AN ABSTRACT OF THE DISSERTATION OF

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Title: Dynamic Linkages of Personality and Health: The Effect of Traits and States in Predicting Health-Goal Progress

Abstract approved:

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Karen A. Hooker

Optimal aging is strongly related to personality factors along with health-behavior habits. Personality has played a key role in understanding the interactions between human behavior and the environment and as a vital predictor in determining health outcomes of individuals. Although previous studies have found links between personality traits and health, less is known about more process-oriented personality constructs, such as goals and self-regulatory strategies as linkages between traits and health outcomes. The purpose of this study is to explore the dynamic linkages of personality and health by examining how daily health-goal progress is associated with daily positive and negative affect as well as whether the association between health-goal progress and positive and negative affect can be predicted by personality traits of neuroticism and conscientiousness. Main research questions are: 1) Are daily positive and negative affect associated with daily health-goal progress? 2) To what extent are the traits of neuroticism and conscientiousness related to the overall levels of daily

health-goal progress over a 100-day time period? 3) Do neuroticism and conscientiousness moderate the relationships between daily positive affect and daily health-goal progress as well as between negative affect and daily health-goal progress? This study was guided by *developmental systems theory* (Ford & Lerner, 1992) and *the six-foci model of personality* (Hooker & McAdams, 2003). This study utilized data from the "Personal Understanding of Life and Social Experiences" (PULSE) project that was a 100 day internet-based, daily study of Oregon residents over the age of 50. The sample for this study ($N = 76$) included participants who have participated at both baseline (initial survey) and the microlongitudinal phase (over 100 days). Personal health goals, neuroticism, and conscientiousness were measured at baseline. Daily health-goal progress, daily positive affect, and negative affect were measured over 100 days. Multilevel modeling analysis was used to examine within-person variations and between-person differences in daily health-goal progress and daily positive and negative affect by estimating an intercept (initial status) and slope (change) for each individual. The results of this study show that first, daily health-goal progress was positively coupled with daily positive affect and negatively coupled with daily negative affect within persons. Second, the associations between daily positive affect and daily health-goal progress and between daily negative affect and daily health-goal progress varied between individuals. Third, health-goal progress on the previous day was positively related to concurrent positive affect and negatively related to concurrent negative affect. Fourth, individuals high in neuroticism and individuals high in conscientiousness were only marginally likely to experience higher levels of health-goal progress over the 100-day period compared to those with low scores. Fifth, individuals high in neuroticism when experiencing high levels of

negative affect tended to report lower levels of daily health-goal progress. These findings may provide enhanced knowledge of patterns of day-to-day variability within persons and lead to better health care. Moreover, the findings of the current study suggest that health-improving interventions could be targeted individually to participants based on knowledge of the linkages between daily goal progress and daily affect and personality traits. Ultimately, the personality of older adults may act as risk factors and/or protective factors in the processes of aging during the second half of life.

Dynamic Linkages of Personality and Health:

The Effect of Traits and States in Predicting Health-Goal Progress

by
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APPROVED:

Major Professor, representing Human Development and Family Studies

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Co-Director of the School of Social and Behavioral Health Sciences

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Dean of the Graduate School

I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

Soyoung Choun, Author

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INTRODUCTION

Studies on aging have continued to research the possible development of individuals in order to allow people to live their lives as desirably and successfully as possible (e. g., Baltes, Lindenberger, & Staudinger, 2006; Ryff, 1989; Schulz & Heckhausen, 1996). Personality has been prominently and variously featured in research on aging as a key role in understanding the interactions between human behavior and the environment (Ebner & Freund, 2007) and as a vital predictor in determining health outcomes of individuals (Hooker, Hoppmann, & Siegler, 2010; Smith & Spiro, 2002). While many studies found links between traits and health (e.g., Friedman & Booth-Kewley, 1987; Lahey, 2009; Siegler, Hooker, Bosworth, Elias, & Spiro, 2010), less is known about more process-oriented personality constructs, such as goals and self-regulatory strategies, as linkages between traits and health outcomes (Hooker, et al., 2010). Goals and self-regulation may have important roles for achieving and maintaining resources that are meaningful for the person and important for adaptation to loss (e.g., Carver & Scheier, 1998; Lock & Latham, 2006). Health goals refer to individuals' choices of health-promoting activities to enhance their health (Bolkan & Hooker, 2012; Schwarzer, 2008). Health self-regulation as health-goal guidance processes involves phases of health-goal setting, health-goal pursuing, and health-goal accomplishment (Maes & Karoly, 2005). Examining how self-regulating health goals relate to health behaviors is important in understanding healthy aging. Successful self-regulatory processes related to health may lead to

engagement in positive health behaviors. Positive health behaviors, such as maintenance of proper nutrition and daily exercise, have been identified as key determinants in one's ability to age optimally (Renner, Knoll, & Schwarzer, 2000).

Personality is thought to be a driving force leading to health-related behaviors and how individuals plan for and achieve their health goals. Previous studies found that pursuing personal goals was related to emotional well-being such as happiness or depression (e.g., Klinger, 1975: McGregor & Little, 1998; Sheldon & Kasser, 1998). Positive and negative emotional states (i.e., happiness, joy, sadness, or anxiety) are caused by appraisals of events relating to goals, concerns, and aspirations (Oatley, 2004). Personality traits have been shown to predict daily experiences of emotions (Robinson, Meier, & Vargas, 2005). For example, high neuroticism is linked with experience of daily negative emotions (e. g., Mroczek & Almeida, 2004; Schimmak, 2003), whereas conscientiousness has been linked to daily positive emotions (Nater, Hoppmann, & Klumb, 2010). The traits of neuroticism and conscientiousness have been acknowledged to predict longevity, disease progression, and mortality (e.g., Bogg & Roberts, 2004; Hooker, et al., 2010; Lahey, 2009). In this study, we examine whether state affect (positive and negative) is associated with health regulatory processes (health-goal progress) on a daily basis. We also focus on neuroticism and conscientiousness in order to assess whether individual differences in these traits predict intraindividual processes of health-goal progress and emotional well-being. Enhanced knowledge of the dynamic processes of personality and how these are related to health-goal progress may afford increased opportunities for health-promotion interventions that will initiate and sustain health-related behaviors and improve quality of life.

Examination of how daily changes in state aspects of personality (i.e., positive and negative affect) are associated with changes in daily health behaviors is rare. Understanding within-person variability (intraindividual variability) in personality and health will not only contribute to the conceptualization and measurement of the dynamic processes of personality development in adulthood, but also it will provide new knowledge to promote healthy aging. Specifically, emotional states (i.e., happiness, joy, sadness, or anxiety) refer to intraindividual processes involving short-term change across time and situations (Bolkan, Meierdiercks, & Hooker, 2008). Therefore, frequent and repeated measurements are necessary to capture intraindividual variability of emotional states. In this study, we used microlongitudinal data that consist of daily repeated assessment data collected over 100 days via online daily surveys.

The overall goal of this study is to enhance understanding of the dynamic processes of personality and how these are related to health-goal progress through examination of how people self-regulate their health guided by *developmental systems theory* (Ford & Lerner, 1992) and *the six-foci model of personality* (Hooker & McAdams, 2003) that was the scaffold for this study. This study is based on a microlongitudinal model that incorporates daily health-goal progress with personality traits and states. To do this, we examine how daily health-goal progress is associated with daily positive and negative affect as well as whether the association with health-goal progress and positive and negative affect can be predicted by personality traits of neuroticism and conscientiousness.

The main research questions are: 1) How does daily positive and negative affect associate with daily health-goal progress? 2) How do neuroticism and

conscientiousness predict overall levels of daily health goal progress over the 100-day time period? 3) Do neuroticism and conscientiousness moderate the relationships between daily positive affect and daily health-goal progress as well as between negative affect and daily health-goal progress?

Chapter 2
LITERATURE REVIEW

Theoretical Frameworks

Developmental Systems Theory

As an overarching theoretical framework, *developmental systems theory* (Ford & Lerner, 1992) offers an understanding of how biological, psychological, behavioral, and environmental elements interact and shape a person's life. Developmental systems theory views human development as "successively selectively constrained and facilitated by current states and contexts of the person" (Ford & Lerner, 1992, p. 50). Ford and Lerner (1992) state that "individual human development involves incremental and transformational processes through a flow of interactions among current characteristics of the person and his or her current contexts" (p. 49). Developmental systems theory proposes a theoretical synthesis by integrating the concepts of elaborative vs. decremental changes, successive vs. progressive changes, adaptive vs. aptive changes, and incremental vs. transformational changes. We will discuss the most relevant assumptions of the developmental systems theory for the current study.

The Most Relevant Tenets of Developmental Systems Theory

Multivariate and multilevel organization. One of most important issues is the idea that human life and development is involved in multiple variables from multilevel (e.g., within and between levels) of organizations.

Dynamic interaction. The structures and functions of human development from multilevel are interacted within dynamic and reciprocal relations.

Mutual causality. All variables of human development are interrelated in

mutual causality. The relationship between causes and effects is considered mutually influential.

The fused influences of nature and nurture. Genes and environment are reciprocally facilitating and restraining in influencing human life and development.

Relative plasticity and developmental variability. The processes of human development vary and change across a lifespan. Each individual has a unique fusion of human development and behavior. This means that there are huge variabilities—both intraindividual variability across time as well as interindividual differences among people (e.g., height, personality, intelligence, or motivation).

The individual as an open, self-regulating, and self-constructing system. The person in context can be described as "an open, self-organizing, self-constructing system, or a living system" (Ford & Lerner, 1992, p. 92). Within the concept of open systems, developmental processes and outcomes become "larger, more complex, and more elaborate" through acquiring additional resources and conveying materials and information (p. 95).

Self-regulating control system. To produce "desired imagined states" (p. 179), the self-regulating system operates through "feedforward and feedback processes" (p. 99) that take on different roles (Ford & Lerner, 1992). Feedforward processes are involved in proactive, future-oriented, and goal-oriented actions to prepare to produce desired outcomes. In contrast, feedback processes engage in past-oriented and reactive roles to interpret information about current situations. Negative feedback is "a stability-maintaining regulatory process" that activates to reduce the gap between desired results and current states (p. 99). Positive feedback is "a change-producing" process that operates to increase the disparity between desired and current

states (p. 99) and engage in an important role in human change and development.

What Developmental Systems Theory Applies to the Present Study?

To apply the emphasis on person–context interactions to the present study, the internal processes of how people adapt, change, and grow over time may be shaped by what people try to do within their own unique contexts. Ford and Lerner (1992) emphasize the importance of the complex relationship between an individual and his or her context on development because development is open ended and unpredictable. This theory also points out that changes in developmental pathways are influenced by personal goals. People usually construct "desired imagined states" that are described as "goals, purposes, wants, or intentions" to arrange anticipating ideal outcomes (Ford & Lerner, 1992, p. 179). Subsequently, people organize their behaviors to pursue developmental pathways that will lead to preferred outcomes. For instance, if a person wants to lose weight to achieve better health (personal goal), he or she may pursue daily health behaviors such as exercise and diet to lose weight (self-regulation). However, people may expect different outcomes and pursue different pathways to the same goal.

The Six-Foci Model of Personality

While developmental systems theory guides this study to examine the relationship between an individual and his or her context on development, the six-foci model of personality (Hooker & McAdams, 2003) guided our exploration of how personality may play an important role in understanding the interactions between human behavior and environment. Gottlieb, Wahlsten, and Lickliter (1996) have indicated that "developmental system theory does not answer the specific questions about specific phenotypes of a specific organism" (p. 263). This study employed the

six-foci model of personality as a model for how dynamic transactions between individual personalities and contexts continuously shape the individual life course; how individuals interplay with their environment in adaptive ways; how personality offers risk or protective factors; how personality is integrated with the process of aging during the second half of life.

To explain the complexity of determining development within and between individuals, Hooker (2002) and Hooker and McAdams (2003) presented the six-foci model of personality as a comprehensive framework. The six-foci model of personality highlights the plasticity and multidirectionality of individuals and integrates personality processes and structures within a levels-of-analysis framework (Bolkan & Hooker, 2012). Baltes, Lindenberger, and Staudinger (2006) also utilize a structural and a process-oriented approach. These paralleling structure and process pairs characterize each of the three levels of analysis. The three levels comprise traits and states (Level 1), personal action constructs and self-regulatory processes (Level 2), and life stories and self-narration (Level 3) (Hooker & McAdams, 2003). Personality structures contain traits, personal action constructs (goals and developmental tasks), and life stories. Personality processes include states, self-regulation, and self-narration (see Figure 1).

Level 1: Traits and States

Traits are defined as "a dispositional signature and account for broad consistencies in behavior across situations and over time" (Hooker & McAdams, 2003). McAdams (1995) argues that traits based on cautious observations reflect individual differences in behavior and the personality of the person being rated. Similarly, Costa and McCrae (2003) identify that traits must be seen over time and

across situations. Traits are acknowledged as broad and general dispositions that are not fixed to particular contexts and are generally stable (Hooker, 2002). Although recent studies found that personality traits change in adulthood (Mroczek & Spiro, 2007), it has been argued that these findings may not generally apply to short-term personality intervention because personality traits change and occur slowly over a number of years and some individuals remain stable (Turiano, Pitzer, Armour, Karlamangla, Ryff, & Mroczek, 2011). Costa and McCrae (1989) identify five major dimensions of personality that have come to be accepted by most personality researchers and are known as the Big Five personality traits: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness.

States are characterized as a process construct involving the transient processes engaging the moment-to-moment changes a person experiences depending on internal or environmental triggers (Bolkan, et al., 2008). States contain emotions and moods such as happiness and worry as well as physiological states such as fatigue or hunger (Hooker, et al., 2010). Particularly, examining individual variation within different temporal frames (e.g., daily, monthly, yearly) is important to understand how the transient processes occur within a person (Bolkan, et al., 2008). To capture intraindividual variability in personality states (e.g., moods, anxiety), frequently and repeated measurements of individuals over long periods of time are required (Hooker, et al., 2010).

Level 2: Personal Action Constructs and Self-Regulatory Processes

Personal action constructs (PACs) are conceptualized as cognitive structures that represent an individual's goals, developmental tasks, and personal motivations (Bolkan, et al., 2008). PACs emphasize the motivational feature of goal-directed

behavior and the context relating to each individual's time, place, and social context (e.g., social roles, gender, social class) (Hooker, et al., 2010). Examples of PACs are current concerns (Klinger, 1975), personal projects (Little, 1989), life tasks (Cantor & Kihlstrom, 1987), personal strivings (Emmons, 1986), identity goals (Gollwitzer & Wicklund, 1985), and possible selves (Markus & Nurius, 1986). These PACs are related to goals and vary by level of abstract goals and temporal frame (Hooker, et al., 2010). For instance, a personal project might be completing one's doctoral dissertation that is a concrete goal within a short time; whereas, possible selves might be related to becoming a college professor that requires great efforts sustained over time. As goal constructs, PACs are hierarchically organized in motivational structures (Bolkan & Hooker, 2012).

Self-regulatory processes are viewed as the processes involved in one's efforts to reach goals or desired outcomes through the setting, pursuing, and evaluation of goals (Bolkan & Hooker, 2012). Self-regulatory processes are linked to domain-specific and personal goals (Hooker, et al., 2010). Once PACs are formed, volitional processes of action control activate the pursuit of goals (Bolkan & Hooker, 2012). The ability to feel in control of goals is significantly related to achieving well-being (Bandura, 1997). Examples of self-regulatory processes are self-efficacy, sense of control, resilience, and sense of mastery. Self-efficacy and sense of control are related to specific developmental domains and outcomes (Bolkan, et al., 2008). For example, older adults with high self-efficacy tend to continue to engage in physical activities compared to those with low self-efficacy (Prohaska, Belansky, Belza, Buchner, Marshall, McTigue, Satariano, & Wilcox, 2006). A sense of personal control also has positive effects on health in later life (Skaff, 2007). The perceived

sense of control decreases in adulthood but varies significantly between individuals within age groups, and it shows wide variations in intraindividual changes over time (Lachman, Neupert, & Agrigoroaei, 2011). Ong and his colleagues (2006) found that older adults with high resilience show faster emotional recovery from daily stress. A sense of mastery has also been related to maintaining the positive views of the aging self in the face of age-related developmental challenges in midlife (Lachman & Bertrand, 2001).

Level 3: Life-Story and Self-Narration Processes

The life-story process refers to narrations of a person's reconstructed past, perceived present and anticipated future (Hooker & McAdams, 2003). Life stories include how individuals integrate and internalize their life story with plots, characters, images, themes, and scenes. This is accomplished by reviewing and self-understanding one's life story.

The self-narration processes represent what individuals remember, reminisce, and tell in their life stories by co-constructing the nature of self (Hooker & McAdams, 2003). Self-narration processes are involved in reciprocal communications between autobiographical memories (e.g., long term memories) and current self. Autobiographical memories support self-continuity that can lead to goal-striving, self-knowledge, and well-being. For older adults, memorizing and telling their life stories may be modified to align with the audience or current situational environment.

What the Six-Foci Model of Personality Applies to the Present Study?

Even though the six-foci model of personality is thought to provide an overarching direction for our lives and our developmental trajectories, the dynamic process aspects related to the structural aspects have received little empirical

investigation. Within the six-foci model of personality, this study explored how the dynamic linkages of personality processes (states and self-regulatory processes) and personality structures (traits and goals) relate to health-goal progress. Through the utilization of a shot-term longitudinal design, we examined how daily positive and negative affect and daily health goal progress vary over time as well as how neuroticism and conscientiousness might influence these processes.

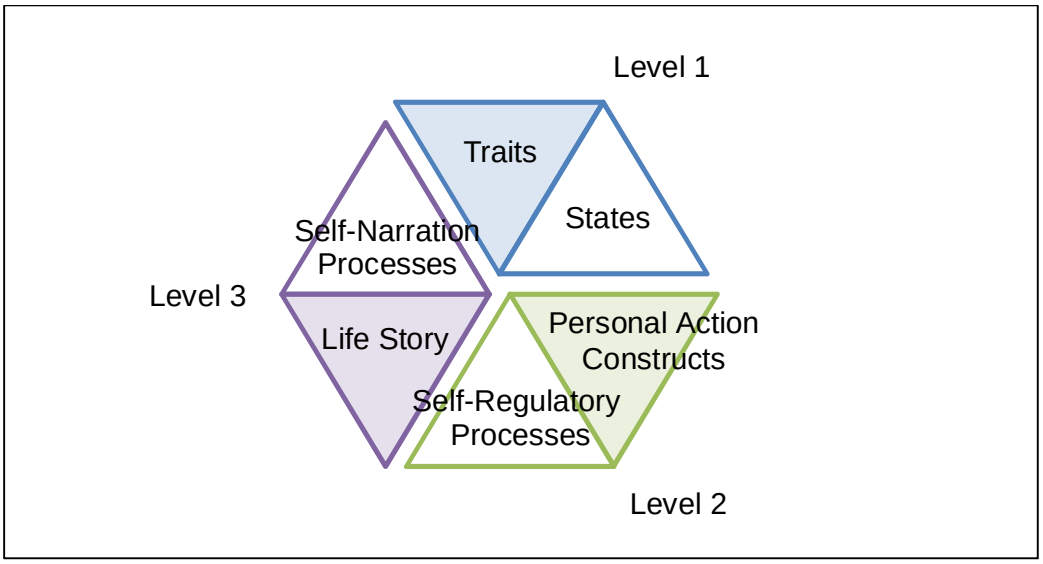

Figure 1 The Six-Foci Model of Personality (Hooker & McAdams, 2003)

Optimal Aging and Health

The current emphasis on understanding optimal aging is prompted by increased longevity, improved health, and growing aging populations (Wykle, Whitehouse, & Morris, 2005). Most criteria for optimal aging tend to assume that the aging processes take place on biological, psychological, and social levels (e.g., Baltes, 1994; Crosnoe & Elder, 2002; Rowe & Kahn, 1987, 1997; Ryff, 1989; Schmidt, 1994; Schulz & Heckhausen, 1996; Vaillant, 2002). Definitions and conceptual frameworks

of optimal aging, however, still place a strong emphasis on physical and functional health (Young, Frick, & Phelan, 2009). Health has been characterized as a life-long process across the life span (Spiro, 2001). Thus, later life health has been shaped as an outcome of all phases of life (Aldwin, Spiro, & Park, 2006; Hooker, Hoppmann, & Siegler, 2010). Specifically, health issues become increasingly important as people move from mid-life to later life (Hooker, 1992). For older adults in particular, the health related dimension of quality of life is significantly important. Health is not the only aspect in achieving optimal aging, but still it is the means to fulfilling one's purpose of life (Aldwin & Gilmer, 2004).

