect on daily life fluctuations in affect quality and physical symptoms, which makes sense given that these problems are appraised as disruptive to daily tasks and interfere with current plans (Hoppmann & Blanchard-Fields, 2011; Lazarus,

2007). Hence, this study confirms well-established associations between daily hassles, affect quality, and physical health.

How might personality play a role in emotional and physical wellbeing in the presence of everyday problems? It was hypothesized that for this study's older adults, those high in neuroticism would show reduced problem-affect quality and problem-physical symptom slopes. However, contrary to expectations, neuroticism did not moderate the association between everyday problems and daily affect quality and physical symptoms for individuals. One possible explanation might be that because the everyday problems that were assessed were likely routine hassles rather than catastrophic issues, these problems, while still stressful, may not have been potent enough to trigger stress responses that could be shaped by neuroticism (Bolger & Schilling, 2006; Bolger & Zuckerman, 1995; DeLongis & Holtzman, 2005). That is, any adaptive benefits of being anxious or hypervigilant may only manifest in certain high-risk situations. Moreover, due to the selective survival of older adults lower in neuroticism, neuroticism levels in this sample of adults age 60 and above may not have been high enough to fall into a spectrum in which they might influence stress responses (Wilson et al., 2005). With respect to evolutionary theory, it may be that anxiety and hypervigilance help individuals survive to a certain age, but that the poor health and increased mortality associated with high neuroticism masks any positive, stress buffering effects in old age (Lahey, 2009; Smith & Mackenzie, 2006). Hence, the lack of significant effects of neuroticism in the presence of everyday problems may be attributable to the limited potency of problems reported or to the fact that this sample, like other aging samples (e.g. Baltes et al., 1999), represents a positive selection in relation to their birth cohort.

4.2. Effects of Spousal Neuroticism on Individual Affect, Health, and Responses to Problems

Had this study only considered individual level associations between neuroticism and daily affect quality and physical symptoms, results would merely have confirmed findings from the extant literature; however, considering the special influence of spouses led to a more nuanced picture. Interestingly, even though individual neuroticism did not affect the strength of association between everyday problems and emotional and physical wellbeing, spousal neuroticism did act as a moderator by reducing the strength of these associations. In line with the hypothesis that spousal neuroticism would have a positive influence in the presence of everyday problems, individuals whose spouses were higher in neuroticism (compared to those with spouses lower in neuroticism) reported less pronounced elevations in negative affect and physical symptoms, and less pronounced reductions in positive affect, upon encountering everyday problems. Hence, in accord with theoretical notions from evolutionary psychology, which point to the potential adaptiveness of heightened vigilance and anxiety in the face of threats to health and safety (e.g. Bateson et al., 2011), it appears that moderately high neuroticism in a marriage partner can indeed have protective effects (Lee et al., 2006; Mathews et al., 1997). Specifically, one may speculate that when everyday problems do occur, it may be helpful to have a spouse who is already prepared for potential catastrophes, and hence can readily ease the burden of more mundane challenges. This theoretical assumption has not been subjected to empirical testing, but it is consistent with this study's finding that the spousal neuroticism effect was limited to times at which problems were reported; there were no significant effects of spousal neuroticism on overall affect quality or physical symptoms. This beneficial effect of spousal neuroticism would have been missed completely had the study not

considered the influences of both spouses on daily affect quality and physical symptoms. An important caveat is that this beneficial effect needs to be seen in relation to the overall hazards of neuroticism; in the absence of particular problems to deal with, neuroticism's negative marital effects may be manifested (Caughlin et al., 2000; Karney & Bradbury, 1995).

Of note, findings are based on a community sample of older adults with relatively moderate neuroticism scores (see also Baltes et al., 1999); less than 10 percent of participants had neuroticism scores higher than 3.0 on the 5-point scale. Hence, it is very well possible that participants who were higher than the sample mean may have benefited their partners through a heightened vigilance that still falls into a "healthy" spectrum. Findings pertaining to these moderate neuroticism levels may not generalize to samples with clinically relevant high levels of neuroticism (Karney & Bradbury, 1995). Hence, future research should replicate the current study procedures with a sample that includes older individuals with clinically significant levels of neuroticism, and then using multilevel modeling to explore possible nonlinear effects of neuroticism. Such a design could enable the detection of a theoretical "tipping point" at which adaptive levels of neuroticism become maladaptive.

It is further important to consider that this study's older, long-term married couples may respond to their spouse's neuroticism in a way that is specific to this age group (O'Rourke et al., 2011). In comparison to their younger counterparts, older couples have been shown to positively misperceive one another's neuroticism to a greater extent, and to exhibit more positive affect and interpret one another's affiliative behaviour more positively when discussing marital conflict (Carstensen et al., 1995; Claxton et al., 2012; Henry et al., 2007; Story et al., 2007). These kinds of mechanisms may therefore help older adults to overcome the previously documented detrimental effects of spousal neuroticism on marriage and they open the door for the benefits of

being married to a vigilant spouse to take effect. However, the reported protective effect of spousal neuroticism may be very specific to older couples or vulnerable populations, who may particularly benefit from having someone at their side who has strong radar for potential health threats (Baltes & Smith, 2003). To test this interpretation and its generalizability, it would be useful to conduct similar studies looking at middle-aged or younger couples, and to compare older adults who are and are not experiencing substantial physical or functional impairment.