The recent perception of health has changed from disease management to emphasis on health promotion that is highlighted by self-managing healthy lifestyle habits (Bandura, 2004, 2005). It has been known that healthy lifestyle habits such as exercising regularly, eating a healthy diet, avoiding smoking, decreasing alcohol consumption, and reducing chronic stress have an effect on the quality of health and the rate of aging (Aldwin, et al., 2006; Vaillant, 2002). Maintaining health-related behaviors not only promotes a healthy life, but it also prevents serious health problems that include obesity, diabetes, high blood pressure, heart disease, stroke, cancer, and other chronic conditions (Prochaska, Spring, & Nigg, 2008). It will be necessary to explore how individuals initiate and sustain healthy behaviors to make desirable health outcomes that will have a greater impact on public health and health care expenses which increase dramatically with age (Zohrabian & Philipson, 2010).

Health and Personality

It has been identified that individual differences in optimal aging are strongly

related to personality factors along with health-behavior habits (Aldwin, Spiro, & Park, 2006; Hendricks & Hatch, 2006; Hooker, Monahan, Bowman, Frazier, & Shifren, 1998). Personality has been defined as the internal organization of individual characteristics and qualities that guides what we do and what we think and helps us to predict our behaviors (Bolkan, Meierdiercks, & Hooker, 2008). Personality is a key contributor to important life outcomes that are related to components of optimal aging such as the absence of chronic conditions, maintaining functioning, and active engagement with life (Hooker, Choun, & Hall, 2010). For instance, personality change is related to mortality (Mroczek & Spiro, 2007), social relationships, status attainment, and physical health (Caspi, Roberts, & Shiner, 2005). Personality is associated with subjective well-being, longevity, peer and family relationship, marital relationship, occupation, political attitude, criminality, and community involvement (Ozer & Benet-Martinez, 2006). Evidence supports that personality predicts mortality, divorce, and occupational attainment better than socioeconomic status (Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). Duberstein and his colleagues (2011) also found that elevated neuroticism, lower openness, and lower conscientiousness are associated with risk of Alzheimer's disease.

Despite the fact that personality has been known as a critical health predictor (e.g., Hooker, Choun, & Hall, 2010), it has been argued that personality may have been most under acknowledged in empirical research on later life health (Hooker, et al., 2010). With advancing age, Roberts and Mroczek (2008) found that personality (e.g., traits) continued to develop in adulthood as a result of cumulative changes across the life course. Even though social vitality declines with age, people become more confident, warm, responsible, calm, and socially mature (Helson, Jones, &

Kwan, 2002; Roberts & Mroczek, 2008; Roberts & Wood, 2006). These positive changes in personality traits may be positively related to the physical health and lead to optimal aging (Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007).

Many studies have documented the association between health and personality characteristics (Hooker, et al., 1998; Lochenhoff, Duberstein, Friedman, & Costa, 2011; Mroczek & Spiro, 2007; Mroczek, Spiro, & Griffin, 2006; Smith & Gallo, 2001; Turiano, Pitzer, Armour, Karlamangla, Ryff, & Mroczek, 2011). For example, Smith and Gallo (2001) report that high neuroticism and low conscientiousness are related to negative health behaviors such as smoking, lack of exercise, poor diet, and excessive alcohol consumption. Furthermore, hostility, anxiety, and depressive symptoms are negatively related to cardiovascular health (Aldwin, Spiro, & Park, 2006). However, less is known about how changes in personality are associated with changes in health outcomes within aging individuals. Siegler and her colleagues (2003) report that an increase in hostility from young to middle-adulthood was significantly associated with unhealthy behaviors such as avoidance of exercise and consuming a high-fat diet. On the other hand, Mroczek, Spiro, and Griffin (2006) found that an increase in conscientiousness and decrease in neuroticism would enhance physical health. Therefore, changes in personality seem to be important factors predicting health in later life.

Although understanding the influences of personality on health are helpful in connecting personality with possible health risks, it has been argued that simply showing the association between personality traits and health cannot explain the underlying mechanisms (e.g., Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). The association between personality and health outcomes could be a result of direct

and indirect influences of other possible mechanisms. Specifically, more process-oriented personality constructs (e.g., Hooker & McAdams, 2003) such as goals and self-regulatory strategies could act as linkages between personality traits and health outcomes (Bolkan & Hooker, 2012; Hooker, Hoppmann, & Siegler, 2010; Smith & Spiro, 2002). However, relatively little empirical research has examined the dynamic processes involved in the possible mechanisms linking personality and health (Smith & Spiro, 2002). Given that personality could influence health outcomes through health behaviors, an increased understanding of the relationships of health goals and the self-regulatory processes on health goals will enable us to better predict health outcomes (Smith & Spiro, 2002).

Health Goals and Self-Regulatory Processes

Health Goals

Even though people understand living a healthy lifestyle is beneficial in preventing diseases and promoting health, it is considered to be difficult to adopt and maintain healthy behaviors. The question arises as to what makes it possible for individuals to be motivated to adopt and maintain health-promoting activities. According to the developmental systems theory, individuals' desired imagined states such as goals, purposes, wants, or intentions motivate their behaviors to pursue preferred outcomes (Ford & Lerner, 1992). Goals are recognized as the starting point for all behaviors, and they are known to control behaviors through cognitive and motivational processes (Dijksterhuis & Aarts, 2010). As regulators of actions, goals may motivate individuals to focus on their ability toward goal-relevant actions by using stored requisite task knowledge and skills and by searching for new knowledge

(Lock & Latham, 2006).

Although goals are key predictors of behaviors, relatively little is known about how goals are translated to behaviors (Karoly, 1999). Carver (2004) has argued that studies of goal constructs in personality such as current concerns (Klinger, 1975), personal project (Little, 1989), personal striving (Emmons, 1986), life task (Cantor & Kihlstrom, 1987), and possible selves (Markus & Nurius, 1986) tend to assume that goals energize and direct activities. In the context of health, it is unclear why and how some individuals translate their health goals into actual health activities, while others do not. The gap between goals and actual behaviors reflects the behind the scenes or the black box of psychological process (Karoly, 1999; Schwarzer, 2008). In an attempt to fill the gap between health goals and health behaviors, Schwarzer (2008) has provided a more detailed health action process approach (HAPA) model that emphasizes mediating factors that are assumed to predict health behaviors. The mediators (e.g., self-efficacy, action planning) in the health-action process approach (Schwarzer, 2008) help us better understand how individuals may adopt and maintain their health behaviors.

Health-related goals represent individuals' choice of health activities to enhance their health (Bolkan & Hooker, 2012). The selection of health goals (e. g., improving body strength, avoiding chronic disease), involve personal resources (e. g., physical ability, financial capability, and time) and personal preferences (e, g., walking versus jogging; eating more vegetables versus participating more in exercise) (Bolkan & Hooker, 2012). Personal health goals can be hierarchically built from smaller daily action units to larger or higher level of goals (Bolkan & Hooker, 2012; Hooker, 1999; Little, 1983). For example, daily action units such as jogging every

day for 30 minutes or taking multi-vitamins everyday can be incorporated with higher personal health goals such as maintaining a healthy weight or increasing body strength. Understanding how older people select and pursue their goals is important for older adults in maintaining their physical functioning and compensating for their physical losses (Bolkan & Hooker, 2012).

Health Regulatory Processes: Health Goal Progress

Schwarzer (2008) suggests that health behavior changes occur through eliminating health compromising behaviors and adopting health enhancing behaviors by self-regulatory efforts. Self-regulatory efforts imply that some form of internal energy systems, patterns, and processes exist (Carver & Scheier, 1998). Self-regulation refers to individuals' abilities to regulate their thoughts, emotions, and behaviors in order to avoid discrepancies between current self and desired self (Carver & Scheier, 1998). Individuals' abilities to self-generate goals and goal-directed behaviors may be required for efficient adaptation in self-regulatory processes (Carver & Scheier, 1998). In this regard, the processes of self-regulation are characterized as "goal-guidance processes" that involve iterative phases of goal setting, goal pursuing, and goal accomplishment (Maes & Karoly, 2005, p. 269).

Bolkan and Hooker (2012) use the metaphor of a gyroscope to illustrate how internal processes of self-regulation play a central role in understanding multidirectional processes of human development. Like a physical gyroscope used for maintaining orientation and balance by relying on rotating three rings whose axis is free to take any orientation, the internal processes of self-regulation involve selecting goals and pursuing goals to achieve desired outcomes. Similarly, health self-regulation as a sequence of self-regulatory processes involves motivational,

volitional, and actional processes that eliminate health compromising behaviors and adopt health promoting behaviors (Leventhal, Rabin, Leventhal, & Burns, 2001 cited in Schwarzer, 2008).

Evidence supports that self-regulation is the most powerful predictor of initiation and maintenance of health-enhancing behaviors (Maes & Karoly, 2005). Empirical studies on health self-regulation have been conducted on multiple areas including physical exercise (Reuter, Ziegelmann, Lippke, & Schwarzer, 2009), dietary self-care (Nouwen, Ford, Balan, Twisk, Ruggiero, & White, 2011), chronic pain (Karoly & Ruehlman, 2006), chronic illness and disability (Schwarzer, Lippke, & Luszczynska, 2011), and weight loss (Rejeski, Mihalko, Ambrosius, Bearon, & McClellend, 2011). Even though these studies on health self-regulation provide specific self-efficacy, risk perception, action planning, outcome expectancies, and goal units to predict health related outcomes and behaviors, there is not much known on how they can be changed over time (Leventhal & Mora, 2005).

One of the most important aspects of research on self-regulation will be the longitudinal study of self-regulatory processes in everyday circumstances (Blanchard-Fields & Kalinauskas, 2008). However, a few studies on health self-regulation (Nouwen, Ford, Balan, Twisk, Ruggiero, & White, 2011; Reuter, Ziegelmann, Lippke, & Schwarzer, 2009) have conducted longitudinal investigations with relatively long measurement intervals (e.g., three-month to six-month intervals). Moreover, tracking daily within-person variations and between-person differences in self-regulatory processes toward health goals by using time sampling methods remains largely unexplored (Affleck, Tennen, Urrows, Hall, Higgins, Abeles, Karoly, & Newton, 1998). Likewise, there is little study on exploring within–person associations

between health regulated goals and other health goal related variables (e.g., positive and negative affect, personality traits) (Maes & Karoly, 2005). For that reason, providing sensitive detection of within-person variations of the processes of health goal regulation will be useful in comprehending how older adults maintain their well-being in selected goal domains in the face of multiple losses with aging.

Emotional States: Positive and Negative Affect

It has been known that affect is central for understanding personal goal constructs (Emmons & Kaiser, 1996) and effective goal pursuits (Karoly, 2010). Although previous studies use the terms *affect*, *mood*, and *emotion* to distinguish duration, these uses are not applied consistently (Pressman & Cohen, 2005; Schulz, 1985), and therefore the present study use these terms interchangeably. As one of emotional phenomena, affect is commonly used to represent "personal and subjective feelings that may vary in intensity" of arousal (Schulz, 1985, p. 531). Lazarus (1993) emphasizes the appraisal of relational meaning as the cognitive and motivational foundation of emotion. Each emotion is aroused from a different appraisal regarding personally meaningful goal attainment. Positive emotions are results from the attainment of meaningful personal goals, while negative emotions are related to the failure of achieving goals (Lazarus, 1993). Carver and Scheier (2011) have stated that affect is "a consequence of a feedback process that runs automatically, simultaneously with and in parallel to the behavior-guiding process" (p. 6). In the feedback process, positive or negative affect arise depending on whether the desired rate of progress is high or below (Carver & Scheier, 2011). Positive affect (doing well) such as elation, eagerness, and excitement is related to approach activities whereas negative affect

(doing poorly) such as fear, guilt, and anxiety is related to avoidance activities (Carver & Scheier, 2011).

Studies show that poor health goal regulation may create negative affect (Muller & Spitz, 2010) and people high in perceived self-efficacy or feeling of personal control are less likely to appraise events as threatening or negative (Bandura, 1986). Empirical evidence suggests that older adults experience fewer motivational conflicts (i.e., personal goals) and higher level of day-to-day emotional well-being (Riediger & Freund, 2008). Research on age related self-regulation and a low-calorie diet found that older adults experience more positive affect and less negative affect than younger people during dieting (Hennecke & Freund, 2010). Older adults show greater self-regulation of emotion than younger adults that decreases in negative affect and increases in positive affect (Carstensen & Mikels, 2005; Carstensen & Charles, 1994) as well as a lower range of intraindividual variability in daily positive and negative affect (Rocke, Li, & Smith, 2009). Despite the fact that affect has been known as a vital goal motivator, there are limited studies on an association between affect and health goals.

On the other hand, several studies examine the relationships between affect and health outcomes (e.g., Okun, Stock, Haring, & Witter, 1984). For example, increased positive affect is associated with lower risk of developing a cold. (e.g., Cohen, Doyle, Turner, Alper, & Skoner, 2003), lower risk of AIDS mortality (Moskowitz, 2003), improved functional status following stroke (Seale, Berges, Ottenbacher, & Ostir, 2010), reduced cardiovascular disease risk and increased resistance to infection (Steptoe, Dockray, & Wardle, 2009), and reduced mortality (Chida & Steptoe, 2008). The interplay between affect and health has been

extensively studied with negative affect related to health outcomes (e.g., Brown & Moskowitz, 1997; Diefenbach, Leventhal, Leventhal, & Patrick-Miller, 1996). For example, increased negative affect is associated with increased same-day pain and health care use (Gil, Carson, Porter, Scipio, Bediako, & Orringer, 2004), higher mobility and mortality (Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002), and lower health-related quality of life (Kressin, Spiro, & Skinner, 2000). Taken together evidence is accumulating that changes in positive affect seem to be an important factor predicting better health outcomes and changes in negative affect are significantly related to poorer health outcomes.

Daily Affect

As personality states are the transient processes engaging the moment-to-moment changes, conducting a longitudinal study of affective experiences in everyday circumstances is important to understand how the momentary processes happen within a person (Bolger, Davis, & Rafaeli, 2003; Bolkan, et al., 2008). Daily measurements can be explicitly explained how changes in emotions are related to changes in other variables in everyday life context including daily possible selves (Hoppmann, Gerstorf, Smith, & Klumb, 2007), stressful events (Sliwinski, Almeida, Smyth, & Stawski, 2009), daily lives (Nezlek, Kafetsios, & Smith, 2008), daily stress and events (Rocke, Li, & Smith, 2009), daily anxiety (Shifren & Hooker, 1995), and daily state optimism (Shifren & Hooker, 1995). Tracking daily within-person variations and between-person differences in associations between affect and health goal progress in older adults can help us understand patterns of day-to day variability and lead to better health care and increased quality of life.

Personality Traits: Neuroticism and Conscientiousness

In order to examine individual differences in within-person associations between daily health-goal progress and daily affect, the traits of neuroticism and conscientiousness as predictors will be added into a model of the dynamic linkages of personality and health. Although links between daily goal progress and daily affect and personality traits have not been studied previously, the results of some studies show consistent effects of personality traits on health-related variables, especially concerning neuroticism (Mroczek, Spiro, Griffin, & Neupert, 2006). According to Costa and McCrae (2003), high scores on neuroticism reflect aspects of emotional instability such as "anxiety, hostility, self-pity, worry, depression, and impulsiveness," while lower scores reflect aspects of stability such as "calm, relaxed, unemotional, secure, and self-satisfied" (p. 48). High scores on conscientiousness reflect characteristics of discipline and organization such as "competence, order, achievement, efficiency, and reliability," while lower scores reflect lack of seriousness such as aimless, unreliable, lazy, careless, and negligent" (p. 50). Individuals high in neuroticism are more likely to be self-critical and sensitive to criticism from others and experience difficulty in managing stress and controlling impulses and negative affectivity (Duberstein, et al., 2011; Lahey, 2009). On the other hand, individuals high in conscientiousness are likely to be task-oriented, plan ahead, and work persistently toward achieving goals (Duberstein, et al., 2011; Robert & Bogg, 2004). Longitudinal studies found that higher neuroticism and lower conscientiousness are associated with greater increases in body mass index (BMI) and more weight fluctuations over 50 years (Sutin, Ferrucci, Zonderman, & Terracciano, 2011) and greater risk of Alzheimer's disease (Duberstein, et al., 2011).

In terms of high neuroticism, empirical evidence emerged of higher levels of negative affect (Costa & McCrae, 1989; Isaccowitz & Smith, 2003), higher occurrence of minor daily illness (Larsen & Kasimatis, 1991), greater exposure to stress (Bolger & Zuckerman, 1995), less self-care behaviors (Kressin, Spiro, Bosse, & Garcia, 1999), and greater risk for Alzheimer's disease (Duberstein, et al., 2011). Studies support the hypotheses that higher levels of neuroticism are significantly related to poorer health behaviors such as smoking and excessive drinking that often lead to worse physical health outcomes and earlier death (Mroczek, Spiro, & Turiano, 2009; Lahey, 2009).

Research of daily experiences found that individuals high in neuroticism are more reactive to stress and have higher negative affect compared to those who are low in neuroticism (Mroczek & Almeida, 2004). These findings may be associated with potential self-regulatory problems. With a negative view of events, individuals high in neuroticism may show lack of regulatory ability (Mroczek, Spiro, Griffin, & Neupert, 2006). In this sense, little is known about how individuals high in neuroticism with higher negative affect regulate their daily events, such as health enhancing activities. Moreover, examining how individuals high in neuroticism with higher levels of positive affect engage in their health activities is rare.

With regard to conscientiousness, relatively little research has been conducted to find consistent evidence of linkages with the more dynamic aspects of personality such as affect, goals, or self-regulation. Studies found that high conscientiousness is significantly related to reduced risk of illness and greater longevity (Friedman & Martin, 2007; Hill, Triano, Hurd, Mroczek, & Roberts, 2011), longer survival with chronic medical illness (Christensen , Ehlers, Wiebe, Moran, Raichle, Ferneyhough,

& Lawton, 2002), and a decrease in daily cortisol concentrations that were driven by positive affect (Nater, Hoppmann, & Klumb, 2010). Conscientious individuals are more likely to participate in health enhancing behaviors (Duberstein, et al., 2011) and feel relatively younger (Knoll, Rieckmann, Scholz, & Schwarzer, 2004). Although research reported conscientious individuals are more likely to participate in health enhancing behaviors, it has been argued that health behaviors cannot completely explain the link between conscientiousness and health (Duberstein, et al., 2011). Little is known about how individuals high in conscientiousness regulate their health behaviors attaining health goals in everyday life. Furthermore, examining the association between levels of conscientiousness and daily positive and negative affect have received little empirical investigation. Therefore, it will be useful to explore whether a link between daily goal progress and daily affect and personality traits exists.

The Present Study

The aim of this study is to explore the dynamic linkages of personality and health including personal health goals, health goal progress, positive and negative affect, neuroticism, and conscientiousness based on the six-foci model of personality. This study explores how personality processes (states and self-regulatory processes) and personality structures (traits and goals) operate together across within and between-person levels. Understanding the dynamic linkages of personality and health by testing models of how personality differences are revealed within processes of daily life in the domain of health will enable us to gain new knowledge about how to optimize healthy aging.

Research Questions

1. To what extent are daily positive and negative affect associated with daily health-goal progress?
2. Do neuroticism and conscientiousness predict overall levels of health goal progress across a 100-day time period?
3. To what extent do neuroticism and conscientiousness moderate the relationships between daily positive affect and daily health-goal progress and between daily negative affect and daily health-goal progress?

Research Hypotheses

Because there is a research base related to all these research questions, it will be possible to derive specific research hypotheses (Figure 2). Six hypotheses are tested:

1. We hypothesized that within-person variations in daily positive affect will positively covary with daily health-goal progress, and daily negative affect will negatively covary with daily health-goal progress.
2. We hypothesized that health-goal progress on previous day will be positively associated with the next day's positive affect and negatively associated with next day's negative affect.
3. We hypothesized that the associations of daily positive and negative affect and daily health-goal progress will vary significantly between individuals.
4. We hypothesized that individuals high in neuroticism will experience lower levels of progress with their health goals and individuals high in conscientiousness will experience higher levels of progress with their health goals compared to those with low scores.

5. We hypothesized that high neuroticism will strengthen the links between positive affect and health-goal progress and strengthen the links between negative affect and health- goal progress.
6. We hypothesized that high conscientiousness will strengthen the links between daily positive affect and daily health-goal progress and attenuate the links between daily negative affect and daily health-goal progress.

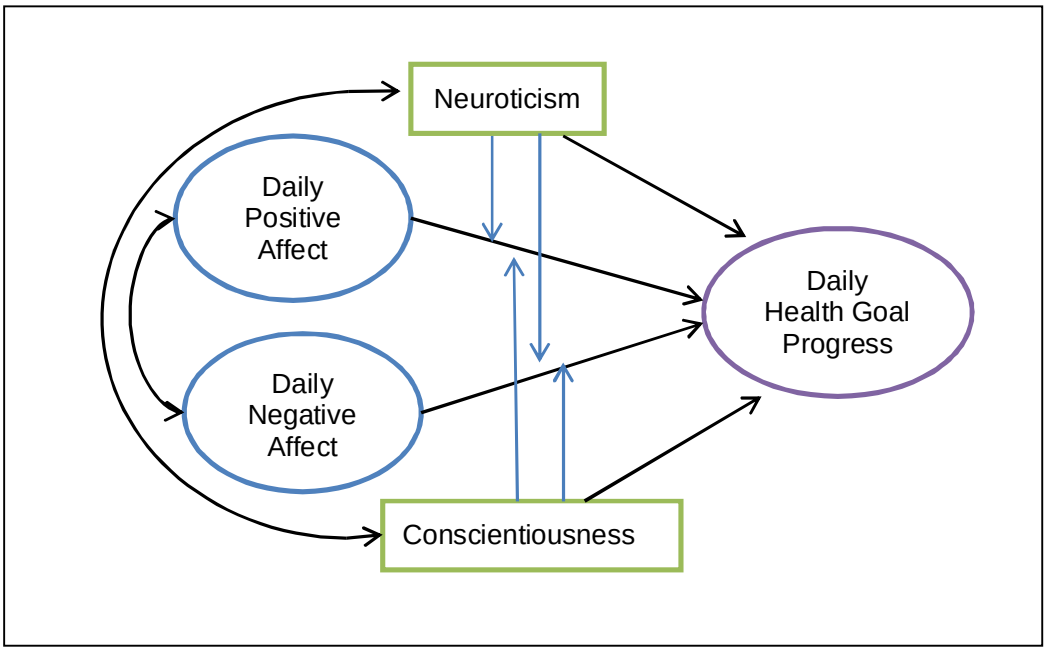

Figure 2 Conceptual Model of Dynamic Linkages of Personality and Health

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Note. A bidirectional arrow depicts a correlation, and unidirectional arrows depict hypothesized directional links.

Chapter 3
METHOD

Study Design

The present study used the data from a project entitled, "Personal Understanding of Life and Social Experiences (PULSE)" and completed online surveys taken from June to November, 2010 through this project. This PULSE project is a microlongitudinal study that was a 100 day internet-based, daily study of Oregon residents over the age of 50. Participants were recruited from the LIFE Registry of the Center for Healthy Aging Research at Oregon State University for the PULSE project. LIFE registry participants were informed about the PULSE study by a newsletter or e-mail and allowed to participate in this project through the Internet website. In the PULSE study, 105 participants were randomly assigned into two groups, daily group or burst group.

The PULSE study was designed to explore how an individual's personality, mood, social networks, and daily life influence his/her daily progress on health and social goals. This multivariate repeated measurement data allows for examination of within-person variations and between-person differences in personality and health-goal progress. Daily measurements may reduce retrospective bias because of minimizing time and experiences and the report of these experiences (Bolger, Davis, & Rafaeli, 2003). Internet-based assessment could provide the advantage of convenience, flexibility, and cost savings (Bolger, Davis, & Rafaeli, 2003). Moreover, the use of the Internet might allow a longer period of data collection (Michalak & Szabo, 1998).

Participants

The sample for the present study (n = 76) included participants who have participated in both the initial survey and the daily surveys for 100 days in the daily group. Of the 76 participants, 67 (88.2%) were women. Most participants were Caucasian (96.1 %) except for one Asian American (1.3%), and two participants identified themselves as "other" (2.6%). The average age of participants was 62.6 years (SD = 7.3 years), and the ages ranged from 52 to 87 years.

Participants were highly educated, with 42.1 percent reporting having a post-graduate degree, 36.8% being 4-year-college graduates, 14.5% being partial college graduates, and 2.6% being high school graduates. In this sample, 71.1% of respondents also reported that they were married, 10.5% were divorced or separated, 10.5% were widowed, 5.3% were single, and 2.6% of respondents were reported as "other." The employment status of participants was largely retired (39.5%), with the next large employment status being employed full time (31.6%), employed part time (15.8%), unemployed (10.5%), and homemaker (2.6%). Participants reported their health conditions; 47.4% were excellent, 43.4% were good, and 9.2% were fair.

Attrition analyses. Six participants (all women) dropped from the study between baseline (n =105) and the microlongitudinal phase (n = 99). An attrition analysis indicated that there were no differences between the dropped and the retained samples: age (t = 1.792, p = .063), race (χ^2 = .866, p = .648), marital status (χ^2 = 3.613, p = .461), education (χ^2 = 1.793, p = .774), employment status (χ^2 = 5.870, p = .209), and health condition (χ^2 = 2.104, p = .349).

Differences between daily and burst groups. In preliminary analyses, a multivariate analysis of variance (MANOVA) was conducted to determine whether

daily (n =76) and burst groups (n =23) differed significantly on the variables: age (t = 1.61, p = .112), gender (t = -.34, p = .732), race (t = -.85, p = .396), marital status (t = -.08, p = .936), education (t = .63, p = .529), employment (t = -.20, p = .845), health condition (t = 1.05., p = .298) , neuroticism (t = .72, p = .471), and conscientiousness (t = -1.40, p = .166). Based on MANOVA, the results indicated that there were not significant differences between daily and burst groups, Wilks' Lambda = .914, F (9, 99) = .98, p = .463.

Procedure

The PULSE project includes two phases: the baseline phase (an initial survey) and the microlongitudinal phase (daily surveys for 100 consecutive days). In the baseline phase, this study conducted the initial survey that collected demographic information, personality, and personal health goals. In the micro longitudinal phase, participants were randomly assigned into two groups, daily group or burst group. Participants in the daily group were assessed for consecutive 100 days and participants in the burst group were assessed for a week (7 days) at four different sessions (bursts) spaced at one month-intervals. The daily PULSE was an internet-based survey that was taken every evening for 100 days. Participants received a daily e-mail with a link to their daily PULSE questionnaires, including daily progress on personal health goals and their daily positive and negative emotional states. Each daily session was approximately 5 minutes long and concluded with a visual feedback that was provided to participants every day based on their responses for that day and comparing it to their responses on prior days. The visual feedback component was considered to help keep people motivated to remain in the PULSE study for such a

long period of time. The daily PULSE study was expected to provide useful insight into personal life by tracking their goal progress and identifying meaningful patterns of their daily lives.

Initial Survey Measures at Baseline

This study used personality traits of neuroticism and conscientiousness and personal health goals that were measured at baseline, the initial survey.

Neuroticism and Conscientiousness. The *NEO-Five Factor Inventory* (NEO-FFI, Costa & McCrae, 1989, 1997) was used to measure personality traits. The NEO-FFI is a 60-item instrument with 12 items measuring each of the five personality trait domains; neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. The NEO-FFI has been utilized extensively in gerontological research and health research (Hooker et al., 1992, 1998; Patrick & Hyden, 1999). For the purpose of this study, we used neuroticism and conscientiousness scales that are considered to be reliably related to health (McCrae & Costa, 2003) and achieving goals (Duberstein, et al., 2011; Robert & Bogg, 2004). Sample items are "Sometimes I feel completely worthless" (neuroticism), and "I work hard to accomplish my goal" (conscientiousness). Response categories of a 5-point scale for the items are (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, and (5) strongly agree, which were summed to produce total scores with higher scores indicating higher levels of neuroticism and conscientiousness. Cronbach's alpha coefficients in this study were .92 for neuroticism and .83 for conscientiousness indicating adequate internal consistency reliability. The new norms for the NEO-FFI (Costa & McCrae, 1989) were utilized in converting *T*-scores from the raw data. Based on NEO Five Factor

Inventory score, *T*-scores between 45 and 55 are considered average; above 55 are considered high and those below 45 are considered low (Costa & McCrae, 1989).

Health goals to track for 100 days. Participants were asked to choose and describe specific health goals that were important to them in the realm of health and to choose one that they expect to be working on over the next 4 months. Examples of health goals to track were maintaining a healthy weight, working on controlling disease, increasing body strength, or maintaining mobility (see Table 1). Participants were also asked to specify whether their health goals were engaged at achievement or maintenance. In this sample, participants reported that 55.3% were achievement, 44.7% were maintenance.

Daily Measures at Microlongitudinal Phase

For daily surveys, the average of participation was 86 sessions for participants in the daily group (*SD* = 16.17, range = 21 – 100). This study used daily health-goal progress and daily positive and negative affect that were measured at the microlongitudinal phase, over 100 days.

Daily health-goal progress. Personal health goals were tracked with a self-rating progress towards their health goals over 100 days. Participants briefly described their health goals and chose cue words (e.g., lose 10 pounds, walking every day, eat healthy food, or get more exercise) that were programmed to automatically populate their daily PULSE survey. Examples of the individual daily PULSE questionnaires were “Rate your progress towards your goal of Exercise Everyday”, “Rate your progress towards your goal of Healthy Diet”, or “Rate your progress towards your goal of Staying Active.” Response slider scales were from (0) no

progress to (100) much progress. The measures of daily health-goal progresses used a slider with an underlying scale so that individuals could not simply check the same number every day. This has been found to be a more sensitive indicator of change for daily use (Brose & Ram, in press; Freyd, 1923; Hooker, 1991).

Table 1

Examples of Health Goals, Meaning of Goals, Cue Words, and Goal Orientations

Health Goal	Meaning of Goal	Cue Words	Goal Orientation
Exercising at least 30 minutes every day	To improve body strength	30 minutes per day	Maintain
Lose weight and get in better shape	To have better physical condition	More fruits and veggies	Maintain
Improve muscle strength and slim down to stay healthy	To remain healthy and strengthen bones	Walking two miles	Maintain
Keep my weight under control	To be at a healthier weight	Stop snacking	Maintain
Decrease my weight	To prevent illness and diseases and tiredness	Lose 10 pounds	Maintain
Regain full use of knees following replacement surgery	To maintain my activity level better	Knee rehab	Achieve
Maintaining weight between 138 and 142	I want to be at a healthier weight	On food plan	Achieve
Regular exercise to maintain flexibility in my shoulders and elbows.	To increase my range of motion	Shoulder mobility	Achieve
Be able to walk pain free	I can walk as far as I want to	Active, healthy, balanced	Achieve
Manage my own physical health	Remaining cancer free	Healthy nutrition, aerobic exercise	Achieve

Note, The health goals and meaning of goals are not direct quotations from the PULSE survey.

Daily positive and negative affect. Daily affect was measured over 100 days with the 10-item *Affect Scale* (Kleban, Lawton, Nesselroade, & Parmelee, 1992). Participants were asked to rate how well each item described their feelings and emotions on that day using a slide indicator with scale ranging from (0) not at all to (49) extremely. Five items measured daily positive affect: (a) happy, (b) interested, (c) energetic, (d) content, and (e) warm. The other five items measured daily negative affect: (a) sad, (b) annoyed, (c) worried, (d) irritated, and (e) depressed. The order of the items was presented in a random order each day to avoid order effects.

Daily positive affect was calculated by summing the scores of the five items; higher scores indicate more positive emotional states. Daily negative affect was calculated in the same manner such that higher scores indicate more negative emotional states. Cronbach's alpha coefficients of individual means (iMEAN) for daily positive affect were .98 and for daily negative affect were .97. Cronbach's alpha coefficients of individual standard deviations across the duration of the study (iSD) for daily positive affect were .95 and for daily negative affect were .94.

Analytic Strategies

This study used multilevel modeling (MLM) to answer research questions. MLM is a method of longitudinal data analysis designed to understand within-person variation and between-individual changes over time (Curran & Bauer, 2011; Hox, 2010; Singer & Willett, 2003). Multilevel modeling analysis was used to examine within and between-person level variations in health-goal progress and positive and negative affect by estimating an intercept (initial status) and slope (change) for each individual. Within-person variation refers to amounts of variability from occasion to

occasion within a person; whereas, between-person variation refers to individual differences in process tendencies (Mroczek, Spiro, & Almeida, 2003). Occasions can be any regular and irregular length of time such as timely, daily, weekly, monthly, or yearly. Within-person variation varies above and below the individual's mean. Multilevel modeling analysis allowed us to determine the within-person coupling of the associations (e.g., travel together) between health-goal progress and positive and negative affect over time (Neupert & Allaire, 2012). Multilevel modeling analysis was used to examine to what degree the associations between health-goal progress and positive and negative affect can be explained by neuroticism and conscientiousness.

In preliminary analyses, the first step was to examine within and between-person variances and correlations among all study variables. The next step was to construct multilevel models to test research questions by using the bottom-up procedure that starts with a simplest model (the unconditional means model) and builds up into a full model by adding parameters step by step (Curran & Bauer, 2011; Hox, 2010).

Evaluating model fit. To evaluate models, the adequacy of model fit to the data was assessed by log likelihood (- 2LL), Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and the residual variances. According to Singer and Willett (2003), the AIC and the BIC are measures or criteria that can use to compare maximum likelihood models and that are based on the log-likelihood statistics. Given two models fit on the same data, the model with the smaller value of the information criterion is considered to be better. When STATA calculates the

above measures, the difference between AIC and BIC is that AIC uses number of parameters estimated, whereas BIC uses number of observations.

Data management. This study used SPSS 19, STATA 12, and Stat Transfer. SPSS 19 and STATA 12 were used to organize data and to calculate descriptive statistics. Stat Transfer was used to communicate between SPSS 19 and STATA 12. STATA 12 was used to analyze missing values, test the model fit, and to calculate the estimation of parameters.

Hypothesized Multilevel Models

Step 1: Analyzing the unconditional means model. In modeling within-person variations, the first step was to analyze the unconditional means model, which estimates the proportion of within-and between-person variance for the outcome variables and provides a benchmark value of deviance which can be used to compare models (Hox, 2010; Singer & Willett, 2003). The proportion of within-and between-person variance (intraclass correlation coefficient [ICC]) was estimated for daily positive and negative affect variables in addition to health-goal progress. The unconditional means models of health-goal progress, positive affect, and negative affect were described by the following equations:

$$Y_{ij} = \beta_{0j} + e_{ij} \quad \textbf{(1.1)}$$

$$\beta_{0j} = \Upsilon_{00} + u_{0j}$$

$$Y_{ij} = \Upsilon_{00} + u_{0j} + e_{ij}$$

where Y_{ij} represents health-goal progress, positive affect, or negative affect for individual *j* at day *i*. β_{0j} refers to individual *j*'s intercept, mean of health goal progress, positive affect, or negative affect and Υ_{00} is the between-person intercept.

e_{ij} represents the within-person residual error for person *j* at day *i* while u_{0j} refers to the between-person residual error.

Step 2: Adding functions of time and covariates. To understand the within-person processes underlying day-to-day variability in health goal progress and positive and negative affect, time (linear change trajectory) was included in the model of the individual within-person processes. The covariates of age and gender were included in the model at level 2 to control for between-person differences due to age and gender. Models with functions of time and covariates were described by the following equations:

$$Y_{ij} = \beta_{0j} + \beta_{1j}\,(Day_{ij}) + e_{ij} \qquad \textbf{(2.1)}$$

$$\beta_{0j} = \Upsilon_{00} + \Upsilon_{01}\,(Age_j) + \Upsilon_{02}\,(Gender_j) + u_{0j,}$$

$$\beta_{1j} = \Upsilon_{10} + u_{1j}$$

where Y_{ij} represents health goal progress for individual *j* at day *i* and β_{1j} refers to individual *j*'s true rate of change during the period under study. The Υs represents the random-effect estimates.

Step 3: Adding positive affect and negative affect. As time-varying explanatory variables, daily positive affect was included in the model sequentially followed by daily negative affect to examine their unique variation in health-goal progress on the within-and between-person levels. This model also controls for between-person differences in mean level of positive affect and negative affect across the study. This model was written as:

Individual within-person processes, **(3.1)**

$$Y_{ij} = \beta_{0j} + \beta_{1j}\,(Day_{ij}) + \beta_{2j}\,(PA\ within_{ij}) + e_{ij}$$

Between-person differences in within-person processes, **(3.2)**

$\beta_{0j} = \Upsilon_{00} + \Upsilon_{01}$ (Age $_j$) + Υ_{02} (Gender $_j$) + Υ_{03} (PA mean $_j$) + $u_{0j,}$

$\beta_{1j} = \Upsilon_{10} + u_{1j,}$

$\beta_{2j} = \Upsilon_{20} + \Upsilon_{21}$ (PA mean $_j$) + u_{2j}

In equation (3.1), Y_{ij} represents the health goal progress score for individual *j* at day *i*. β_{0j} represents individual *j*'s intercept; mean of health-goal progress. At level 2, β_{0j} represents the random intercept and β_{1j} refers to slope (change) for individual *j* of daily positive affect which is moderated by the mean level of positive affect and allowed to vary for each participant.

Step 4: Adding neuroticism and conscientiousness. Personality traits of neuroticism and conscientiousness were added in sequence into the hypothesized model as predictors of individual differences in health-goal progress and positive affect and negative affect. Including neuroticism and conscientiousness in the model allowed this study to examine whether each trait has direct or moderating effects on health-goal progress and positive and negative affect. We ran positive affect and negative affect independently with neuroticism and conscientiousness and then combine the model to see how they go together. This model was written as:

Individual within-person processes, **(4.1)**

$Y_{ij} = \beta_{0j} + \beta_{1j}$ (Day$_{ij}$) + β_{2j} (PA within $_{ij}$) + β_{3j} (NA within $_{ij}$) + e_{ij}

Between-person differences in within-person processes, **(4.2)**

$\beta_{0j} = \Upsilon_{00} + \Upsilon_{01}$ (Age $_j$) + Υ_{02} (Gender $_j$) + Υ_{03} (PA mean $_j$)

+ Υ_{04} (NA mean $_j$) + Υ_{05} (Neuroticism $_j$) + $u_{0j,}$

$\beta_{1j} = \Upsilon_{10} + u_{1j,}$

$\beta_{2j} = \Upsilon_{20} + \Upsilon_{21}$ (PA mean $_j$) + Υ_{02} (Neuroticism $_j$) + $u_{2j,}$

$\beta_{3j} = \Upsilon_{30} + \Upsilon_{31}$ (NA mean $_j$) + Υ_{03} (Neuroticism $_j$) + u_{3j}

Chapter 4
RESULTS

Preliminary Analyses

Comparison of neuroticism and conscientiousness with the national norms. A preliminary analysis was to compare neuroticism and conscientiousness scores of the PULSE sample with the national adult normative sample (Costa & McCrae, 1989). As shown in Table 2, compared to the adult normative sample (N = 1,000), the *t*-test indicated that all participants (n = 76) in the PULSE sample did not differ significantly in their mean raw scores for neuroticism ($t = .570$, $p = .570$) and for conscientiousness ($t = 1.496$, $p = .139$). Based on the new norms for the NEO-Five Factor Inventory score, raw scores of neuroticism and conscientiousness in this study were converted into standardized *T*-scores with a mean of 50 and a standard deviation of 10. *T*-scores were calculated using published NEO-FFI means and standard deviations that represent population norms published in the NEO PI-R manual (Costa & McCrae, 1992, p. 78 & p. 85). According to Costa and McCrae (1998, 1992), *T*-scores above 55 are considered high, those below 44 are considered low, and scores between 45 and 54 are considered average.