We can only speculate on the mechanisms underlying the differential individual and spousal neuroticism effects on problem responses. Another possible, arguably less favourable, explanation of the spousal neuroticism effect is that observing a spouse high in neuroticism who is ruminating may distract older adults from their own problems, resulting in more favourable problem-affect/physical symptom associations. Alternatively, individuals with partners high in neuroticism may minimize their attentiveness to their own problems to avoid upsetting their spouses. To address these and other alternative explanations, future research should disentangle the underlying mechanisms by comparing self-reports with other indices of problem responses, such as implicit measures and biomarkers.

4.3. Influence of Covariates on Spousal Neuroticism, Affect Quality, and Physical Symptoms

Recognizing that marital satisfaction has a robust, positive influence on both affect quality and physical health, relationship satisfaction was included as a covariate in the current study to ensure that it was not influencing study outcomes (Holtzman and DeLongis, 2007; Hoppmann & Gerstorf, 2009; Kiecolt-Glaser & Newton, 2001). Relationship satisfaction was associated with positive affect in this study but it did not alter the main findings. Of note, this study's sample, like most convenience samples of married couples, exhibited very high levels of

marital satisfaction (a mean of 4.45 on a 5-point scale). Because marital satisfaction tends to be higher in older couples (compared to their middle-aged counterparts), and has also been cited as a contributor to older couples' positive sentiment override and effective management of conflict, future research might benefit from comparing happy marriages with less happy marriages to broaden current knowledge (Henry, Berg, Smith, & Florsheim, 2007; Smith et al., 2009; Story et al., 2007).

A possible link between spousal personality similarity and wellbeing in couples was also considered: previous research has linked spousal similarity in neuroticism levels with higher relationship satisfaction (e.g. Nemechek & Olson, 1999; Russell & Wells, 1991). However, similarly to what has been seen with individual and spousal neuroticism, a different picture emerges for older couples; high similarity between individual and spousal neuroticism is not associated with marital happiness in old age (Gattis et al., 2004; O'Rourke et al., 2011). To verify that spousal similarity was not influencing the present study findings, analyses were conducted with and without the inclusion of a variable capturing the difference between individual and spousal neuroticism levels. Greater difference in neuroticism levels was found to be associated with higher average negative affect for both spouses, as would be expected if spousal personality dissimilarity contributes to unhappiness in a marriage. However, the inclusion of this variable did not affect the main study findings. Therefore, for reasons of parsimony, neuroticism difference was not included in the model reported here.

To disentangle the effects of age and gender on the main study variables, these were also included as covariates in analyses. In line with Steunenberg and colleagues' (2005) finding that neuroticism increases with age after age 70, the current study revealed a positive relationship between age and negative affect (a key aspect of neuroticism); however, age did not account for

any of the main study findings. With respect to gender, wives exhibited higher neuroticism than husbands in this study, in line with well-documented findings in the personality literature, including in old age (Chapman, Duberstein, Sörensen, & Lyness, 2007). However, no gender differences were found for any of the main study findings.

Furthermore, because conscientiousness has been shown to influence individual and spousal health outcomes on its own and in conjunction with neuroticism, individual and spousal conscientiousness were also included in the current analyses as covariates (Roberts et al., 2009). This inclusion did not, however, alter study findings; although the lack of effect may be due to the use of a conscientiousness scale with a low alpha level, the neuroticism effects uncovered in this study do seem to be independent of conscientiousness.

4.4. Limitations and Future Directions

Given the extensive literature on gender differences in neuroticism and potential mechanisms underlying the protective effect of spousal neuroticism, the possibility of gender-specific effects warrants consideration. In comparison to husbands, wives have been shown in previous research to be higher in neuroticism, to provide more spousal support, and to engage in more monitoring of their spouses' health behaviours (Chapman et al., 2007; Umberson, 1992; Verhofstadt & Devoldre, 2012). This suggests that wives may be more responsive to their spouses' health problems. No evidence was found in this study for such gender differences, which may, at least in part, be due to limitations in power; however, future research should investigate gender differences more directly by, for example, examining wives' and husbands' reports of everyday spousal support and monitoring, and asking to what extent spousal efforts alleviated the stress of daily hassles.

This study examines spontaneous, naturally occurring fluctuations in affect quality and physical symptoms as older adults engage in their daily activities in the environments in which they live. This emphasis on measuring experiences as they occur in daily life is a fundamental benefit of time-sampling research, which embraces the complexities of lived experience (Bolger, Davis, & Rafaeli, 2003). However, this design comes with the disadvantage of not being able to manipulate variables. Hence, this study is a first step; future experimental work is necessary to address the underlying causal mechanisms, including the proposed role of spousal neuroticism in reducing affective responses to everyday problems. For example, experiments could expose spouses with varying levels of neuroticism to a laboratory stressor designed to mimic a threat to wellbeing (e.g., presenting participants with grim pamphlets detailing the risk of falls for people of their age), and then measuring both partners' affective and behavioural responses. It would also be useful to better understand the ramifications of high spousal neuroticism for coping responses to stress, given neuroticism's demonstrated association with higher use of ineffective coping strategies (such as escape avoidance and self-blame; DeLongis & Holtzman, 2005). However, neuroticism here, too, may have beneficial effects for older adults if it leads to coping strategies that are effective at this particular stage in life. For example, emotion-focused coping (including avoidance) may actually be effective when older adults are confronted with unavoidable stressors (e.g. age-normative health problems; Blanchard-Fields, 2007). Finally, although participants were instructed to complete their electronic questionnaires independently (without consulting their spouses), it cannot be guaranteed that these instructions were followed. Hence, research needs to go back and forth between lab and life to establish findings that are high in ecological validity and that hold under rigorous experimental conditions.