The analysis of incomplete data. In any longitudinal study, there are the inevitable problems of missing data or incomplete data. During the 100-day period, 76 participants who have participated in both the initial survey and the daily surveys completed on average 86 sessions ($SD = 16.17$, range = 21 – 100). Neuroticism and conscientiousness measured in the initial survey did not have any missing values. There were missing values in the daily survey measures as in health-goal progress (14%), positive affect (14%), and negative affect (14%).

Table 2

Comparison of Means and Standard Deviations for Neuroticism and Conscientiousness Scales

NEO-FFI scale		Adult Normative Sample[a]			PULSE Sample[b]				
		M	*SD*	Range	*m*	*sd*	Range	*t*-value	*p*-value
Neuroticism									
	Men	17.60	7.46	2-36	15.89	8.02	2-28	.358	.729
	Women	20.54	7.61	4-41	18.72	10.20	2-42	1.501	.138
	Combined	19.07	7.68	2-41	18.39	10.01	2-42	.570	.570
Conscientiousness									
	Men	34.10	5.95	17-45	34.11	4.31	30-40	.320	.758
	Women	35.04	5.78	15-46	33.16	7.02	15-46	1.977	.052
	Combined	34.57	5.88	15-46	33.28	6.77	15-46	1.496	.139

Note. Means and standard deviations for neuroticism and conscientiousness scales reflect person-level averages of the raw scores prior to *T*-score conversion. [a]Adult normative sample: N = 1000, men = 500, women = 500, age range = 21- 65+, and White (85%) (Costa & McCrae, 1989). [b]PULSE sample: n = 76, men = 9, women = 67, age range = 52 – 87, and White (96 %).

One of the advantages of the multilevel modeling (MLM) analysis is its ability to handle missing data such as missing measurements within individuals (Hox, 2010). According to Hox (2010), multilevel modeling does not require balanced data because multilevel regression models do not assume an equal number of observations and missing observations that do not cause significant problems. However, when an explanatory variable is missing, the usual treatment within MLM analysis is to remove the observation from the analysis by listwise deletion (Hox, 2010).

This study conducted preliminary analyses for missing data or incomplete data using two approaches, multiple imputation (MI) and maximum likelihood (ML) estimation techniques. We found that the results of multilevel models with the multiple imputation techniques (10 imputed data sets) were not different when compared to the results of the multilevel models with maximum likelihood (ML)

estimation (see Appendix A). Multiple imputation (MI) permits the analysis of complete data sets in which missing values are filled in based on regression-predicted values through generating multiple complete data sets (Hofer & Hoffman, 2007). The main disadvantage of multiple imputation (MI) is that it does not produce a determinate result such as Log Likelihood, AIC (Akaike Information Criterion), or BIC (Bayesian Information Criterion) (Allison, 2003). On the other hand, maximum likelihood (ML) provides estimates of variances, covariances, and means for reporting summary descriptive statistics (Hofer & Hoffman, 2007). Maximum likelihood (ML) is the most widely used for missing data, but it is much more restricted in its applications compared to multiple imputation (MI) (Allison, 2003). This study presented the results using maximum likelihood (ML) estimation method for missing values provided in STATA 12.

Descriptive Analyses

Between-person variables. Table 3 shows means, standard deviations, and correlations among the measures of between-person level variables in the study. Health-goal progress was positively correlated with positive affect and conscientiousness and negatively correlated with negative affect and neuroticism. Health-goal progress was not significantly correlated with age and gender. Positive affect was positively correlated with conscientiousness and age and negatively correlated with negative affect and neuroticism. Negative affect was positively correlated with neuroticism and negatively correlated with conscientiousness and gender. Neuroticism and conscientiousness were correlated negatively.

Table 3

Between-Person Correlations, Means, and Standard Deviations for Variables in the Models

Variable	1	2	3	4	5	6	7
1. Health Goal Progress							
2. Positive Affect	.44***						
3. Negative Affect	-.28***	-.46***					
4. Neuroticism	-.13***	-.40***	.54***				
5. Conscientiousness	.19***	.31***	-.18***	-.60***			
6. Age	-.04	.17***	.004	-.12***	.16***		
7. Gender	-.05	-.14***	-.13***	.09**	-.05	.07	
M	63.16	15.13	3.56	18.39	33.28	62.55	.88
SD	19.38	4.69	3.06	10.01	6.77	7.31	

Note. n = 76, Gender (0 = Male, 1 = Female). Means and standard deviations for neuroticism and conscientiousness reflect person-level averages of the raw scores prior to *T*-score conversion. $^{**}p \leq .01$, and $^{***}p \leq .001$, Two-tailed tests.

Daily within-person variables. As shown in Table 4, the proportion of within-and between-person variance (intraclass correlation coefficient [ICC]) was estimated for all daily variables, health-goal progress, positive and negative affect. Unconditional means models were used to partition within-person and between-person variance. The within-person variance consists of variance attributed to day-to-day fluctuations for 100 days. Results revealed that there was significant variance at both levels for each variable. For health-goal progress, the intraclass correlations coefficient (ICC) was .50 indicating that 50% of variance for health-goal progress reflected differences across individuals and the within-person variance was 50% (1-ICC) that was observed within persons across days. For positive affect, 38% of variance reflected differences across individuals, and 62% of variance was observed within persons across days. The proportion of the between-person variance for negative affect was 61% and the within-person variance was 39%.

The results of correlations in the within-person level between daily variables showed that daily health-goal progress was significantly and positively correlated with daily positive affect and negatively with daily negative affect. Daily positive affect was negatively correlated with daily negative affect.

Table 4

Within-Person Correlations of Health goal progress, Positive and Negative Affect

Variable	ICC	iSD	sd	1	2
1. Health Goal Progress	.50	17.73	7.97		
2. Positive Affect	.38	5.66	1.91	.22***	
3. Negative Affect	.61	3.03	1.67	-.15***	-.11***

Note. n = 76. Number of observations = 6523, ICC = intraclass correlation = the proportion of within-person and between-person variances explained by cluster membership.
iSD = individual standard deviation, sd = standard deviation of iSD.
***$p \leq .001$, Two-tailed tests.

Preliminary Estimation Models of Health-Goal Progress

The preliminary estimation models for health-goal progress were built step by step, adding variables sequentially followed by day and covariates of age and gender on health-goal progress (see Table 5). The results of this study reported unstandardized estimates of coefficients (B) with p-values for the fixed effects because MLM analyses provide only unstandardized estimates of coefficients (Nezlek, in press).

As presented in Table 5, the mean model (unconditional means model) of health-goal progress showed the significant initial status (the grand mean) of health-goal progress ($B = 63.17$, $p \leq .001$) indicating that individuals were significantly different from zero in health-goal progress at baseline. The intercept of 63.17 in this model was simply the average health-goal progress across all participants over the

100 days. The within-person variance was 19.45 ($p \leq .001$) and between-person variance was 19.28 ($p \leq .001$) suggesting that an average individual's health-goal progress varies over time and that individuals differ from each other in health-goal progress because each variance was significantly different from 0. The within-person variance of 19.45 and the between-person variance of 19.28 are benchmark values of deviance which can be used to compare models (Hox, 2010; Singer & Willett, 2003). The proportion of variance at between-person level is estimated as $\rho = 19.28/(19.28 + 19.45) = .50$, indicating that 50% of variance for health-goal progress reflected differences across individuals and the within-person variance was 50% (1 - .50) (Hox, 2010; Singer & Willett, 2003).

In the slope model of health-goal progress, only one predictor of day as a linear change trajectory was introduced into the individual within-person processes. The slope model showed that there was a significant increase in health-goal progress across the100 days ($B = .07$, $p \leq .001$) and 4% of within-person variance in health goal progress was explained by day. The between-person variance in day on daily health-goal progress reflected that individuals' health-goal progress varied over time for 100 days by a standard deviation of .12 ($SE = .01$, $p \leq .001$). Comparing the slope model with the mean model, the difference of 3 degrees of freedom and the -2LL (Log Likelihood) difference of 185.78 far exceeds of 16.27, the .001 critical values of a χ^2 distribution on 3 degrees of freedom showing that the slope model provides a better fit to the data than the mean model.

The covariates of age and gender were included in the covariate model at the between-personal level. Day, age, and gender are grand-mean centered (Hox, 2010). The main effect of age and gender was not significant and the between-person

variance (19.30, $p \leq .001$) did not change compared to the slope model, which indicated that age and gender differences did not have a significant effect on health-goal progress.

Table 5

Preliminary Estimation Models of Daily Health-Goal Progress

	Daily Health-Goal Progress		
	Mean Model B (SE)	Slope Model B (SE)	Covariate Model B (SE)
Fixed Effects			
Intercept	63.17*** (2.23)	63.24*** (2.23)	63.05*** (2.24)
Day		.07*** (.02)	.07*** (.02)
Age			-.26 (.30)
Gender			.37 (6.69)
Random Effects (SD)			
Level 1 Within-person	19.45*** (.17)	19.02*** (.17)	19.02*** (.17)
Level 2 Between-person	19.28*** (1.58)	19.30*** (1.69)	19.30*** (1.59)
Rate of change	__	.12*** (.01)	.12*** (.01)
R^2 Within	__	.04	.04
R^2 Between	__	.00	.00
-2LL	57565.14	57379.36	57378.64
Δ-2LL(*df*)	__	185.78 (3)	186.5(5)
AIC	57571.13	57391.36	57394.64
BIC	57591.48	57432.06	57448.90

Note. n = 76, Number of observations = 6523. Dependent variable is Daily Health-Goal Progress. Day, Age, and Gender are grand mean centered (Hox, 2010). -2LL = Log Likelihood, AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion. * $p \leq .05$, ** $p \leq .01$, and *** $p \leq .001$, Two-tailed tests

Research Question 1:
Associations of Positive and Negative Affect and Health-Goal Progress

Table 6 presents the results for the research question 1, which was to examine the associations between daily positive affect and daily health-goal progress and between daily negative affect and daily health-goal progress. This study also examined the lagged effects between daily positive and negative affect and daily

health-goal progress on previous and present days (see Table 7 and Figure 3). Examining relationships between lagged coefficients such as a measure at time (today) and another at time n-1 (previous day) provides some indication of causal relationships between measures (Nezlek, in press). Day, age, gender, positive affect between-person (mean positive affect), and negative affect between-person (mean negative affect) are grand- mean centered because centering makes the meaning of the intercept clearer (Nezlek, in press).

Daily positive affect and daily health-goal progress. The positive affect model in Table 6 showed that the fixed effect of positive affect in the within-person level ($B = 1.66$, $p \leq .001$) and the between-person level ($B = 2.24$, $p \leq .001$) significantly predicted an increase in health-goal progress. As this study predicted, these results showed that daily health-goal progress was positively coupled with daily positive affect in the within-person level. In the between-person level, individuals with higher levels of positive affect were likely to experience higher levels of health-goal progress compared to those with lower levels of positive affect during the study period. Importantly, there was a significant cross-level interaction between the within-person and between-person positive affect ($B = .09$, $p \leq .05$) indicating that individuals with high-average positive affect tended to experience a greater increase in health-goal progress compared to those with low-average positive affect. In the positive affect model, 14% of the variance in within-person positive affect and 30% of the variance in between-person positive affect were associated with health-goal progress. The between-person variance in positive affect on daily health-goal progress indicated that individuals' health-goal progress varied from the within-person positive affect by a standard deviation of 1.36 ($SE = .18$, $p \leq .001$).

Table 6

Within-Person Coupling of Daily Positive and Negative Affect on Daily Health-Goal Progress

	Daily Health-Goal Progress		
	Positive Affect Model B (SE)	Negative Affect Model B (SE)	PA and NA Model B (SE)
Fixed Effects			
Intercept	52.82***(2.28)	64.56***(2.21)	51.50***(2.57)
Day	.05***(.02)	.05***(.02)	.05**(.02)
Age	-.31 (.26)	-.22 (.26)	-.35 (.24)
Gender	1.74 (5.84)	6.32 (6.22)	3.07 (5.75)
PA Within	1.66***(.21)	__	1.74***(.23)
PA Between	2.24***(.42)	__	2.47***(.47)
PA Within × Between	.09*(.04)	__	.09*(.04)
NA Within	__	-.97***(.14)	.19 (.14)
NA Between	__	-1.57*(.71)	.34 (.72)
NA Within × Between	__	.01 (.04)	-.03 (.04)
Random Effects (SD)			
Level 1 Within-person	18.08***(.16)	18.70***(.17)	18.03***(.16)
Level 2 Between-person	16.13***(1.36)	18.73***(1.56)	16.43***(1.41)
Rate of change	.12***(.01)	.12***(.01)	.12***(.01)
PA	1.36***(.18)	__	1.44***(.19)
NA	__	.78***(.13)	.63***(.17)
R^2 Within	.14	.08	.14
R^2 Between	.30	.06	.27
-2LL	56804.76	57185.68	56788.74
Δ-2LL(*df*)	760.38 (11)	379.46 (11)	776.40(18)
AIC	56832.76	57213.67	56830.74
BIC	56927.72	57308.64	56973.18

Note. n = 76, Number of observations = 6523. Dependent variable is Daily Health-Goal Progress. Day, Age, Gender, PA between, and NA between are grand mean centered (Hox, 2010). PA Within = positive affect in the within-person level, PA Between = positive affect in the between-person level, NA Within = negative affect in the within-person level, NA Between = negative affect in the between-person level. -2LL = Log Likelihood, AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion. * $p \leq .05$, ** $p \leq .01$, and *** $p \leq .001$, Two-tailed tests.

Daily negative affect and daily health-goal progress. As presented in Table 6, the negative affect model showed that the fixed effect of negative affect in the within-person level (B = -.97, $p \leq .001$) and the between-person level (B = -1.57, $p \leq .05$) significantly predicted a decrease in health-goal progress. As this study expected, these results revealed that daily health-goal progress was negatively coupled with daily negative affect in the within-person level. In the between-person level, individuals with higher levels of negative affect were likely to experience lower levels of health-goal progress compared to those with lower levels of negative affect during the study period. However, there was not a significant cross-level interaction between the within-person and between-person negative affect (B = .01, p = .743). In the negative affect model, 8% of the variance in within-person negative affect and 6% of the variance in between-person negative affect were associated with health-goal progress. The between-person variance in negative affect on daily health-goal progress indicated that individuals' health-goal progress varied from the within-person negative affect by a standard deviation of .78 (SE = .13, $p \leq .001$).

Daily positive affect, daily negative affect, and daily health-goal progress. In the PA and NA model presented in Table 6, both positive and negative affect were included into the individual within-person processes and between-person level. The PA and NA model showed the fixed effect of positive affect in the within-person level (B = 1.74, $p \leq .001$) and the between-person level (B = 2.47, $p \leq .001$) significantly predicted an increase in health-goal progress, whereas negative affect in the within-person level (B = .19, p = .183) and between-person level (B = .34, p = .625) was not significantly associated with the progress on daily health goal. According to Nezlek (in press), one reason for this result may have been the relatively smaller amount of

the between-person variance in negative affect (6%) than positive affect (30%). Comparing the PA and NA model to the positive affect alone model and the negative affect alone model, the difference of 7 degrees of freedom and the -2LL (Log Likelihood) difference of 396.94 ($p \leq .001$) and 16.03 ($p \leq .05$) showed that the PA and NA model provides a better fit to the data than the positive affect alone model and the negative affect alone model.

Lagged effects of positive and negative affect and health-goal progress. Table 7 and Figure 3 show the results of lagged effects between positive affect and health-goal progress on previous and present days. The lagged model 1 in Table 7 showed that health-goal progress on the previous day was positively and significantly associated with concurrent health-goal progress ($B = .22$, $p \leq .001$) indicating that individual who reported high levels of health-goal progress on the previous day tended to report experiencing high levels of concurrent health-goal progress. The lagged model 2 showed that positive affect on the previous day was positively associated with concurrent health-goal progress ($B = .11$, $z = 1.68$, $p = .092$) but the association was marginally significant. The lagged model 3 showed that negative affect on the previous day was not significantly associated with concurrent health-goal progress ($B = -.17$, $z = -1.62$, $p = .105$). Furthermore, the lagged model 4 revealed that the lagged effect of positive affect on the previous day was not significant ($B = .04$, $p = .680$) after including health-goal progress on the previous day. The lagged model 5 showed that negative affect on the previous day was not significantly associated with concurrent health goal progress ($B = -.06$, $p = .650$) including health-goal progress on the previous day. Likewise, the lagged model 6 demonstrated that there were not lagged effects between concurrent health-goal

progress and positive and negative affect on the previous day.

The cross-lagged effects between variables as shown in Figure 3 demonstrate that health-goal progress on the previous day was positively associated with concurrent positive affect ($B = .01, p \leq .05$). On the other hand, health-goal progress on the previous day was negatively associated with concurrent negative affect ($B = -.01, p \leq .10$) but the association was marginally significant. These results revealed that individuals who reported high levels of health-goal progress on the previous day were likely to experience high levels of concurrent positive affect and low levels of concurrent negative affect. In addition, positive affect on the previous day was positively associated with concurrent positive affect ($B = .09, p \leq .001$). Negative affect on the previous day was positively associated with concurrent negative affect ($B = .17, p \leq .001$).

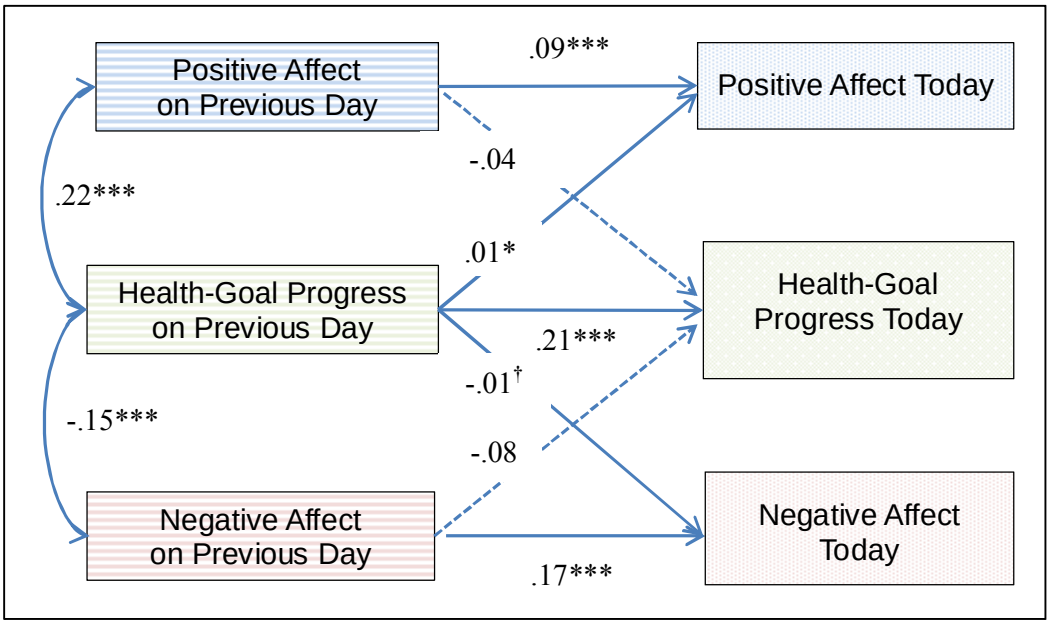

Figure 3 Cross-lagged Effects between Health-Goal Progress, Positive Affect, and Negative Affect on Previous and Present days

Note. Solid paths are statistically significant and broken paths are not significant.
†$p \leq .10$, *$p \leq .05$, **$p \leq .01$, and ***$p \leq .001$, Two-tailed tests.

Table 7

Within-Person Lagged Models of Daily Positive and Negative Affect on Daily Health-Goal Progress

Effect	Daily Health-Goal Progress					
	Lagged Model 1 B (SE)	Lagged Model 2 B (SE)	Lagged Model 3 B (SE)	Lagged Model 4 B (SE)	Lagged Model 5 B (SE)	Lagged Model 6 B (SE)
Fixed Effects						
Intercept	63.40*** (2.24)	63.37*** (2.24)	63.42*** (2.24)	63.29*** (2.25)	63.38*** (2.25)	63.48*** (2.27)
Day	.04** (.01)	.06**(.02)	.05**(.02)	.04**(.01)	.04**(.01)	.04**(.01)
Previous Day HGP	.22*** (.02)	—	—	.21*** (.01)	.21*** (.02)	.21*** (.02)
Previous Day PA	—	.11†(.06)	—	.04(.10)	—	-.04(.11)
Previous Day NA	—	—	-.17(.11)	—	-.06(.12)	-.08(.13)
Random Effects (SD)						
Level 1 Within-person	18.27*** (.17)	18.71*** (.17)	18.74*** (.17)	18.25*** (.17)	18.20*** (.17)	18.19*** (.17)
Level 2 Between-person	19.42*** (1.60)	19.37*** (1.59)	19.37*** (1.59)	19.37*** (1.59)	19.49*** (1.60)	19.47*** (1.60)
Day	.08*** (.01)	.12*** (.01)	.12*** (.01)	.08*** (.01)	.08*** (.01)	.08*** (.01)
HGP	.14*** (.02)	—	—	.14*** (.02)	.14*** (.02)	.14*** (.02)
PA	—	.38*** (.07)	—	.35* (.16)	—	.13 (.41)
NA	—	—	.53*** (.10)	—	.61*** (.13)	.60*** (.13)
R^2 Within	.12	.07	.07	.12	.12	.13
R^2 Between	.01	.01	.01	.01	.01	.01
-2LL	50740.72	56623.84	56626.68	50738.52	50726.28	50726.12
AIC	50754.73	56637.84	56640.68	50756.51	50744.29	50748.13
BIC	50801.41	56685.25	56688.09	50816.52	50804.30	50821.47

Note. n = 76, Number of observations = 5814. Dependent variable is Daily Health-Goal Progress. HGP = health-goal progress, PA = positive affect, NA = negative affect.
† $p \leq .10$, * $p \leq .05$, ** $p \leq .01$, and *** $p \leq .001$, Two-tailed tests.

Research Question 2:
Associations of Neuroticism, Conscientiousness, and Health-Goal Progress

Table 8 presents the results for the research question 2, which was to examine associations between neuroticism and daily health-goal progress and between conscientiousness and daily health goal progress across a 100-day time period. In addition, the direct effects of neuroticism and conscientiousness on the relationships of daily affect and daily health-goal progress were presented in Tables 9, 10 and 11.

Neuroticism and daily health-goal progress. For neuroticism, trait model 1 in Table 8 showed that neuroticism did not have a significant effect on health-goal progress (B = -.23, p = .289) indicating that individuals high in neuroticism did not experience significantly lower levels of health-goal progress over the 100-day period compared to those low in neuroticism. Trait model 1 revealed an insignificant cross-level interaction between neuroticism and day (B = -.003, z = -1.60, p = .109) representing that individuals high in neuroticism were not likely to experience more decrease in health-goal progress over the 100-day period when compared to those low in neuroticism. In order to examine how neuroticism and conscientiousness work together, neuroticism and conscientious were included in trait model 3 in Table 8. Although trait model 3 showed that neuroticism had a marginally significant cross-level interaction with day (B = -.003, z = -1.69, p = .091), the coefficient of -.003 was estimated nearly zero, which indicated that the substantial direct effect of neuroticism on daily health-goal progress was not significant over the 100 days.

Conscientiousness and daily health-goal progress. As shown in Table 8, trait model 2 showed that conscientiousness did not have a significant effect on health-goal progress (B = .36, p = .101). This result revealed that individuals high in

conscientiousness did not experience significantly higher levels of health-goal progress across the 100-day period compared to those low in conscientiousness. Furthermore, there was not a significant cross-level interaction between conscientiousness and day (B = .001, p = .701) across the 100-day period. In trait model 3 in Table 8, conscientiousness did have neither a significant effect on health-goal progress (B = .34, p = .103) nor a significant cross-level interaction between conscientiousness and day (B = .001, p = .519).

Table 8

Models of Neuroticism and Conscientiousness on Daily Health-Goal Progress

	Daily Health-Goal Progress		
Effect	Trait Model 1 B (SE)	Trait Model 2 B (SE)	Trait Model 3 B (SE)
Fixed Effects			
Intercept	63.15***(2.21)	63.01***(2.19)	63.00***(2.19)
Day	.06***(.02)	.07***(.02)	.07***(.02)
Neuroticism	-.23 (.22)	__	-.03 (.27)
Neuroticism × Day	-.003 (.00)	__	-.003†(.00)
Conscientiousness	__	.36 (.22)	.34 (.27)
Conscientiousness × Day	__	.00 (.00)	-.00 (.00)
Random Effects (SD)			
Level 1 Within-person	19.02***(.17)	19.02***(.17)	19.03***(.17)
Level 2 Between-person	18.62***(1.58)	18.37***(1.56)	18.32***(1.55)
Day	.12***(.01)	.12***(.01)	.12***(.01)
R^2 Within	.04	.04	.04
R^2 Between	.08	.09	.10
-2LL	57376.34	57376.72	57378.88
AIC	57392.35	57392.71	57393.88
BIC	57446.61	57446.98	57461.71

Note. n = 76, Number of observations = 6523. Dependent variable is Daily Health-Goal Progress. Day, Neuroticism, and Conscientiousness are grand mean centered (Hox, 2010). $^{\dagger}p \leq .10$, $*p \leq .05$, $**p \leq .01$, and $***p \leq .001$, Two-tailed tests.

Table 9

Models of Positive Affect, Neuroticism, and Conscientiousness on Health-Goal Progress

Effect	Daily Health-Goal Progress			
	Model 1 B (SE)	Model 2 B (SE)	Model 3 B (SE)	Model 4 B (SE)
Fixed Effects				
Intercept	53.26***(2.26)	52.70***(2.30)	53.33***(2.27)	52.71***(2.28)
Day	.05**(.02)	.05**(.02)	.05**(.02)	.05**(.02)
PA Within	1.66***(.22)	1.66***(.22)	1.68***(.21)	1.67***(.22)
PA Between	2.15***(.42)	2.37***(.46)	2.11***(.44)	2.32***(.46)
PA Within × Between	.09*(.04)	.09*(.05)	.08†(.04)	.09†(.05)
Neuroticism	—	.25 (.21)	—	.41†(.25)
Neuroticism × PA Within	—	.00(.02)	—	.02(.02)
Conscientiousness	—	—	.07(.20)	.28(.23)
Conscientiousness × PA Within	—	—	.01(.02)	.02(.02)
Random Effects (SD)				
Level 1 Within-person	18.08***(.16)	18.08***(.16)	18.08***(.16)	18.08***(.16)
Level 2 Between-person	16.25***(1.37)	16.12***(1.35)	16.26***(1.37)	15.98***(1.34)
Day	.12***(.01)	.12***(.01)	.12***(.01)	.12***(.01)
PA	1.36***(.18)	1.36***(.18)	1.35***(.18)	1.34***(.18)
R^2 Within	.14	.14	.14	.14
R^2 Between	.29	.30	.29	.31
-2LL	56806.14	56804.70	56805.54	56802.36
AIC	56830.14	56832.71	56833.54	56834.36
BIC	56911.53	56927.67	56958.50	56942.89

Note. n = 76, Number of observations = 6523. Dependent variable is Daily Health-Goal Progress. PA Within = positive affect in the within-person level, PA Between = positive affect in the between-person level. $^{\dagger}p \leq .10$, $*p \leq .05$, $**p \leq .01$, and $***p \leq .001$, Two-tailed tests.

Research Question 3:
Associations of Positive Affect, Negative Affect, Neuroticism, Conscientiousness, and Health-Goal Progress

Tables 9, 10, and 11 present the results for the research question 3, which was to examine the effect of neuroticism and conscientiousness on the relationships of daily affect and daily health-goal progress. Neuroticism and conscientiousness were added into the models as predictors of individual differences in health-goal progress and positive affect and negative affect. The models were built including positive affect and negative affect independently with neuroticism and conscientiousness. Age and gender were dropped to build more parsimonious models that provide more precise estimates of individual coefficients which are the focus of most hypotheses (Nezlek, in press).

Positive affect, neuroticism, conscientiousness, and health-goal progress. Model 1 in Table 9 showed that the fixed effect of positive affect in the within-person level ($B = 1.66$, $p \leq .001$) and the between-person level ($B = 2.15$, $p \leq .001$) significantly predicted an increase in health-goal progress. A cross-level interaction between the within-person and between-person positive affect was significant ($B = .09$, $p \leq .05$). Model 2 included neuroticism to examine the direct effect of neuroticism on daily health-goal progress that was not significant ($B = .25$, $p = .235$). To test the moderating effect for neuroticism on the association with daily positive affect and daily health-goal progress, neuroticism was included into a cross-level interaction with the within-person positive affect in Model 2. However, the moderating effect of neuroticism was not significant ($B = .004$, $p = .829$).

Conscientiousness was include in Model 3 to test the direct effect on daily health-goal progress and the moderating effect on the association between daily

Table 10

Models of Negative Affect, Neuroticism, and Conscientiousness on Health-Goal Progress

Effect	Daily Health-Goal Progress			
	Model 5 B (SE)	Model 6 B (SE)	Model 7 B (SE)	Model 8 B (SE)
Fixed Effects				
Intercept	64.73***(2.19)	64.96***(2.20)	64.52***(2.18)	64.91***(2.16)
Day	.05**(.02)	.05**(.02)	.05**(.02)	.05**(.02)
NA Within	-.96***(.14)	-.97***(.14)	-.95***(.14)	-.96***(.14)
NA Between	-1.54*(.70)	-1.82*(.83)	-1.41*(.71)	-2.15*(.83)
NA Within × Between	01(.04)	.05(.05)	01(.04)	.06(.05)
Neuroticism	—	.17(.25)	—	.51†(.31)
Neuroticism × NA Within	—	-.02(.01)	—	-.03†(.02)
Conscientiousness	—	—	.22 (.21)	.48†(.26)
Conscientiousness × NA Within	—	—	.00(.01)	-.02(01)
Random Effects (SD)				
Level 1 Within-person	18.70***(.17)	18.70***(.17)	18.70***(.17)	18.70***(.17)
Level 2 Between-person	18.64***(1.53)	18.60***(1.53)	18.51***(1.52)	18.20***(1.50)
Day	.12***(.01)	.12***(.01)	.12***(.01)	.12***(.01)
NA	.77***(.12)	.75***(.16)	.77***(.13)	.73***(.13)
R^2 Within	.08	.08	.08	.08
R^2 Between	.07	.07	.08	.11
-2LL	57187.18	57185.20	57185.78	57181.88
AIC	57211.18	57213.20	57213.78	57213.89
BIC	57292.58	57308.17	57308.74	57322.42

Note. n = 76, Number of observations = 6523. Dependent variable is Daily Health-Goal Progress. NA Within = negative affect in the within-person level, NA Between = negative affect in the between-person level. † $p \leq .10$, * $p \leq .05$, ** $p \leq .01$, and *** $p \leq .001$, Two-tailed tests.

positive affect and daily health-goal progress. Model 3 showed that the direct effect of conscientiousness on daily health goal was not significant ($B = .07$, $p = .726$) and the moderating effect on the association between daily positive affect and daily health-goal progress was not significant ($B = .01$, $p = .474$). In order to examine how neuroticism and conscientiousness work together with positive affect, neuroticism and

conscientiousness were included in Model 4 (see Table 9). Interestingly, Model 4 showed that the direct effect of neuroticism on daily health goal was positively but marginally significant ($B = .41$, $p = .098$) indicating that individuals high in neuroticism were likely to experience higher levels of health-goal progress over the 100-day period when compared to those low in neuroticism. However, neuroticism and conscientiousness did not have the moderating effects on the associations between daily positive affect and daily health-goal progress.

Negative affect, neuroticism, conscientiousness, and health-goal progress. Model 5 in Table 10 presented that the fixed effect of negative affect in the within-person level ($B = -.96$, $p \leq .001$) and the between-person level ($B = -1.54$, $p \leq .05$) significantly predicted a decrease in health-goal progress. A cross-level interaction between the within-person and between-person negative affect was not significant ($B = .01$, $p = .750$). Neuroticism was included in Model 6 to test the direct effect on daily health-goal progress and the moderating effect on the association between daily negative affect and daily health-goal progress. However, Model 6 showed the direct effect of neuroticism on daily health-goal was not significant ($B = .17$, $p = .501$), and the moderating effect on the association with daily negative affect and daily health-goal progress was not significant ($B = -.02$, $p = .154$). Model 7 included conscientiousness to test the direct effect on daily health-goal progress and the moderating effect on the association with daily negative affect and daily health-goal progress. Model 7 showed that the direct effect of conscientiousness on daily health-goal was not significant ($B = .22$, $p = .297$), and the moderating effect on the association with daily negative affect and daily health-goal progress was not significant ($B = .00$, $p = .998$).

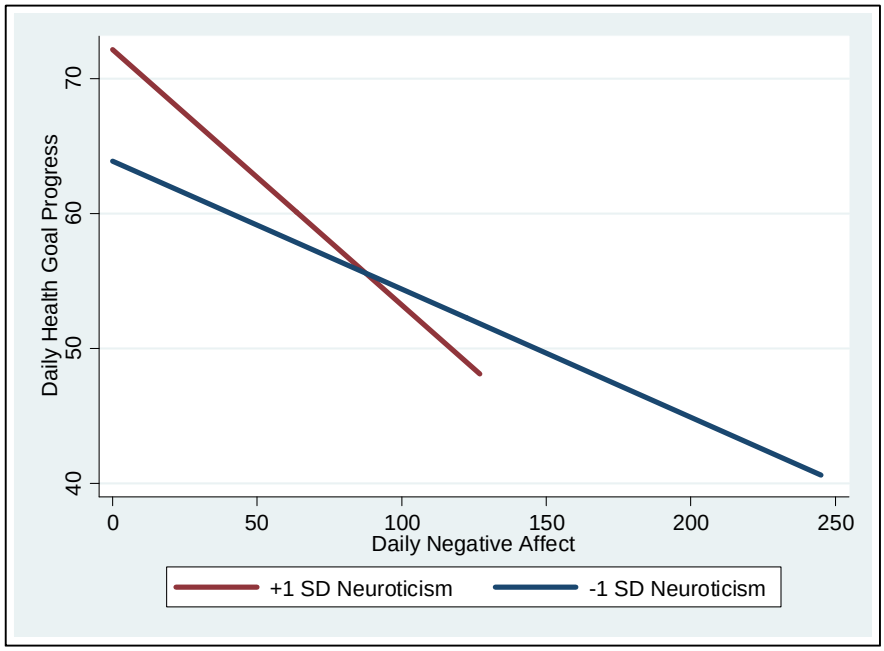

Figure 4 Moderating Effect of Neuroticism on the Association between Daily Negative Affect and Daily Health-Goal Progress

In order to examine how neuroticism and conscientiousness work together with negative affect, neuroticism and conscientiousness were included in Model 8 (see Table 10). Model 8 presented that the main effect of negative affect in the within-person level (B = -.96, $p \leq .001$) and the between-person level (B = - 2.15, $p \leq .05$) significantly predicted a decrease in health-goal progress. However, the direct effect of neuroticism on daily health-goal progress was marginally significant (B = .51, p = .099). Moreover, the moderating effect of neuroticism on the association between daily negative affect and daily health-goal progress was marginally significant (B = -.03, p = .080). As we hypothesized, this result revealed that high neuroticism strengthened the link between daily negative affect and daily health-goal progress. As shown in Figure 4, individuals high in neuroticism were likely to report experiencing lower levels of daily health-goal progress when they experienced high levels of

negative affect. Importantly, the direct effect of conscientiousness on daily health-goal progress was also marginally significant (B = .48, p = .068) indicating that individuals high in conscientiousness were likely to experience higher levels of health-goal progress over the 100-day period compared to those low in conscientiousness. However, the moderating effect of conscientiousness on the association between daily negative affect and daily health-goal progress was not significant (B = -.02, p = .294).

Dynamic linkages of positive and negative affect, neuroticism, conscientiousness, and health-goal progress. As shown in Table 11, in order to examine how traits and states are associated with health-goal progress, models were built including positive affect and negative affect together, and neuroticism and conscientiousness were added independently, and then combined with the model to examine how they are related to each other. In Model 12, positive affect significantly predicted an increase in health-goal progress whereas negative affect did not. The direct effect of neuroticism on daily health-goal progress was marginally significant (B = .53, p = .066) reflecting that individuals high in neuroticism were likely to experience higher levels of health-goal progress over the 100-day period when compared to those low in neuroticism. However, the moderating effect of neuroticism on the association between daily negative affect and daily health-goal progress was not significant (B = -.01, p = .505). The direct effect of conscientiousness on daily health-goal progress was not significant (B = .30, p = .218). The moderating effect of conscientiousness on the associations between positive affect and health-goal progress and between negative affect and health-goal progress were not significant (see Figure 5).

Table 11

Models of Positive Affect, Negative Affect, Neuroticism, and Conscientiousness on Health-Goal Progress

Effect	Daily Health-Goal Progress			
	Model 9 B (SE)	Model 10 B (SE)	Model 11 B (SE)	Model 12 B (SE)
Fixed Effects				
Intercept	52.20***(2.54)	52.26***(2.53)	52.32*** (2.55)	52.61***(2.52)
Day	.05**(.02)	.05**(.02)	.05**(.02)	.05**(.02)
PA Within	1.74***(.23)	1.75***(.24)	1.76***(.23)	1.75***(.24)
PA Between	2.33*** (.47)	2.43***(.49)	2.28***(.49)	2.32***(.48)
PA Within × Between	.09*(.04)	.09†(.02)	.08†(.04)	.08†(.05)
NA Within	.19(.14)	.19(.14)	.19(.14)	.18(.14)
NA Between	.25(.72)	-.22(.80)	.24(.72)	-.50 (.81)
NA Within × Between	-.03(.04)	-.01(.04)	-.03(.03)	-.01(.04)
Neuroticism	—	.32(.24)	—	.53†(.29)
Neuroticism × PA Within	—	-.00(.02)	—	.01(.02)
Neuroticism × NA Within	—	-.01(.01)	—	-.01(.02)
Conscientiousness	—	—	.04(.20)	.30(.24)
Conscientiousness × PA Within	—	—	.02(.02)	.02(.02)
Conscientiousness × NA Within	—	—	.00(.01)	00(.02)
Random Effects				
Level 1 Within-person	18.03***(.16)	18.03***(.16)	18.03***(.16)	18.03***(.16)
Level 2 Between-person	16.47***(1.40)	16.31***(1.39)	16.51***(1.41)	16.16***(1.34)
Day	.12***(.01)	.12***(.01)	.12***(.01)	.12***(.01)
PA	1.45***(.19)	1.45***(.19)	1.44***(.19)	1.44***(.19)
NA	.64***(.17)	.64***(.17)	.63***(.17)	.63***(.17)
R^2 Within	.14	.14	.14	.14
R^2 Between	.27	.28	.27	.30
-2LL	56790.80	56788.84	56790.00	56786.40
AIC	56828.79	56832.84	56834.00	56836.40
BIC	56957.67	56982.07	56983.23	57005.98

Note. n = 76, Number of observations = 6523. Dependent variable is Daily Health-Goal Progress. PA Within = positive affect in the within-person level, PA Between = positive affect in the between-person level, NA Within = negative affect in the within-person level, NA Between = negative affect in the between-person level. $^{\dagger}p \leq .10$, * $p \leq .05$, ** $p \leq .01$, and *** $p \leq .001$, Two-tailed tests.