This study provides snapshots of concurrent associations involving affect, physical symptoms, and problems as they occur. As such, findings do not allow causal or time-ordered inferences. For example, spouses may have reported more negative affect because they experienced a problem, or they could have experienced problems due to experiencing elevated negative affect. This study's intention was to assess the direct and moderating effects of individual and spousal neuroticism on these concurrent daily life fluctuations. More complex models involving, for example, lead-lag effects would have extended the data capacity and remain to be considered in future research. The models presented could also be extended to consider day-to-day variability in order to examine, for example, how stress response patterns vary across different days in a study.

A second limitation of this study is its reliance on self-report measures of physical symptoms, which inevitably reflect cognitive appraisal. While self-reports provide important insights into participants experiences and feelings, they also have to be taken with a grain of salt given that previous findings showed that individuals high in neuroticism tend to report higher symptom severity due to increased attention to bodily symptoms (Watson & Pennebaker, 1989). Hence, similar research on neuroticism and stress may benefit from the inclusion of biomarkers, including heart rate monitoring to assess sympathetic-adrenal-medullary axis response, or salivary cortisol measurement to assess hypothalamic-pituitary-adrenal axis response (Kamarck, Schwartz, Janicki, Shiffman, & Raynor, 2003; Piazza, Almeida, Dmitrieva, & Klein, 2010).

Furthermore, this study measured neuroticism using a subset of six items from the NEO-FFI (Costa & McCrae, 1989). Internal consistency was acceptable, and this same abbreviated version of the neuroticism scale has been fruitfully employed in other aging samples (e.g. Berlin Aging Study, Baltes et al., 1999). Of note, an even briefer (2-item) scale of

neuroticism with adequate psychometric properties has also been put forward (Gosling, Rentfrow, & Swann, 2003). However, neuroticism items were administered on a 5-point scale instead of Costa & McCrae's (1989) standard 4-point scale, to reduce participant confusion by having a consistent response scale across the different study questionnaires. As a result, neuroticism scores cannot be compared to those of epidemiological studies using the standard NEO-FFI. Hence, this study's findings pertaining to neuroticism should be taken as initial evidence only. Finally, the use of a comprehensive physical symptoms measure came with costs in terms of internal consistency; the relatively low Cronbach's alpha of this 4-item scale is a reflection of this study's attempt to capture the whole spectrum of possible symptoms.

4.5. Closing Remarks

With the aging of the population, it is crucial to better understand key social factors that contribute to wellbeing and health in old age, and to recognize the central role of marital partners for wellbeing and health. This study highlights the unique insight to be gained by considering how personality traits like neuroticism may affect individuals and their spouses: although high neuroticism has been linked with poor affect quality and more intense physical symptoms, this study points to the positive, potentially protective aspects of spousal neuroticism in old age. Future research needs to substantiate these findings by subjecting them to experimental testing, by extending them to other samples that differ in age and marital satisfaction, and by complementing self-reports with biological indices.

Table 1:

Means and Standard Deviations of the Central Study Variables for Wives and Husbands, and Variable Intercorrelations (N = 98)

| | Mean (<i>SD</i>) | | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------------------------------|--------------------|---------------|------|-------|-------|--------|--------|--------|-------|--------|--------|
| | Husbands | Wives | | | | | | | | | |
| 1. Age | 73.33 (4.06) | 70.98 (5.11)* | .21* | .00 | .20* | .10 | -.02 | .05 | .16 | .05 | .08 |
| 2. Relationship satisfaction | 4.56 (0.45) | 4.34 (0.60)* | | -.24* | .36** | -.29** | -.15 | -.33** | -.23* | .19 | .13 |
| 3. Number of daily problems | 0.84 (1.05) | 0.80 (0.90) | | | -.15 | .41** | .23* | .33** | .24* | -.15 | -.06 |
| 4. Positive affect | 3.57 (0.40) | 3.41 (0.48) | | | | -.57** | -.38** | -.46** | -.07 | .30** | .17 |
| 5. Negative affect | 1.77 (0.53) | 1.85 (0.50) | | | | | .67** | .57** | .17 | -.37** | -.11 |
| 6. Physical symptom severity | 1.71 (0.53) | 1.76 (0.49) | | | | | | .37** | .07 | -.25* | -.04 |
| 7. Individual neuroticism | 2.05 (0.66) | 2.48 (0.66)** | | | | | | | -.05 | -.50** | .00 |
| 8. Spousal neuroticism | 2.48 (0.66) | 2.05 (0.66)** | | | | | | | | .00 | -.50** |
| 9. Individual conscientiousness | 3.85 (0.46) | 3.81 (0.51) | | | | | | | | | -.04 |
| 10. Spousal conscientiousness | 3.81 (0.51) | 3.85 (0.46) | | | | | | | | | |

Note. * $p < .05$, ** $p < .01$. ANOVAS tested mean differences between wives and husbands; correlations are based on means that were aggregated across wives and husbands unless indicated otherwise.