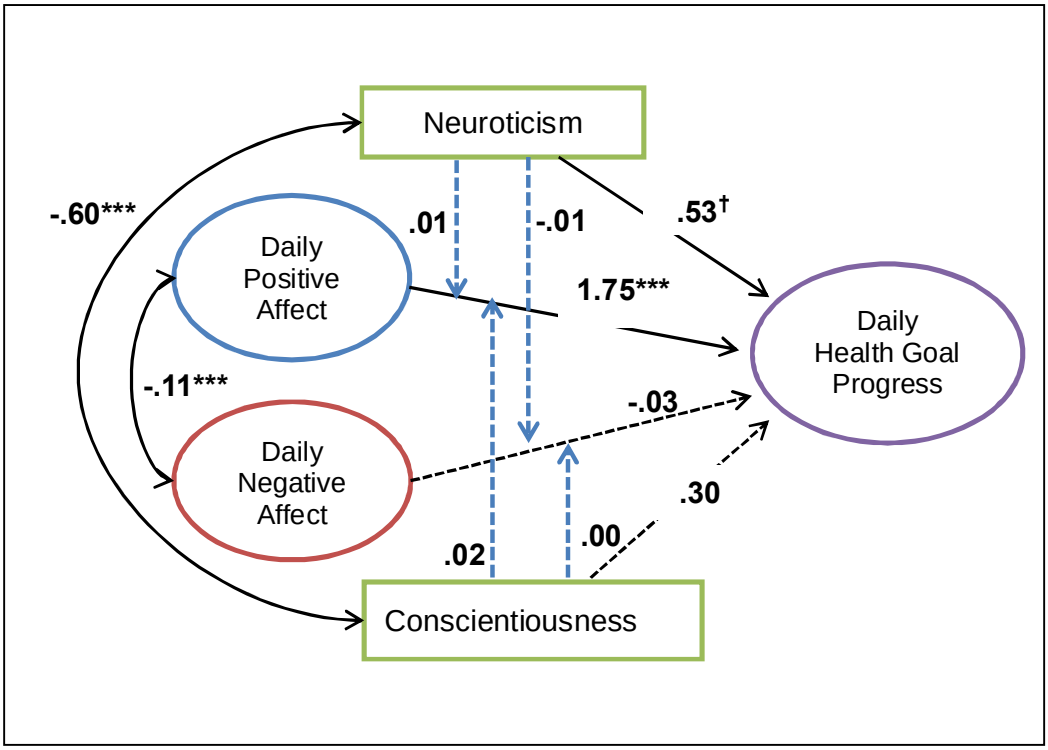

Figure 5 Dynamic Linkages of Positive and Negative Affect, Neuroticism, and Conscientiousness on Health-Goal Progress

Note. Solid paths are statistically significant and broken paths are not significant. See Model 12 in Table 11 for parameter estimates for these paths. $^{\dagger}p \leq .10$, $^{*}p \leq .05$, $^{**}p \leq .01$, and $^{***}p \leq .001$. Two-tailed tests.

Chapter 5
DISCUSSION

A consistent research question in the study of aging is how biological, psychological, behavioral, and environmental elements interact and shape a person's life (Ford & Lerner, 1992) and why individuals show great individual differences in the processes of aging. Previous research has established both personality and health as important predictors in optimal aging (Aldwin, et al., 2006; Hendricks & Hatch, 2006; Hooker, et al., 1998). Furthermore, early studies have found links between personality traits and health (Hooker, et al., 1998; Lochenhoff, et al., 2011; Mroczek & Spiro, 2007; Mroczek, et al., 2006; Smith & Gallo, 2001; Turiano, et al., 2011). What has not been shown to date is whether the process-oriented personality constructs such as health goals and health self-regulatory processes could act as linkages between personality traits and health (Hooker, et al., 2010).

The primary purpose of the present study was to enhance understanding of the dynamic processes of personality and how these are related to health-goal progress through micro-longitudinal examination of how people self-regulate their health. Based on the six-foci model of personality, the present study explored how daily health-goal progress is associated with daily positive and negative affect and determined whether the association with health-goal progress and positive and negative affect can be predicted by neuroticism and conscientiousness.

Daily Health Goal Progress

Participants significantly increased in health-goal progress over the100-day period. It is important to notice that participants' self-rating of how well they felt they were progressing towards their health goals significantly fluctuated within individuals

during this period. This fluctuation within individuals revealed health-goal progress as an internal process of how individuals adapt, change, and grow over time. Consistent with developmental systems theory (Ford & Lerner, 1992) suggesting that people may expect different outcomes and pursue different pathways to the same goal, we found that the average individual's health-goal progress varies over time and that individuals differ from each other in health-goal progress. These findings are consistent with previous research (Lachman, Neupert, & Agrigoroaei, 2011), which found that perceived sense of control varies significantly between individuals and shows wide variations in individuals over time.

Importantly, in the lagged effect analyses, we found that health-goal progress on the previous day was positively associated with concurrent health-goal progress. This result reflects developmental system theory (Ford & Lerner, 1992), which assumes that individuals self-regulate their behaviors through a discrepancy-reducing negative feedback process that is a stability-maintaining regulatory process. A similar process is described in Carver and Scheier's (1998) control-process model of self-regulation and Higgins' self-discrepancy theory (1998), which demonstrate how people set goals (i.e., ideal behavior standards) and achieve their goals by comparing their current progress to desired states. Given these considerations, it seems that individuals regulate their health-related behaviors to reduce the gap between desired outcomes and current states over time. Similar to our findings, Prohaska and colleagues (2006) reported that individuals with high self-efficacy tend to continue to engage in physical activities when compared to those with low self-efficacy.

Within-Person Coupling of Daily Positive Affect on Daily Health-Goal Progress

In the process of self-regulating goals, it is important to explore the associations between what people are trying to do and what people are feeling. As personal goals are related to ideal self-representations, people may have an internal image of desired end states relating to hopes or responsibilities (Bolkan & Hooker, 2012). Consequently, the successful or unsuccessful pursuit of desired outcomes arouses emotions such as happiness or dejection (Lockwood, Jordan, & Kunda, 2002). The present study examined the associations between daily positive affect and daily health-goal progress. The results of this study support our hypotheses that within-person variations in daily positive affect would positively covary with daily health-goal progress. This study found that on days when individuals reported higher positive affect than their own average, their health-goal progress was significantly higher.

We also hypothesized that the associations of daily positive affect and daily health-goal progress would vary significantly between individuals. Consistent with our hypotheses, we found that individuals' health-goal progress significantly varied from the within-person positive affect. This result reveals that some individuals experience greater progress on their health goals when they feel high levels of positive affect, while others experience lower health-goal progress when their positive affect levels are low. Importantly, we found that individuals with high-average positive affect tended to experience a greater increase in health-goal progress compared to those with low-average positive affect. Therefore, along with significant within-person variation in daily health-goal progress, the present study found that

within-person variations in daily positive affect and daily health-goal progress were positively related, or coupled, within persons.

Within-Person Coupling of Daily Negative Affect on Daily Health-Goal Progress

The present study also examined the associations between daily negative affect and daily health-goal progress. We hypothesized that within-person variations in daily negative affect would negatively covary with daily health-goal progress. Consistent with our hypotheses, we found that on days when individuals reported higher negative affect than their own average, their health-goal progress was significantly lower.

In addition, we hypothesized that the associations of daily negative affect and daily health-goal progress would vary significantly between individuals. The results of this study supported our expectations. We found that some individuals with higher levels of daily negative affect tend to experience low levels of daily health-goal progress, whereas others with lower levels of daily negative affect tend to experience high levels of health-goal progress. As a result, the present study found that within-person variations in daily negative affect and daily health-goal progress are negatively associated, or coupled, within persons. Congruent with these findings, Carver (2004) indicates that individuals who experience higher negative affect tend to show problems with focusing their attention control on goal pursuit. Experiencing high levels of negative affect could undermine goal engagement. Similarly, Emmons and Kaiser (1994) in their cross-sectional study reported that individuals who strive to avoid negative goals reported lower positive affect, less life satisfaction, and more anxiety.

The results of the coupling association between daily positive and negative affect and daily health-goal progress are similar to an earlier study (Winter, Lawton, Langston, Ruckdeschel, & Sando, 2007), which observed that daily positive affect was positively coupled with daily self-rated health; whereas, daily negative affect was negatively coupled with daily self-rated health. Furthermore, our findings are congruent with a previous time-sampling study (Hoppmann & Klumb, 2006) that showed strong goal-furthering activities were significantly associated with high levels of positive affect and low goal-furthering activities were significantly related to high levels of negative affect. Our findings also support previous research (Diehl, Semegon, & Schwarzer, 2006), which found that positive affect had a significant positive effect on goal commitment and attainability; whereas, negative affect had a significant negative effect on goal commitment.

The results of this study concerning the significant relationships associated with daily health-goal progress, and daily positive affect and daily negative affect are consistent with the notions (Carver & Scheier, 2011) that affect is a consequence of a feedback process running automatically and simultaneously with and in parallel to the behavior-guiding process. In the feedback process, our results indicate that positive affect was the result of the successful attainment of health-goal progress; whereas, negative affect was related to the failure of achieving health-goal progress. As a result, it appears that positive affect and negative affect are partially caused by appraisals of events relating to goals (Oatley, 2004).

Lagged Effects of Positive and Negative Affect and Health-Goal Progress

In the cross-lagged effect analyses, we also found that health-goal progress on the previous day was positively related to concurrent positive affect and negatively

related to concurrent negative affect. These results reveal that individuals who reported high levels of health-goal progress yesterday were likely to experience high levels of positive affect and low levels of negative affect today. These findings support previous research (Carver & Scheier, 2011), which suggests that the levels of positive and negative affect resulted from dependence on the high or low rate of desired progress. Our findings are consistent with a prior study (Muller & Spitz, 2010), which suggests that poor health goal regulation may create negative affect.

Interestingly, in the lagged effect analyses, our results also show that positive affect on the previous day was positively but marginally associated with concurrent health-goal progress. However, we also found that the lagged effect of positive affect on health-goal progress disappeared when health-goal progress on the previous day was included in the model. Although further research is needed to elucidate this lagged relationship between positive affect and health-goal progress, one possible interpretation is that these results might be related to the transitory nature of affective states in engaging the shorter-term changes within individuals (Fleeson, 2001). Fleeson (2001) has found a high intraindividual variability, which indicates that individuals may experience the moment-to-moment changes of states in everyday life. Given that states engage the moment-to-moment changes within individuals, it seems that there might be a disconnect among positive affect on the previous day and health-goal progress on the previous and present days.

Moreover, we found that negative affect on the previous day was not significantly related to concurrent health-goal progress. This result supports previous research (Carstensen, Fung, & Charles, 2003), which suggested that older adults experience low levels of negative affect and seem to have a relatively faster recovery

from negative affective states. Mather and Carstensen (2003) have reported that older adults tend to shift their attention away from negative stimuli toward positive stimuli. Based on their results, it seems that the high levels of negative affect from the previous day did not influence individuals' abilities to focus on concurrent goal-relevant activities.

The Direct Effect of Neuroticism and Conscientiousness on Daily Health-Goal Progress

The results of the present study showed that individuals' health-goal progress varied over time and that individuals differ from each other in health-goal progress. In order to examine individual differences in daily health-goal progress, this study explored how the personality traits of neuroticism and conscientiousness are related to overall levels of daily health-goal progress over a 100-day time period. We hypothesized that individuals high in neuroticism would experience lower levels of progress with their health goals. Contrary to our expectations, we found that the direct effect of neuroticism on daily health-goal progress was positive. Individuals high in neuroticism were likely to experience higher levels of health-goal progress over the 100-day period when compared to those low in neuroticism. Other studies have shown that individuals high in neuroticism were likely to experience higher occurrence of minor daily illness (Larsen & Kasimatis, 1991), demonstrate fewer self-care behaviors (Kressin, Spiro, Bosse, & Garcia, 1999), have worse health outcomes (Turiano, et al., 2012), poorer health behaviors, and earlier death (Mroczek, Spiro, & Turiano, 2009; Lahey, 2009). Although our findings are not consistent with these studies, a different interpretation can be made regarding the relationship between neuroticism and health-goal progress. One possible interpretation is that this result

might be related to the characteristics of the neuroticism. According to Costa and McCrae (2003), high scores on neuroticism reflect aspects of emotional instability such as anxiety, self-pity, and worry. Moreover, individuals high in neuroticism are more likely to be self-critical and sensitive to criticism from others (Duberstein, et al., 2011; Lahey, 2009). Given these characteristics of neuroticism, individuals high in neuroticism may be more worried and feel more self-pity about their health conditions than those low in neuroticism. Previous research (Turiano, et al., 2012) found that individuals high in neuroticism reported worse self-rated physical health. Therefore, individuals high in neuroticism may feel self-critical to evaluate their health-goal achievement and be sensitive to criticism from their family members or near friends. These characteristics in turn may positively direct individuals high in neuroticism to pursue health-relevant activities more.

Conscientiousness is another predictor of how individuals plan for and achieve their health goals. This study also examined the associations between conscientiousness and daily health-goal progress. We expected that individuals high in conscientiousness would experience higher levels of progress on their health goals. Congruent with our expectations, we found that individuals high in conscientiousness experienced higher levels of health-goal progress over time compared to those with low conscientiousness. This is consistent with previous findings that individuals high in conscientiousness are likely to experience reduced risk of illness and greater longevity (Friedman & Martin, 2007; Hill, Triano, Hurd, Mroczek, & Roberts, 2011), longer survival with chronic medical illness (Christensen , Ehlers, Wiebe, Moran, Raichle, Ferneyhough, & Lawton, 2002), and are more likely to participate in health enhancing behaviors (Duberstein, et al., 2011). Apparently, our findings are related to

the characteristics of conscientiousness that individuals high in conscientiousness are likely to be task-oriented, plan ahead, and work persistently toward achieving goals (Duberstein, et al., 2011; Robert & Bogg, 2004). Moreover, high scores on conscientiousness reflect characteristics of discipline and organization such as competence, order, achievement, efficiency, and reliability (Costa & McCrae, 2003). Given these considerations, we interpret that individuals high in conscientiousness were likely to experience higher levels of progress toward achieving health goals over the 100-day period when compared to those with low conscientiousness. In this sample, it seems that individuals high in both neuroticism and conscientiousness are better able to make progress on their health goals.

The Moderating Effect of Neuroticism and Conscientiousness

As we expected, we found that within-person variations in daily health-goal progress positively covary with daily positive affect and negatively covary with daily negative affect within persons. In order to examine individual differences in these associations, it is important to examine the potential moderating roles of neuroticism and conscientiousness between positive and negative affect and health-goal progress.

Neuroticism has been shown to predict daily experiences of emotions (Robinson, Meier, & Vargas, 2005). It was expected that neuroticism would strengthen the links between positive affect and health-goal progress and strengthen the negative association between negative affect and health- goal progress. For the moderating effect of neuroticism on the relationships between daily positive affect and daily health goal progress, the results of this study failed to support our hypotheses. However, for the moderating effect of neuroticism on the relationships

between daily negative affect and daily health-goal progress, the results of this study supported our hypotheses. We found that individuals high in neuroticism when they experience high levels of negative affect tended to report experiencing lower levels of daily health goal progress. These results concerning the significant relationships associated with neuroticism and negative affect are consistent with prior studies that individuals high in neuroticism experience higher levels of negative affect than those individuals low in neuroticism (Costa & McCrae, 1989; Hooker, et al., 1998; Isaccowitz & Smith, 2003; Mroczek & Almeida, 2004; Schimmak, 2003). Aldwin, Levenson, Spiro, and Bossé (1989) suggest that individuals with high scores on neuroticism perceive their life experiences more negatively and in a different way when compared to individuals with low scores on neuroticism. Consequently, we interpret that individuals high in neuroticism when they feel high levels of negative affect may experience greater exposure to stress (Bolger & Zuckerman, 1995), increased same-day pain and health care use (Gil, Carson, Porter, Scipio, Bediako, & Orringer, 2004), and lower health-related quality of life (Kressin, Spiro, & Skinner, 2000), which in turn adversely affect individuals' healthy activities.

Conscientiousness has been recognized to play one of the most significant roles in predicting health outcomes (Bogg & Roberts, 2004) and is linked to daily positive emotions (Nater, Hoppmann, & Klumb, 2010). Although linkages between conscientiousness, positive and negative affect, and health-goal progress have not been studied previously, the present study hypothesized that conscientiousness would strengthen the links between positive affect and health-goal progress and attenuate the negative association between negative affect and health-goal progress. However, results did not support these hypotheses. This may be, in part, due to the strong main

effect of conscientiousness on health-goal progress. For the moderating effect of conscientiousness on the relationships between daily positive affect and daily health-goal progress, the results of this study failed to support our hypotheses. Likewise, for the moderating effect of conscientiousness on the relationships between daily negative affect and daily health-goal progress, the results of this study did not support our hypotheses.

Age and gender were also included as covariates in the model. However, our study did not show that age and gender had a significant effect on daily health-goal progress. Consistent with our findings, previous research (Luszczynska, Mazurkiewicz, Ziegelmann, & Schwarzer, 2006) found no age and gender differences in the relationships of self-efficacy and physical activities over a 2-year period. For the effect of age, Hennecke and Freund (2010) report that age did not have an effect on pursuit of personal goals such as dieting. However, Ryff and Keyes (1995) found older participants showed lower scores in pursuit of meaningful goals when compared with younger participants. For the effect of gender differences, an earlier short-term longitudinal study (Diehl, Semegon, & Schwarzer, 2006) has found that men and women did not differ significantly for attention control in goal-directed behaviors and depressive symptoms. The results of an insignificant gender effect on daily health-goal progress may be partially explained in that the sample of this study was comprised of 88% women.

Limitations and Future Directions

As in any study, there were limitations that should be considered when interpreting the findings of the current study. First, racial and geographical diversities

are not represented in this sample; participants were predominantly white (96%) Oregon residents. Another limitation is an imbalance in the gender of participants; women (88%) and men (12%). Participants were highly educated, with 78.9 percent reporting themselves as being 4-year-college graduates. Participants reported their health conditions; 47.4% were excellent and 43.4% were good. Therefore, the results cannot be generalized to other populations; non-White, less-educated, and less healthy individuals.

The most important limitation is that all measures of daily health-goal progress, daily positive and negative affect, neuroticism, and conscientiousness are self-reported. Therefore, these measures are subject to biases within the self-report methods. Although Internet-based assessment of this study could provide the advantage of convenience, flexibility, and cost savings, the self-selected nature of our sample is another major limitation of online survey research. There are undoubtedly some participants who are more willing to and able to participate in online survey research than others. Even though the usability of the Internet has generally improved, substantially, the use of the Internet is often limited for older people. It is important to note that our sample of older people could successfully participate in the 100-day internet-based study. It is hoped that this study will motivate researchers who might be considering gathering data from older people.