Table 2:

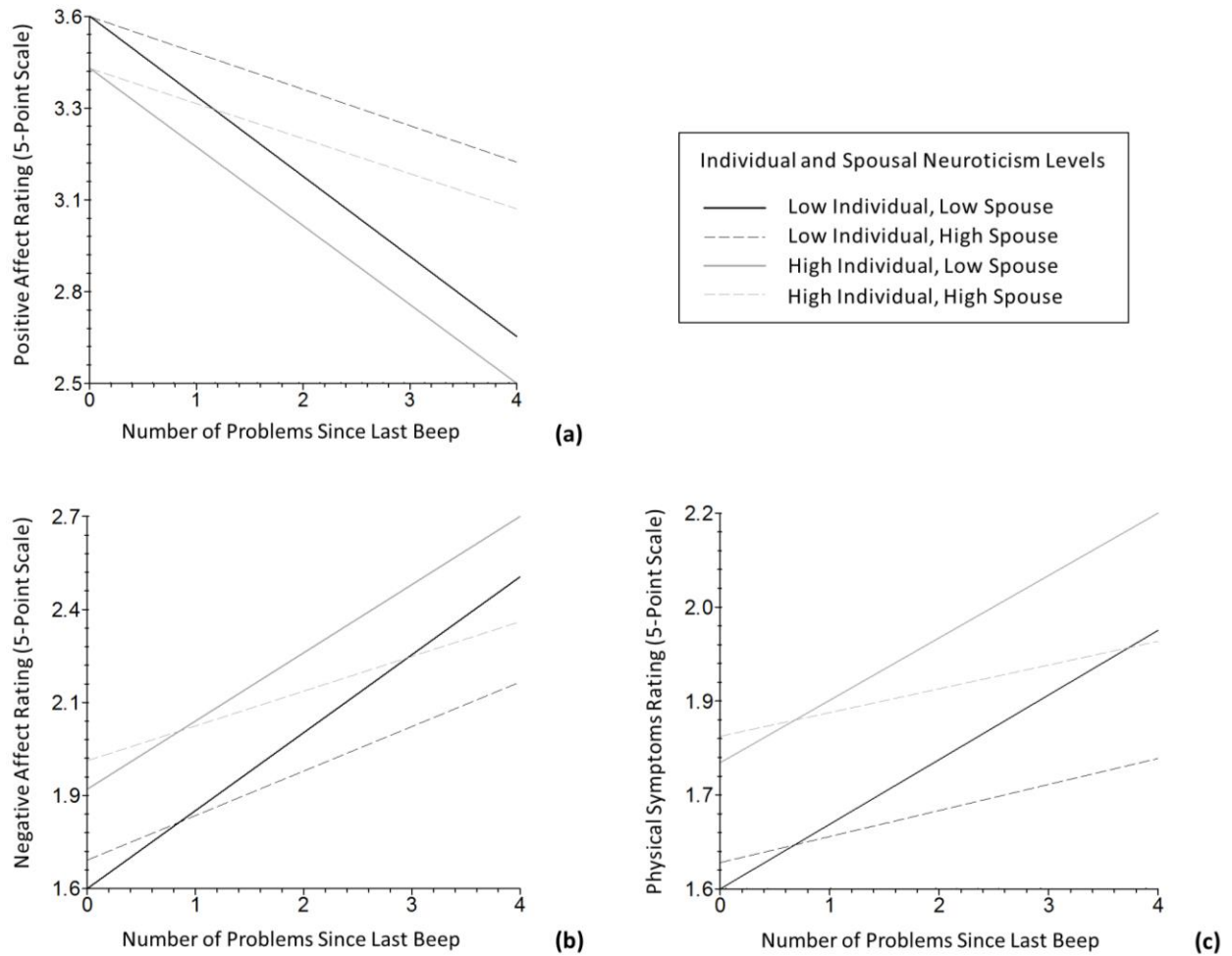
Hierarchical Linear Models Predicting Daily Affect Quality and Physical Symptoms From Situation-Level and Person-Level Characteristics Using Full Maximum Likelihood Estimation in HLM (N = 98)

| | Positive affect | Negative affect | Physical symptoms |
|--|-----------------|-----------------|-------------------|
| Fixed effects: coefficient (<i>standard error</i>) | | | |
| Intercept | 3.54** (0.06) | 1.77** (0.06) | 1.74** (0.07) |
| Number of problems | -0.16** (0.03) | 0.17** (0.03) | 0.07** (0.02) |
| Individual neuroticism | -0.18* (0.07) | 0.36** (0.07) | 0.23* (0.09) |
| Spousal neuroticism | -0.00 (0.07) | 0.10 (0.08) | 0.05 (0.09) |
| Individual conscientiousness | 0.14 (0.09) | -0.14 (0.09) | -0.10 (0.12) |
| Spousal conscientiousness | 0.16 (0.09) | -0.07 (0.10) | -0.03 (0.12) |
| Gender | -0.04 (0.09) | 0.01 (0.09) | -0.03 (0.10) |
| Age | -0.01 (0.01) | 0.02* (0.01) | 0.01 (0.01) |
| Relationship satisfaction | 0.16* (0.08) | -0.06 (0.08) | -0.03 (0.10) |
| Interaction effects: coefficient (<i>standard error</i>) | | | |
| Individual neuroticism x number of problems | 0.00 (0.04) | -0.03 (0.04) | -0.00 (0.03) |
| Spousal neuroticism x number of problems | 0.15** (0.04) | -0.12** (0.04) | -0.07* (0.03) |

Note. * $p < .05$, ** $p < .01$. Interactions of number of problems with age, gender, relationship satisfaction, and individual and spouse conscientiousness were also examined. None of these interactions were significant; hence, the more parsimonious models without the interaction terms are presented. The difference between individual and spousal neuroticism was also examined; however, the inclusion of this variable did not change the above findings.

Figure 1:

Positive affect (a), negative affect (b), and physical symptoms (c) as a function of number of problems, for different combinations of individual and spousal neuroticism.³



³ High neuroticism scores are those that fall above the 75th percentile, and low neuroticism scores fall below the 25th percentile. High and low neuroticism are depicted for illustrative purposes but neuroticism was treated as a continuous variable in the models.

References

- Almeida, D. M. (2005). Resilience and vulnerability to daily stressors assessed via diary methods. *Current Directions in Psychological Science*, 14(2), 64-68.
doi:10.1111/j.0963-7214.2005.00336.x
- Almeida, D. M., Wethington, E., & Kessler, R. C. (2002). The Daily Inventory of Stressful Events: An interview-based approach for measuring daily stressors. *Assessment*, 9(1), 41-55. doi:10.1177/1073191102009001006
- Antonucci, T. C. (2001). Social relations: An examination of social networks, social support, and sense of control. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (5th ed.) (pp. 427–453). San Diego, CA: Academic Press.
- Baltes, P. B., Freund, A. M., & Horgas, A. L. (1999). Men and women in the Berlin Aging Study. In P. B. Baltes & K. U. Mayer (Eds.), *Berlin Aging Study: From 70 to 100* (pp. 259-281). Cambridge, UK: Cambridge University Press.
- Baltes, P. B., & Smith, J. (2003). New frontiers in the future of aging: From successful aging of the young old to the dilemmas of the fourth age. *Gerontology*, 49(2), 123-135.
doi:10.1159/000067946
- Bateson, M., Brilot, B., & Nettle, D. (2011). Anxiety: An evolutionary approach. *The Canadian Journal Of Psychiatry*, 56(12), 707-715.
- Berg, C. A. & Upchurch, R. (2007). A developmental-contextual model of couples coping with chronic illness across the adult life span. *Psychological Bulletin*, 133(6), 920.
doi:10.1037/0033-2909.133.6.920

- Blanchard-Fields, F. (2007). Everyday problem solving and emotion: An adult developmental perspective. *Current Directions in Psychological Science*, 16(1), 26-31.
doi:10.1111/j.1467-8721.2007.00469.x
- Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual Review of Psychology*, 54(1), 579-616. doi:10.1146/annurev.psych.54.101601.145030
- Bolger, N. & Schilling, E. A. (2006). Personality and the problems of everyday life: The role of neuroticism in exposure and reactivity to daily stressors. *Journal of Personality*, 59(3), 355–386. doi:10.1111/j.1467-6494.1991.tb00253.x
- Bolger, N. & Zuckerman, A. (1995). A framework for studying personality in the stress process. *Journal of Personality and Social Psychology*, 69(5), 890. doi:10.1037/0022-3514.69.5.890
- Bouhuys, A. L., Flentge, F., Oldehinkel, A. J., & van den Berg, M. D. (2004). Potential psychosocial mechanisms linking depression to immune function in elderly subjects. *Psychiatry Research*, 127, 237–245. doi:10.1016/j.psychres.2004.05.001
- Brown, K. W., & Moskowitz, D. S. (1997). Does unhappiness make you sick? The role of affect and neuroticism in the experience of common physical symptoms. *Journal of Personality and Social Psychology*, 72(4), 907. doi:10.1037/0022-3514.72.4.907
- Buss, D. M. (1991). Conflict in married couples: Personality predictors of anger and upset. *Journal of Personality*, 59(4), 663-688. doi:10.1111/j.1467-6494.1991.tb00926.x
- Carstensen, L. L. (1995). Evidence for a life-span theory of socioemotional selectivity. *Current Directions in Psychological Science*, 4(5), 151-156. doi:10.1111/1467-8721.ep11512261

- Carstensen, L. L., Gottman, J. M. & Levenson, R. W. (1995). Emotional behavior in long-term marriage. *Psychology and Aging*, 10(1), 140-149. doi:10.1037/0882-7974.10.1.140
- Carstensen, L. L., Graff, J., Levenson, R. W. & Gottman, J. M. (1996). Affect in intimate relationships: The developmental course of marriage. In C. Magai & S. Y. McFadden (Eds.), *Handbook of emotion, adult development, and aging* (pp. 227–242). Academic Press. doi:10.1016/B978-012464995-8/50014-5
- Caughlin, J. P., Huston, T. L., & Houts, R. M. (2000). How does personality matter in marriage? An examination of trait anxiety, interpersonal negativity, and marital satisfaction. *Journal of Personality and Social Psychology*, 78(2), 326. doi:10.1037/0022-3514.78.2.326
- Chapman, B. P., Duberstein, P. R., Sörensen, S., & Lyness, J. M. (2007). Gender differences in Five Factor Model personality traits in an elderly cohort. *Personality and Individual Differences*, 43(6), 1594-1603. doi:10.1016/j.paid.2007.04.028
- Claxton, A., O'Rourke, N., Smith, J. A. Z. & DeLongis, A. (2012). Personality traits and marital satisfaction within enduring relationships An intra-couple discrepancy approach. *Journal of Social and Personal Relationships*, 29(3), 375–396. doi:10.1177/0265407511431183s
- Costa, P. T., Jr., & McCrae, R. R. (1985). *The NEO Personality Inventory Manual*. Odessa, FL: Psychological Assessment Resources.
- Costa Jr, P. T., & McCrae, R. R. (1987). Neuroticism, somatic complaints, and disease: Is the bark worse than the bite?. *Journal of personality*, 55(2), 299-316. doi:10.1111/j.1467-6494.1987.tb00438.x