Several additional directions for future research are suggested from our findings. This study identified the importance of measuring the within-person processes in between-person differences over time to explain the complexity of determining development within and between individuals. We also identified that the six-foci model of personality is capable to address these methodological issues as an

overarching direction for our lives and our developmental trajectories. Consequently, the six-foci model of personality imposes new empirical challenges and questions for future research in the field of personality and optimal aging. This study has explored how the dynamic linkages of personality processes (states and self-regulatory processes) and personality structures (traits and goals) relate to health-goal progress. Thus, future research should extend the current investigation to elucidate the whole aspects of personality processes and structures within a levels-of-analysis framework by including other personality aspects such as life-story and self-narration processes. It has been identified that personal narratives are associated with health (Hinyard & Kreuter, 2007). Integrating life-story and self-narration processes into the model of personality and health will provide a deeper understanding of how and why individuals select, pursue, and reconstruct their health goals in the experience of individuals within daily lives.

Chapter 6
CONCLUSION

Although previous studies have found links between personality traits and health, less is known about more process-oriented personality constructs, such as goals and self-regulatory strategies, as linkages between traits and health outcomes. The present study was conducted to determine whether linkages among daily goal progress and daily affect and personality traits existed. The present study was centered on how the dynamic linkages of personality processes (states and self-regulatory processes) and personality structures (traits and goals) relate to health-goal progress. We examined not only the within-person coupling of personality processes over time but also the cross-lagged associations of personality processes by tracking daily within-person variations and between-person differences in the associations between affect and health-goal progress. We also tested multilevel models of how personality differences are revealed within processes of daily life in the domain of health. Interrelationships within the dynamic linkages of personality and health are complex; however, the multilevel models in this study present clear pictures of the associations among positive and negative affect, neuroticism, conscientiousness, and health-goal progress.

The summary of the findings of this study is first, daily health-goal progress was positively coupled with daily positive affect and negatively coupled with daily negative affect within persons. Second, there were individual differences in the associations between daily health-goal progress and daily positive affect and between daily health-goal progress and daily negative affect. Third, health-goal progress on the previous day was positively related to next day's positive affect and negatively

related to next day's negative affect. Fourth, previous day's affect did not affect next day's health-goal progress. Fifth, individuals high in neuroticism and high in conscientiousness were only marginally more likely to experience higher levels of health-goal progress over the 100-day period compared to those with lower scores. Sixth, individuals who were high in neuroticism, when experiencing high levels of negative affect, tended to report lower levels of daily health goal progress.

We identified that results of the present study largely supported the six-foci model of personality (Hooker & McAdams, 2003); daily affect (states) was most strongly related to health-goal progress, which was largely independent of personality traits. Furthermore, the results of cross-lagged analyses suggested that health-goal progress drove affect rather the other way around. This finding suggests that interventions which support health-goal progress could also improve affect in older samples. Health-improving interventions could be designed individually in order to target participants based on knowledge of the linkages among daily goal progress, daily affect, and personality traits. In particular, including participants' self-evaluation of health-goal progress followed by supporting the participants in their setting of their own realistic and attainable health goals could be useful to gain detailed knowledge about how participants adopt and maintain their health behaviors. Moreover, participants who scored high or low on traits such as neuroticism and conscientiousness need personalized health-improving interventions to improve their health and quality of life.

REFERENCES

Affleck, G., Tennen, H., Urrows, S., Higgins, P., Abeles, M., Hall, C., Karoly, P., & Newton, C. (1998). Fibromyalgia and women's pursuit of personal goals: A daily process analysis. *Health Psychology, 17*, 40-47.

Aldwin, C. M., & Gilmer, D. F. (2004). *Health, illness and optimal aging: Biological and psychosocial perspectives*. Thousand Oaks: Sage.

Aldwin, C. M., Levenson, M. R., Spiro, A., III., & Bossé, R. (1989). Does emotionality predict stress? Findings from the normative aging study. *Journal of Personality and Social Psychology, 56*, 618-624.

Aldwin, C. M., Spiro, A., III., & Park, C. L. (2006). Health, behavior, and optimal aging: A lifespan developmental perspective. In J. Birren & K. W. Schaie (Eds.), *Handbook of the Psychology of Aging* (6th ed., pp. 85-104). San Diego: Academic Press.

Allison, P. D. (2003). Missing data techniques for structural equation modeling. *Journal of Abnormal Psychology*, *112*, 545-557.

Baltes, M. M. (1994). Aging well and institutional living: A paradox? In R. P. Abeles, H. C. Gift, & M. G. Ory (Eds.), *Aging and quality of life* (pp.185-201). New York: Springer.

Baltes, P. B., Lindenberger, U., & Staudinger, U. M. (2006). Life span theory in Developmental psychology. In R. M. Lerner & W. Damon (Eds.), *Handbook of child Psychology* (6th ed., Vol. 1, pp. 569-664). Hoboken, NJ: John Wiley & Sons, Inc.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

Bandura A. (2004). Health promotion by social cognitive means. *Health Education & Behavior, 31,* 143-164. doi: 10.1177/1090198104263660

Bandura, A. (2005). The primacy of self-regulation in health promotion. *Applied Psychology: An International Review*, *54* (2), 245-254. doi:10.1111/j.1464-0597.2005.00208.x

Blanchard-Fields, F., & Kalinauskas, A. S. (2008). Theoretical perspectives on adult development and learning. In M. C. Smith & T. G. Reio, Jr. (Eds.), *Handbook of research on adult development and learning* (pp. 3-33). Mahwah, NJ: Lawrence Erlbaum Associates.

Bogg, T., & Roberts, B. W. (2004). Conscientiousness and health-related behaviors: A meta-analysis of the leading behavioral contributors to mortality. *Psychological Bulletin*, *130*(6), 887-919.

Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual Review of Psychology*, *54*, 579-616.

Bolger, N., & Zuckerman, A. (1995). A framework for studying personality in the stress process. *Journal of Personality and Social Psychology*, *69*(5), 890-902.

Bolkan, C. R., & Hooker, K. (2012). Self-regulation and social cognition in adulthood: The gyroscope of personality. In S. K. Whitbourne & M. J. Sliwinski (Eds.), *The Wiley-Blackwell Handbook of Adulthood and Aging, 1st ed.* (pp. 357-380). Hoboken, NJ: Wiley-Blackwell.

Bolkan, C. R., Mierdiercks, P., & Hooker, K. (2008). Stability and change in the six-foci model of personality: Personality development in midlife and beyond. In M. C. Smith & T. G. Reio, Jr. (Eds.), *Handbook of research on adult development and learning* (pp. 220-240). Mahwah, NJ: Lawrence Erlbaum Associates.

Brown, K. W., & Moskowitz, D. S. (1998). Dynamic stability of behavior: The rhythms of our interpersonal lives. *Journal of Personality*, *66*(1), 105-134. doi: 10.1111/1467-6494.00005

Cantor, N., & Kihlstrom, J. (1987). *Personality and social intelligence.* Englewood Cliffs, NJ: Prentice Hall.

Carstensen, L. L., Fung, H. H., & Charles, S. T. (2003). Socioemotional selectivity theory and emotion regulation in the second half of life, *Motivation and Emotion*, 27, 103-123. doi: 10.1023/A:1024569803230

Carstensen, L. L., & Mikels, J. A. (2005). At the intersection of emotion and cognition: Aging and the positivity effect. *Current Directions in Psychological Science*, *14*, 117-121. doi:10.1111/j.0963-7214.2005.00348.x

Carstensen, L., & Turk-Charles, S. (1994). The salience of emotion across the adult life span. *Psychology and Aging*, *9*(2), 259-264. doi: 10.1037/0882-7974.9.2.259

Carver, C. S. (2004). Self-regulation of action and affect. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation*, (pp. 13-39). New York, NY: Guilford Press.

Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York, NY: Cambridge University Press.

Carver, C. S., & Scheier, M. F. (2011). Self-regulation of action and affect. In K. D. Vohs (Ed.), *Handbook of self-regulation: Research, theory, and applications* (pp. 3-21). New York, NY: Guilford Press.

Caspi, A., Roberts, B. W., & Shiner, R. (2005). Personality development. *Annual Review of Psychology, 56,* 453-484.

Chida, Y., & Steptoe, A. (2008). Positive psychological well-being and mortality: A quantitative review of prospective observational studies. *Psychosomatic Medicine*, *70*, 741-756. doi: 10.1097/PSY.0b013e31818105ba

Christensen, A. J., Ehlers, S. L., Wiebe, J. S., Moran, P. J., Raichle, K., Ferneyhough, K., & Lawton, W. J. (2002). Patient personality and mortality: a 4-year prospective examination of chronic renal insufficiency. *Health psychology*, *21*, 315-320.

Cohen, S., Doyle, W. J., Turner, R. B., Alper, C. M., & Skoner, D. P. (2003). Emotional style and susceptibility to the common cold. *Psychosomatic Medicine*, *65*, 652-657. doi: 10.1097/01.PSY.0000077508.57784.DA

Costa, P. T., & McCrae, R. R. (1989). *NEO PI/FFI manual supplement: For use with the NEO Personality Inventory and NEO Five-Factor Inventory,* Odessa, FL: Psychological Assessment Resources.

Costa, P. T., & McCrae, R. R. (1992). *Revised NEO Personality Inventory and NEO Five-Factor Inventory: Professional Manual*, PAR. Odessa, FL: Psychological Assessment Resources, Inc.

Costa, P. T., & McCrae, R. R. (1997). Stability and change in personality assessment: The revised NEO personality inventory in the year 2000. *Journal of personality Assessment*, *68*(1), 86-94. doi:10.1207/s15327752jpa6801_7

Costa, P. T., & McCrae, R. R. (2003). *Personality in Adulthood A Five-Factor Theory Perspective* (2nd ed.). New York: The Guilford Press.

Crosnoe, R., & Elder Jr., G. H. (2002). Successful adaptation in the later years: A life course approach to aging. *Social Psychology Quarterly, 65*, 309-328.

Curran, P. J., & Bauer, D. J. (2011). The disaggregation of within-person and between-person effects in longitudinal models of change. *Annual Review of Psychology*, *62*, 583-619. doi: 10.1146/annurev.psych.093008.100356

Dainese, S. M., Allemand, M., Ribeiro, N., Bayram, S., Martin, M., & Ehlert, U. (2011). Protective factors in midlife: How do people stay healthy*? GeroPsych*, *24*, 19-29.

DeLongis, A., Folkman, S., & Lazarus, R. S. (1988). The impact of daily stress on health and mood: Psychological and social resources as mediators. *Journal of Personality and Social Psychology*, *54*, 486-495.

Diefenbach, M. A., Leventhal, E. A., Leventhal, H., & Patrick-Miller, L. (1996). Negative affect relates to cross-sectional but not longitudinal symptom reporting: Data from elderly adults. *Health Psychology*, *15*(4), 282-288. doi: 10.1037/0278-6133.15.4.282

Diehl, M., Semegon, A. M., & Schwarzer, R. (2006). Assessing attention control in goal pursuit: A component of dispositional self-regulation, *Journal of Personality Assessment*, *86*(3), 306-317.

Dijksterhuis, A., & Aarts, H. (2010). Goals, attention, and (un)consciousness. *Annual Review of Psychology*, *61*, 467-490. doi: 10.1146/annurev.psych.093008.100445

Duberstein, P. R., Chapman, B. P., Tindle, H. A., Sink, K. M., Bamonti, P., Robbins, J., Jerant, A. F., & Franks, P. (2011). Personality and risk for Alzheimer's disease in adults 72 years of age and older: A 6-year follow-up. *Psychology and Aging*, *26*, 351-362.

Ebner, N. C., & Freund, A. M. (2007). Personality theories of successful aging. In J. A. Blackburn, & C. N. Dulmus, (Eds.), *Handbook of gerontology: Evidence-based approaches to theory, practice, and policy.* (pp. 87-116). Hoboken, NJ: John Wiley & Sons Inc.

Emmons, R. A. (1986). Personal strivings: An approach to personality and subjective well-being. *Journal of Personality and Social Psychology, 51,* 1058-1068.

Emmons, R. A., & Kaiser, H. A. (1994). Approach and avoidance strivings and subjective well-being. Poster presented at the 102nd Annual Convention of the American Psychology Association, Los Angeles, CA.

Emmons, R. A., & Kaiser, H. A. (1996). Goal orientation and emotional well-being: Linking goals and affect through the self. *Striving and feeling: Interactions among goals, affect, and self-regulation*, 79-98.

Fleeson, W. (2001). Toward a structure- and process-integrated view of personality: Traits as density distributions of states. *Journal of Personality and Social Psychology*, *80*(6), 1011-1027. doi: 10.1037/0022-3514.80.6.1011

Ford, D. H., & Lerner, R. M. (1992). *Developmental systems theory: An integrative approach*. Newbury Park, CA: Sage.

Freyd, M. (1923). The graphic rating scale. *Journal of Educational Psychology*, *14*, 83-102.

Friedman, H. S., & Booth-Kewley, S. (1987). The “disease-prone personality”: A Metaanalytic view of the construct. *American Psychologist*, *42*, 539-555.

Friedman, H. S., & Martin, L. R. (2007). A lifespan approach to personality and longevity: The case of conscientiousness. In C. M. Aldwin, C. L. Park, & A. Spiro, III. (Eds), *Handbook of health psychology and aging* (pp. 167-185). New York, NY: Guilford Press.

Gil, K. M., Carson, J. W., Porter, L. S., Scipio, C., Bediako, S. M., & Orringer, E. (2004). Daily mood and stress predict pain, health care use, and work activity in African American adults with sickle-cell disease. *Health Psychology*, *23*, 267-274.

Gollwitzer, P. M., & Wicklund, R. A. (1985). The pursuit of self-defining goals. In J. Kuhl, & J. Beckmann (Eds.), *Action control: From cognition to behavior* (pp. 61-88). Berlin: Springer.

Gottlieb, G., Wahlsten, D., & Lickliter, R. (1996). The significance of biology for human development: A developmental psychobiological systems view. In W. Damon (Series Ed.) & R. M. Lerner (Vol. Ed), *Handbook of child psychology: Vol. 1. Theoretical models of human development* (5th ed., pp. 233-273) New York: Wiley.

Griffin, P.W., Morczek, D.K., & Spiro, A., III. (2006). Variability in affective change among aging men: longitudinal findings from the VA Normative Aging Study. *Journal of Research in Personality*, *40*, 942-965.

Helson, R., Jones, C., & Kwan, V. S. (2002). Personality change over 40 years of adulthood: hierarchical linear modeling analyses of two longitudinal samples. *Journal of personality and social psychology*, *83*, 752-766.

Hendricks, J., & Hatch, L. R. (2006). Lifestyle and aging. In R. H. Binstock, & L. K. George (Eds.), *Handbook of aging and the social sciences* (6th ed., pp. 301-319). Burlington: MA, Academic Press.

Hennecke, M., & Freund, A. M. (2010). Staying on and getting back on the wagon: Age-related improvement in self-regulation during a low-calorie diet. *Psychology and Aging*, *25*, 876-885. doi: 10.1037/a0019935

Higgins, E. T. (1998). Promotion and prevention: Regulatory focus as a motivational principle. In M. Zanna (Ed.), *Advances in experimental social psychology* (vol. 30, pp. 1–46). San Diego, CA: Academic Press.

Hill, P. L., Turiano, N. A., Hurd, M. D., Mroczek, D. K., & Roberts, B. W. (2011). Conscientiousness and longevity: An examination of possible mediators. *Health Psychology*, *30*(5), 536-541. doi: 10.1037/a0023859

Hinyard, L. J., & Kreuter, M. W. (2007). Using narrative communication as a tool for health behavior change: A conceptual, theoretical, and empirical overview. *Health Education & Behavior*, 3*4*, 777-792.

Hofer, S. M., & Hoffman, L. (2007). Statistical analysis with incomplete data: A developmental perspective. In T. D. Little, J. A. Bovaird, & N. A. Card, (Eds.), *Modeling developmental processes in ecological context* (pp. 13-32). Mahwah, NJ: LEA.

Hooker, K. (1991). Change and stability in self during the transition to retirement: An intraindividual study using p-technique factor analysis. *International Journal of Behavioral Development*, *14*, 209-233. doi:10.1177/016502549101400206

Hooker, K. (1992). Possible selves and perceived health in older adults and college students. *Journal of Gerontology: Psychological Sciences*, *47*(2), 85-95.

Hooker, K. (1999). Possible selves in adulthood: Incorporating teleonomic relevance into studies of the self. In F. Blanchard-Fields & T. Hess (Eds.) *Social cognition and aging* (Chapter 5, pp. 97-122). NY: Academic Press.

Hooker, K. (2002). New directions for research in personality and aging: A comprehensive model for linking levels, structures, and processes, *Journal of Research in Personality*, *36*, 318-334.

Hooker, K., Choun, S., & Hall, B. (2010). Personality and emotion in later life. In J. C. Cavanaugh & C.K. Cavanaugh (Eds.), *Aging in America: Psychological aspects* (Vol. 1, pp. 102-134). Oxford, England: Praeger.

Hooker, K., Hoppmann, C., & Siegler, I. C. (2010). Personality: Life span compass for health. In K.E. Whitfield (Ed.), *Annual Review of Gerontology and Geriatrics: Volume 30* (pp. 199-230). New York: Springer. doi: 10.1891/0198-8794.30.199

Hooker, K., & McAdams, D. P. (2003). Personality reconsidered: A new agenda for aging research. *Journal of Gerontology: Psychological Sciences, 58B,* 296-304.

Hooker, K., Monahan, D. J., Bowman, S. R., Frazier, L. D., & Shifren, K. (1998). Personality counts for a lot: Predictors of mental and physical health of spouse caregivers in two disease groups. *Journal of Gerontology, 53B,* 73-85.

Hooker, K., Monahan, D. J., Shifren, K., & Hutchinson, C. (1992). Mental and physical health of spouse caregivers: The role of personality. *Psychology and Aging. 7,* 367-375.

Hoppmann, C. A., Gerstorf, D., Smith, J., & Klumb, P. L. (2007). Linking possible selves and behavior: Do domain-specific hopes and fears translate into daily

activities in very old age? *Journal of Gerontology: Psychological Sciences*, *62B* (2), 104-111.

Hoppmann, C. A., & Klumb, P. L. (2006). Daily goal pursuits predict cortisol secretion and mood states in employed parents with preschool children. *Psychosomatic medicine*, *68*, 887-894.

Hox, J. (2010). *Multilevel analysis: Techniques and applications* (2nd ed.). New York: Routledge.

Isaacowitz, D. M., & Smith J. (2003). Positive and negative affect in very old age. *The Journal of Gerontology*, *58B*(3), 143-52.

Karoly, P. (1999). A goal systems - self-regulation perspective on personality, psychology, and change. *Review of General Psychology*, *3*, 264-291.

Karoly, P. (2010). Psychopathology as dysfunctional self-regulation: When resilience resources are compromised. In J. W. Reich, A. J. Zautra, & J. S. Hall (Eds.), *Handbook of adult resilience*. (pp. 146-170). New York, NY: Guilford Press.

Karoly, P., & Ruehlman, L. S. (2006). Psychological "resilience" and its correlates in chronic pain: findings from a national community sample. *Pain*, *123*, 90-97.

Kiecolt-Glaser, J. K., McGuire, L., Robles, T. F., & Glaser, R. (2002). Psychoneuroimmunology: Psychological influences on immune function and health. *Journal of Consulting and Clinical Psychology*, *70*, 537-547. doi: 10.1037/0022-006X.70.3.537

Kleban, M. H., Lawton, M. P., Nesselroade, J. R., & Parmelee, P. (1992). The structure of variation in affect among depressed and nondepressed elders. *Journals of Gerontology, Series B: Psychological Sciences and Social Sciences, 47,* 190-198.