- Costa, P. T., & McCrae, R. R. (1989). *Neo PI/FFI manual supplement*. Odessa, FL: Psychological Assessment Resources.
- Daspe, M., Sabourin, S., Péloquin, K., Lussier, Y., & Wright, J. (2013). Curvilinear associations between neuroticism and dyadic adjustment in treatment-seeking couples. *Journal Of Family Psychology*, 27(2), 232-241. doi:10.1037/a0032107
- Davila, J., Bradbury, T. N., & Fincham, F. (1998). Negative affectivity as a mediator of the association between adult attachment and marital satisfaction. *Personal Relationships*, 5(4), 467-484. doi:10.1111/j.1475-6811.1998.tb00183.x
- DeLongis, A. & Holtzman, S. (2005). Coping in context: The role of stress, social support, and personality in coping. *Journal of Personality*, 73(6), 1633–1656. doi:10.1111/j.1467-6494.2005.00361.x
- Dixon, R. A. (1999). Exploring cognition in interactive situations: The aging of N + 1 minds. In T. M. Hess, F. Blanchard-Fields (Eds.), *Social cognition and aging* (pp. 267-290). San Diego, CA US: Academic Press. doi:10.1016/B978-012345260-3/50013-6
- Donnellan, M. B., Conger, R. D. & Bryant, C. M. (2004). The Big Five and enduring marriages. *Journal of Research in Personality*, 38(5), 481–504. doi:10.1016/j.jrp.2004.01.001
- Egan, S., & Stelmack, R. M. (2003). A personality profile of Mount Everest climbers. *Permissions & Reprints Personality and Individual Differences*, 34, 1491–1494. doi:10.1016/S0191-8869(02)00130-7
- Ekstrom, R. B., French, J. W., Harman, H. H., & Dermen, D. (1976). *Manual for kit of factor-referenced cognitive tests* (pp. 109-113). Princeton, NJ: Educational Testing Service.

- Feldman, P. J., Cohen, S., Doyle, W. J., Skoner, D. P., & Gwaltney, J. M. Jr. (1999). The impact of personality on the reporting of unfounded symptoms and illness. *Journal Of Personality And Social Psychology*, 77(2), 370-378. doi:10.1037/0022-3514.77.2.370
- Gattis, K. S., Berns, S., Simpson, L. E., & Christensen, A. (2004). Birds of a feather or strange birds? Ties among personality dimensions, similarity, and marital quality. *Journal of Family Psychology*, 18, 564–574.
- Gerstorf, D., Smith, J., & Baltes, P. B. (2006). A systemic-holistic approach to differential aging: Longitudinal findings from the Berlin Aging Study. *Psychology and Aging*, 21(4), 645-663. doi:10.1037/0882-7974.21.4.645
- Glenn, N. D., & Weaver, C. N. (1981). The contribution of marital happiness to global happiness. *Journal of Marriage and the Family*, 161-168. doi:10.2307/351426
- Goma-i-Freixanet, M. (1991). Personality profile of subjects engaged in high physical risk sports. *Personality and Individual Differences*, 12, 1087–1093. doi:10.1016/0191-8869(91)90038-D
- Gosling, S. D., Rentfrow, P. J. & Swann Jr, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality*, 37(6), 504–528. doi:10.1016/S0092-6566(03)00046-1
- Goubert, L., Crombez, G., & Van Damme, S. (2004). The role of neuroticism, pain catastrophizing and pain-related fear in vigilance to pain: a structural equations approach. *Pain*, 107(3), 234-241. doi:10.1016/j.pain.2003.11.005
- Hendrick, S. S. (1988). A generic measure of relationship satisfaction. *Journal of Marriage and the Family*, 50(1), 93-98. doi:10.2307/352430

- Henry, N. M., Berg, C. A., Smith, T. W., & Florsheim, P. (2007). Positive and negative characteristics of marital interaction and their association with marital satisfaction in middle-aged and older couples. *Psychology And Aging*, 22(3), 428-441. doi:10.1037/0882-7974.22.3.428
- Holtzman, S., & DeLongis, A. (2007). One day at a time: The impact of daily satisfaction with spouse responses on pain, negative affect and catastrophizing among individuals with rheumatoid arthritis. *Pain*, 131(1), 202-213. doi:10.1016/j.pain.2007.04.005
- Hoppmann, C. A. & Blanchard-Fields, F. (2011). Problem-solving variability in older spouses: How is it linked to problem-, person-, and couple-characteristics? *Psychology & Aging*, 26(3), 525. doi:10.1037/a0024114
- Hoppmann, C. & Gerstorf, D. (2009). Spousal interrelations in old age-a mini-review. *Gerontology*, 55(4), 449–459. doi:10.1159/000211948
- Hoppmann, C., & Gerstorf, D. (2013). Spousal goals, affect quality, and collaborative problem solving: Evidence from a time-sampling study with older couples. *Research in Human Development*, 10, 70-87. doi:10.1080/15427609.2013.760260
- Jerram, K. L. & Coleman, P. G. (1999). The big five personality traits and reporting of health problems and health behaviour in old age. *British Journal of Health Psychology*, 4(2), 181-192. doi: 10.1348/135910799168560
- Kamarck, T. W., Schwartz, J. E., Janicki, D. L., Shiffman, S., & Raynor, D. A. (2003). Correspondence between laboratory and ambulatory measures of cardiovascular reactivity: a multilevel modeling approach. *Psychophysiology*, 40(5), 675-683. doi:10.1111/1469-8986.00069

- Karney, B., & Bradbury, T. N. (1995). The longitudinal course of marital quality and stability: A review of theory, methods, and research. *Psychological Bulletin*, 118, 3-34.
doi:10.1037/0033-2909.118.1.3
- Kelly, E. L., & Conley, J. J. (1987). Personality and compatibility: A prospective analysis of marital stability and marital satisfaction. *Journal of Personality and Social Psychology*, 52, 27-40. doi:10.1037/0022-3514.52.1.27
- Kiecolt-Glaser, J. K., & Newton, T. L. (2001). Marriage and health: His and hers. *Psychological Bulletin*, 127(4), 472-503. doi:10.1037/0033-2909.127.4.472
- Lahey, B. B. (2009). Public health significance of neuroticism. *American Psychologist*, 64(4), 241-256. doi:10.1037/a0015309
- Lang, F. R. (2001). Regulation of social relationships in later adulthood. *Journal of Gerontology: Series B: Psychological Sciences & Social Sciences*, 56(6), 321-326.
doi:10.1093/geronb/56.6.P321s
- Lazarus, R. S. (2007). Stress and emotion: A new synthesis. In A. Monat, R. S. Lazarus, G. Reevy (Eds.) , *The Praeger handbook on stress and coping (vol.1)* (pp. 33-51). Westport, CT US: Praeger Publishers/Greenwood Publishing Group.
- Lee, W. E., Wadsworth, M. E. J., & Hotopf, M. (2006). The protective role of trait anxiety: A longitudinal cohort study. *Psychological Medicine*, 36(3), 345-351.
doi:10.1017/S0033291705006847
- Levenson, R. W., Carstensen, L. L., & Gottman, J. M. (1993). Long-term marriage: Age, gender, and satisfaction. *Psychology And Aging*, 8(2), 301-313. doi:10.1037/0882-7974.8.2.301

- Lommen, M. Engelhard, I. M., & van den Hout, M. A. (2010). Neuroticism and avoidance of ambiguous stimuli: Better safe than sorry? *Personality and Individual Differences*, 49, 1001-1006. doi:10.1016/j.paid.2010.08.012
- Malouff, J. M., Thorsteinsson, E. B., & Schutte, N. S. (2005). The relationship between the five-factor model of personality and symptoms of clinical disorders: A meta-analysis. *Journal of Psychopathology and Behavioral Assessment*, 27, 101–114. doi:10.1007/s10862-005-5384-y
- Martire, L. M., Schulz, R., Helgeson, V. S., Small, B. J., Saghafi, E. (2010). Review and meta-analysis of couple-oriented interventions for chronic illness. *Annals of Behavioral Medicine*, 40, 325–342. doi:10.1007/s12160-010-9216-2
- Mathews, A., Mackintosh, B., & Fulcher, E. P. (1997). Cognitive biases in anxiety and attention to threat. *Trends in Cognitive Sciences*, 1, 340–345. doi:10.1016/S1364-6613(97)01092-9
- Mroczek, D. K., Spiro, A., & Turiano, N. A. (2009). Do health behaviors explain the effect of neuroticism on mortality? Longitudinal findings from the VA Normative Aging Study. *Journal Of Research In Personality*, 43(4), 653-659. doi:10.1016/j.jrp.2009.03.016
- Nemeczek, S. & Olson, K. R. (1999). Five-factor personality similarity and marital adjustment. *Social Behavior and Personality: An International Journal*, 27(3), 309–317. doi:10.2224/sbp.1999.27.3.309
- Nettle, D. (2006). The evolution of personality variation in humans and other animals. *American Psychologist*, 61(6), 622-631. doi:10.1037/0003-066X.61.6.622
- O'Brien, T. B., & DeLongis, A. (1996). The interactional context of problem-, emotion-, and relationship-focused coping: The role of the Big Five personality factors. *Journal of*

Personality, Special Issue: Personality and Coping, 64, 775–813. doi:10.1111/j.1467-6494.1996.tb00944.x

O'Rourke, N., Claxton, A., Chou, P. H. B., Smith, J. A. Z., & Hadjistavropoulos, T. (2011).

Personality trait levels within older couples and between-spouse trait differences as predictors of marital satisfaction. *Aging & Mental Health*, 15(3), 344-353.

doi:10.1080/13607863.2010.519324

Paulhus, D. L., Robins, R. W., Trzesniewski, K. H., & Tracy, J. L. (2004). Two replicable suppressor situations in personality research. *Multivariate Behavioral Research*, 39(2), 303-328. doi:10.1207/s15327906mbr3902_7

Piazza, J. R., Almeida, D. M., Dmitrieva, N. O., & Klein, L. C. (2010). Frontiers in the use of biomarkers of health in research on stress and aging. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 65(5), 513-525.

doi:10.1093/geronb/gbq049

Raudenbush, S. W., Bryk, A. S., Cheong, Y. F., & Congdon, R. (2000). *HLM 5. Hierarchical linear and nonlinear modeling*. Chicago: Scientific Software International.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods (Vol. 1)* (2nd ed.). Thousand Oaks, CA: Sage Publications, Incorporated.

Rauers, A., Riediger, M., Schmiedek, F. & Lindenberger, U. (2011). With a little help from my spouse: Does spousal collaboration compensate for the effects of cognitive aging? *Gerontology*, 57(2), 161–166. doi:10.1159/000317335

- Roberts, B. W., Smith, J., Jackson, J. J. & Edmonds, G. (2009). Compensatory conscientiousness and health in older couples. *Psychological Science*, 20(5), 553–559. doi:10.1111/j.1467-9280.2009.02339.x
- Russell, R. J. H. & Wells, P. A. (1991). Personality similarity and quality of marriage. *Personality and Individual Differences*, 12(5), 407–412. doi: 10.1016/0191-8869(91)90057-I
- Smith, J., & Baltes, P. B. (1999). Trends and profiles of psychological functioning in very old age. In P. B. Baltes & K. U. Mayer (Eds.), *Berlin Aging Study: From 70 to 100* (pp. 197-226). Cambridge, UK: Cambridge University Press.
- Smith, T. W., Berg, C. A., Florsheim, P., Uchino, B. N., Pearce, G., Hawkins, M., & ... Olsen-Cerny, C. (2009). Conflict and collaboration in middle-aged and older couples: I. Age differences in agency and communion during marital interaction. *Psychology And Aging*, 24(2), 259-273. doi:10.1037/a0015609
- Smith, T. W., & MacKenzie, J. (2006). Personality and risk of physical illness. *Annual Review of Clinical Psychology*, 2, 435–467. doi:10.1146/annurev.clinpsy.2.022305.095257
- Snijders, T. A. B., & Bosker, R. J. (1999). *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. London: Sage.
- Staudinger, U. M., Freund, A. M., Linden, M., & Maas, I. (1999). Self, personality, and life regulation: Facets of psychological resilience in old age. In P. B. Baltes & K. U. Mayer (Eds.), *Berlin Aging Study: From 70 to 100* (pp. 302-328). Cambridge, UK: Cambridge University Press.
- Steunenberg, B., Twisk, J. R., Beekman, A. F., Deeg, D. H., & Kerkhof, A. M. (2005). Stability and change of neuroticism in aging. *The Journals Of Gerontology: Series B*:

Psychological Sciences And Social Sciences, 60B(1), 27-33.

doi:10.1093/geronb/60.1.P27

Story, T. N., Berg, C. A., Smith, T. W., Beveridge, R., Henry, N. J. & Pearce, G. (2007). Age, marital satisfaction, and optimism as predictors of positive sentiment override in middle-aged and older married couples. *Psychology and Aging*, 22(4), 719.

doi:10.1037/0882-7974.22.4.719

Sullivan, M. J., Thorn, B., Haythornthwaite, J. A., Keefe, F., Martin, M., Bradley, L. A., & Lefebvre, J. C. (2001). Theoretical perspectives on the relation between catastrophizing and pain. *The Clinical Journal of Pain*, 17(1), 52-64. doi:10.1097/00002508-

200103000-00008

ten Have, M., Oldehinkel, A., Vollebergh, W., & Ormel, J. (2005). Does neuroticism explain variations in care service use for mental health problems in the general population?: Results from the Netherlands Mental Health Survey and Incidence Study (NEMESIS). *Social Psychiatry And Psychiatric Epidemiology*, 40(6), 425-431. doi:10.1007/s00127-005-0916-z

Tsai, J. L., Knutson, B., & Fung, H. H. (2006). Cultural variation in affect valuation. *Journal of Personality and Social Psychology*, 90(2), 288-307. doi:10.1037/0022-3514.90.2.288

Umberson, D. (1992). Gender, marital status and the social control of health behavior. *Social Science & Medicine*, 34(8), 907-917. doi:10.1016/0277-9536(92)90259-S

Verhofstadt, L. L., & Devoldre, I. (2012). Observed support provision in couples: The influence of biological sex and gender identity. *Social Behavior And Personality*, 40(1), 175-176.

doi:10.2224/sbp.2012.40.1.175

Wahl, H. W., Heyl, V., & Schilling, O. (2012). Robustness of personality and affect relations

under chronic conditions: The case of age-related vision and hearing impairment. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 67B(6), 687-696. doi:10.1093/geronb/gbs002

Watson, D., & Pennebaker, J. W. (1989). Health complaints, stress, and distress: Exploring the central role of negative affectivity. *Psychological Review*, 96(2), 234-254.
doi:10.1037/0033-295X.96.2.234

Wilson, R. S., Krueger, K. R., Gu, L. P., Bienias, J. L., Mendes de Leon, C. F., & Evans, D. A. (2005). Neuroticism, extraversion, and mortality in a defined population of older persons. *Psychosomatic Medicine*, 67, 841–845.
doi:10.1097/01.psy.0000190615.20656.83