Klinger, E. (1975). Consequences of commitment to and disengagement from incentives. *Psychological Review, 82,* 1-25.

Knoll, N., Rieckmann, N., Scholz, U., & Schwarzer, R.(2004). Predictors of subjective age before and after cataract surgery: Conscientiousness makes a difference. *Psychology and Aging*, *19*(4), 676-688. doi: 10.1037/0882-7974.19.4.676

Kressin, N. R., Spiro, A., III., Bossé, R., & Garcia, R. I. (1999). Personality traits and oral self-care behaviors: Longitudinal findings from the Normative Aging Study. *Psychology & Health*, *14*, 71-85. doi: 10.1080/08870449908407313

Kressin, N. R., Spiro, A., III., & Skinner, K. M. (2000). Negative affectivity and health-related quality of life. *Medical Care*, *38*(8), 858-867. doi:

10.1097/00005650-200008000-00009

Lachman, M. E., & Bertrand, R. M. (2001). Personality and the self in midlife. In M. E. Lachman (Ed.), *Handbook of midlife development* (pp. 279-309). New York: Wiley.

Lachman, M. E., Neupert, S. D., & Agrigoroaei, S. (2011). The relevance of control beliefs for health and aging. In K. W. Schai, & S. L.Willis (Eds.), *Handbook of the psychology of aging* (7th ed., pp. 175-190). San Diego, CA: Elsevier Academic Press. doi: 10.1016/B978-0-12-380882-0.00011-5

Lahey, B. B. (2009). Public health signifi cance of neuroticism. *American Psychologist, 64*(4), 241-256.

Larsen, R. J., & Kasimatis, M. (1991). Day-to-day physical symptoms: Individual differences in the occurrence, duration, and emotional concomitants of minor daily illnesses. *Journal of Personality*, *59*(3), 387-423. doi:10.1111/j.1467-6494.1991.tb00254.x

Lazarus, R. S. (1993). From psychological stress to the emotions: A history of changing outlooks. *Annual Review Psychology, 44,* 1-21.

Leventhal, H., & Mora, P. A. (2005). Is there a science of the processes underlying health and illness behaviors? A comment on Maes and Karoly. *Applied Psychology: An International Review*, *54*, 255-266.

Little, B. R. (1983). Personal projects: A rationale and method for investigation. *Environment and Behavior, 15,* 273-309.

Little, B. R. (1989). Personal projects analysis: Trivial Pursuit, magnificent obsessions, and the search for coherence. In D. M. Buss & N. Cantor (Eds.), *Personality psychology: Recent trends and emerging directions* (pp. 15-31). New York, NY: Springer-Verlag.

Locke, E. A., & Latham, G. P. (2006). New directions in goal-setting theory. *Current Directions in Psychological Science*, *15*, 265-268.

Löckenhoff, Duberstein, Friedman, & Costa (2011). Five-factor personality traits and subjective health among caregivers: The role of caregiver strain and self-efficacy. *Psychology and Aging*, *26*, 592-604.

Lockwood, P., Jordan, C. H., & Kunda, Z. (2002). Motivation by positive or negative role models: Regulatory focus determines who will best inspire us. *Journal of Personality and Social Psychology*, *83*, 854-864.

Luszczynska, A., Mazurkiewicz, M., Ziegelmann, J. P., & Schwarzer, R. (2006). Recovery self-efficacy and intention as predictors of running or jogging

behaviors: Across-lagged panel analysis over a two-year period. *Psychology of Sport and Exercise*, *8*, 247-260.

Maes, S. & Karoly, P. (2005). Self-regulation assessment and intervention in physical health and illness: A review. *Applied Psychology: An International Review*, *54*, 267-299.

Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist, 41,* 954-969.

Mather, M., & Carstensen, L. L. (2003). Aging and attentional biases for emotional faces, *Psychological Science*, *14*, 409-415.

McGregor, I., & Little, B. R. (1998). Personal projects, happiness and meaning: On doing well and being yourself. *Journal of Personality and Social Psychology*, *74*, 494-512.

Michalak, E. E., & Szabo, A. (1998). Guidelines for Internet research: An update. *European Psychologist*, *3*, 70-75.

Moskowitz, J. (2003). Positive affect predicts lower risk of AIDS mortality. *Psychosomatic Medicine*, *65*, 620-626. doi: 10.1097/01.PSY.0000073873.74829.23

Mroczek, D. K., & Almeida, D. M. (2004). The effect of daily stress, personality, and age on daily negative affect. *Journal of Personality*, *72*, 355-378.

Mroczek, D. K., & Spiro, A., III. (2007). Personality change influences mortality in older men. *Psychological Science, 18*(5), 371-376.

Mroczek, D. K., Spiro, A., III., & Griffin, P. W. (2006). Personality and aging. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology and aging* (6th ed., pp. 363-377). San Diego, CA: Academic Press.

Mroczek, D. K., Spiro, A., III., & 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

Muller, L., & Spitz, E. (2010). Effects of personal goal disturbance on psychological distress. *European Review of Applied Psychology/Revue Européenne de Psychologie Appliquée*, *60*(2), 105-112. doi: 10.1016/j.erap.2009.12.001

Nater, U. M., Hoppmann, C., & Klumb, P. L. (2010). Neuroticism and conscientiousness are associated with cortisol diurnal profiles in adults: Role of positive and negative affect. *Psychoneuroendocrinology*, 35, 1573-1577. doi: 10.1016/j.psyneuen.2010.02.017

Neupert, S. D., & Allaire, J. C. (2012). I think I can, I think I can: Examining the within-person coupling of control beliefs and cognition in older adults. *Psychology and Aging*. Advance online publication. doi: 10.1037/a0026447

Nezlek, J. B. (in press). Multilevel modeling analyses of diary-style data. In M. R. Mehl & T. S. Conner (Eds.), *Handbook on research methods for studying daily life*. New York, NY: Guilford Press.

Nezlek, J. B., Kafetsios, K., & Smith, C. V. (2008). Emotions in everyday social encounters: Correspondence between culture and self-construal. *Journal of Cross-Cultural Psychology*, *39*(4), 366-372. doi:10.1177/0022022108318114

Nouwen, A., Ford, T., Balan, A. T., Twisk, J., Ruggiero, L., & White, D. (2011). Longitudinal motivational predictors of dietary self-care and diabetes control in adults with newly diagnosed type 2 diabetes mellitus. *Health Psychology*, 1-9. doi: 10.1037/a0024500

Oatley, K. (2004). *Emotions: A brief history*. Maden, MA: Blackwell Publishing.

Okun, M. A., Stock, W. A., Haring, M. J., & Witter, R. A. (1984). The social activity/subjective well-being relation: A quantitative synthesis. *Research on Aging*, *6*(1), 45-65. doi: 10.1177/0164027584006001003

Ong, A. D., Bergeman, C. S., Bisconti, T. L., & Wallace, K. A. (2006). Psychological resilience, positive emotions, and successful adaptation to stress in later life. *Journal of Personality and Social Psychology*, *91*, 730-749.

Ozer, D., & Benet-Martinez, V. (2006). Personality and the prediction of consequential outcomes. *Annual Review of Psychology, 57,* 401-421.

Patrick, & Hayden, (1999). Neuroticism, coping strategies, and negative well-being among caregivers. *Psychology and Aging, 14*, 273-283.

Pressman, S. D., & Cohen, S. (2005). Does positive affect influence health? *Psychological Bulletin*, *131*, 925-971.

Prochaska, J. J., Spring, B., & Nigg, C. R. (2008). Multiple health behavior change research: An introduction and overview. *Preventive Medicine, 46,*181-188. doi:10.1016/j.ypmed.2008.02.001

Prohaska, T., Belansky, E., Belza, B., Buchner, D., Marshall, V., McTigue, K., Satariano, W., & Wilcox, S. (2006). Physical activity, public health, and aging: Critical issues and research priorities. *Journal of Gerontology*, *61B*, 267-273.

Rabe-Hesketh, S., & Skrondal, A. (2008). *Multilevel and longitudinal modeling using stata 2nd edition* (2nd ed.). College Station, TX: Stata Press.

Ram, N., Brose, A., & Molenaar, P. C. (in press). Dynamic factor analysis: Modeling person-specific process. In T. D. Little (Ed.), *Oxford handbook of quantitative methods*. New York, NY: Oxford University Press.

Renner, B., Knoll, N., & Schwarzer, R. (2000). Age and body make a difference in optimistic health beliefs and nutrition behaviors. *International Journal of Behavioral Medicine*, *7*(2), 143-159.

Reuter, T., Ziegelmann, J. P., Lippke, S., & Schwarzer, R. (2009). Long-term relations between intentions, planning and exercise: A 3-year longitudinal study in orthopedic rehabilitation. *Rehabilitation Psychology, 54,* 363-371.

Rejeski, W. J., Mihalko, S. L., Ambrosius, W. T., Bearon, L. B., & McClellend, J. W. (2011). Weight loss and self-regulatory eating efficacy in older adults: The cooperative lifestyle intervention program. *The Journal of Gerontology, Series B: Psychological Sciences and Social Sciences*, *66*, 279-286. doi: 10.1093/geronb/gbq104

Riediger, M., & Freund, A. M. (2008). Me against myself: Motivational conflicts and Emotional development in adulthood. *Psychology & Aging*, *23*, 479-494.

Roberts, B. W., Caspi, A., & Moffitt, T. E. (2003). Work experiences and personality development in young adulthood. *Journal of Personality and Social Psychology, 84,* 582-593.

Roberts, B. W., Kuncel, N. R., Shiner, R., Caspi, A., & Goldberg, L. R. (2007). The power of personality: The comparative validity of personality traits, socioeconomic status, and cognitive ability for predicting important life outcomes. *Perspectives on Psychological Science, 2,* 313-345.

Roberts, B. W., & Mroczek, D. (2008). Personality traits change in adulthood. *Current Directions in Psychological Science*, *17*, 31-35.

Roberts, B. W., & Wood, D. (2006). Personality development in the context of the Neo-Socioanalytic Model of personality. In D. Mroczek & T. Little (Eds.), *Handbook of personality development* (pp. 11-39). Mahwah, NJ: Erlbaum.

Robinson, M. D., Meier, B. P., & Vargas, P. T. (2005). Extraversion, threat categorizations, and negative affect: A reaction time approach to avoidance motivation. *Journal of Personality*, *73*, 1399-1436.

Röcke, C., Li, S., & Smith, J. (2009). Intraindividual variability in positive and negative affect over 45 days: Do older adults fluctuate less than young adults? *Psychology and Aging*, *24*(4), 863-878. doi:10.1037/a0016276

Rowe, J. W., & Kahn, R. L. (1987). Human aging: Usual and successful. *Science, 237*, 143-149.

Rowe, J. W., & Kahn, R. L. (1997). Successful aging. *The Gerontologist, 37*, 433-440.

Ryff, C. D. (1989). Beyond Ponce de Leon and life satisfaction: New directions in quest of successful ageing. *International Journal of Behavioural Development*, *12*, 35-55.

Ryff, C. D., & Keyes, C .L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, *69*, 719-727. doi: 10.1037/0022-351

Schimmack, U. (2003). Affect measurement in experience sampling research. *Journal of Happiness Studies, 4*, 79-106.

Schmidt, R. M. (1994). Healthy aging into the 21st century. *Contemporary Gerontology, 1*, 3-6.

Schulz, R. (1985). Emotion and affect. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (2nd ed., pp. 531-543). New York: Van Nostrand Reihold Company.

Schulz, R. & Heckhausen, J. (1996). A life-span model of successful aging. *American psychologist*, *51*, 702-714.

Schwarzer, R. (2008). Modeling health behavior change: How to predict and modify the adoption and maintenance of health behaviors. *Applied Psychology, 57,* 1-29.

Schwarzer, R., Lippke, S., & Luszczynska, A. (2011). Mechanisms of health behavior change in persons with chronic illness or disability: The health action process approach (HAPA). *Rehabilitation Psychology*, *56*, 161-170.

Seale, G. S., Berges, I. M., Ottenbacher, K. J., & Ostir, G. V. (2010). Change in positive emotion and recovery of functional status following stroke. *Rehabilitation Psychology*, *55*, 33-39. doi: 10.1037/a0018744

Sheldon, K. M., & Kasser, T. (1998). Pursuing personal goals: Skills enable progress, but not all progress is beneficial. *Personality and Social Psychology Bulletin*, *24*, 1319-1331.

Shifren, K., & Hooker, K. (1995). Daily measurements of anxiety and affect: A study among spouse caregivers. *International Journal of Behavioral Development*, *18*, 595-607. doi: 10.1177/016502549501800402

Shifren, K., & Hooker, K. (1995). Stability and change in optimism: A study among spouse caregivers. *Experimental Aging Research*, *21*, 59-76. doi: 10.1080/03610739508254268

Siegler, I. C., Costa, P. T., Brummett, B. H., Helms, M. J., Barefoot, J. C., Williams, R. B., Dahlstrom, W. G., Kaplan, B. H., Vitaliano, P. P, Nichaman, M. Z., Day, R. S., & Rimer, B. K. (2003). Patterns of change in hostility from college to midlife in the UNC Alumni Heart Study predict high-risk status. *Psychosomatic Medicine, 65,* 738-745.

Siegler, I. C., Hooker, K., Bosworth, H. B., Elias, M. F., & Spiro, A., III. (2010). Adult development, aging, and gerontology. In J. M. Suls, K. W. Davidson, & R.M. Kaplan (Eds.), *Handbook of health psychology and behavioral medicine* (pp. 147-162). New York: Guilford.

Singer, J., & Willett, J. (2003). *Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence.* New York: Oxford University Press.

Skaff, M. M. (2007). Sense of control and health: A dynamic duo in the aging process. In C. M. Aldwin, C. L. Park, & A. Spiro, III. (Eds.), *Handbook of health psychology and aging* (pp. 186-209). New York, NY: The Guilford Press.

Sliwinski, M. J., Almeida, D. M., Smyth, J., & Stawski, R. S. (2009). Intraindividual change and variability in daily stress processes: Findings from two measurementburst diary studies. *Psychology & Aging*, *24*, 828-840.

Smith, T. W., & Gallo, L. C. (2001). Personality traits as risk factors for physical illness. In A. Baum, T. A. Revenson, & J. E. Singer (Eds.), *Handbook of health psychology* (pp. 139-173). Mahwah, NJ: Lawrence Erlbaum Associates.

Smith, T. W., & Spiro, A., III. (2002). Personality, health, and aging: Prolegomenon for the next generation. *Journal of Research in Personality*, *36*, 363-394.

Spiro, A., III. (2001). Health in middle life: Toward a life span view. In M. E. Lachman (Ed.), *Handbook of midlife development* (pp. 156-187). New York, NY: Wiley.

Steptoe, A., Dockray, S., & Wardle, J. (2009). Positive affect and psychobiological processes relevant to health. *Journal of Personality*, *77*, 1747-1775. doi: 10.1111/j.1467-6494.2009.00599.x

Sutin, A. R., Ferrucci, L., Zonderman, A. B., & Terracciano, A. (2011). Personality and obesity across the adult life span. *Journal of Personality and Social Psychology*, *101*, 579-592. doi: 10.1037/a0024286

Turiano, N. A., Pitzer, L., Armour, C., Karlamangla, A., Ryff, C. D., & Mroczek, D. K. (2012). Personality trait level and change as predictors of health outcomes: Findings from a national study of americans (midus). *The Journals of Gerontology*, *Series B: Psychological Sciences and Social Sciences*, *67*, 4-12. doi:10.1093/geronb/gbr072

Vaillant, G. E. (2002). *Aging well: Surprising guideposts to a happier life*. Boston, MA: Little, Brown.

Winter, L., Lawton, M. P., Langston, C. A., Ruckdeschel, K., & Sando, R. (2007). Symptoms, affects, and self-rated health: Evidence for a subjective trajectory of health. *Journal of Aging and Health*, *19*, 453-469.

Wykle, M. L., Whitehouse, P. J., & Morris, D. L. (2005). *Successful Aging through the Life Span: Intergenerational Issues in Health*. New York: Springer Publishing Company.

Young, Y., Frick, K. D., & Phelan, E. A. (2009). Can successful aging and chronic illness coexist in the same individual? A multidimensional concept of successful aging, *Journal of the American Medical Directors Association*, *10*, 87-92.

Zautra, A. J., Affleck, G. G., Tennen, H., Reich, J. W., & Davis, M. C. (2005). Dynamic approaches to emotions and stress in everyday life: Bolger and Zuckerman reloaded with positive as well as negative affects. *Journal of Personality*, *73*(6), 1511-1538.

Zohrabian, A., & Philipson, T. J. (2010). External costs of risky health behaviors associated with leading actual causes of death in the U.S.: A review of the evidence and implications for future research. *International Journal of Environmental Research and Public Health*, *7*, 2460-2472. doi: 10.3390/ijerph7062460

APPENDICES

Appendix A

Results of Multilevel Models with Multiple Imputation (10 Imputed Data)

Results of Preliminary Estimation Models with 10 Imputed Data for Daily Health-Goal Progress

	Daily Health-Goal Progress		
	Mean Model B (SE)	Slope Model B (SE)	Covariate Model B (SE)
Fixed Effects			
Intercept	63.17***(2.23)	63.24***(2.23)	63.05***(2.24)
Day		.07*** (.02)	.07*** (.02)
Age			-.26 (.30)
Gender			.37 (6.69)
Random Effects (SD)			
Level 1 Within-person	19.45***(.17)	19.02***(.17)	19.02***(.17)
Level 2 Between-person	19.28***(1.58)	19.30***(1.69)	19.30***(1.59)
Day	__	.12***(.01)	.12***(.01)
R^2 Within	__	.04	.04
R^2 Between	__	.00	.00

Note. Note. n = 76, Number of observations = 6523, Imputation = 10. Dependent variable is Daily Health-Goal Progress. Day, Age, and Gender are grand mean centered.* $p \leq .05$, ** $p \leq .01$, and *** $p \leq .001$, Two-tailed tests.

Results of Models with 10 Imputed Data for Within-Person Coupling of Daily Positive and Negative Affect on Daily Health-Goal Progress

	Daily Health-Goal Progress		
	Positive Affect Model B (SE)	Negative Affect Model B (SE)	Affect Model B (SE)
Fixed Effects			
Intercept	52.82***(2.28)	64.56*** (2.21)	51.50*** (2.57)
Day	.05**(.02)	.05**(.02)	.05**(.02)
Age	-.31 (.26)	-.22 (.26)	-.35 (.25)
Gender	1.74 (5.84)	6.32 (6.22)	3.07 (5.76)
PA Within	1.66*** (.21)	__	1.74*** (.23)
PA Between	2.24*** (.42)	__	2.47*** (.47)
PA Within × Between	.09* (.04)	__	.09*(.04)
NA Within	__	-.97***(.14)	.19(.14)
NA Between	__	-1.57*(.71)	.35(.72)
NA Within × Between	__	.01(.04)	-.03 (.04)
Random Effects (SD)			
Level 1 Within-person	18.08***(.16)	18.70***(.17)	18.03*** (.16)
Level 2 Between-person	16.13***(1.36)	18.73***(1.56)	16.43*** (1.41)
Day	.12***(.01)	.12*** (.01)	.12*** (.01)
PA	1.36*** (.18)	__	1.44*** (.19)
NA	__	.78*** (.13)	.64*** (.17)
R^2 Within	.14	.08	.14
R^2 Between	.30	.06	.27

Note. n = 76, Number of observations = 6523. Imputation = 10. Dependent variable is Daily Health-Goal Progress. Day, Age, Gender, PA between, and NA between are grand mean centered (Hox, 2010). PA Within = positive affect in the within-person level, PA Between = positive affect in the between-person level, NA Within = negative affect in the within-person level, NA Between = negative affect in the between-person level. *$p \leq .05$, ** $p \leq .01$, and *** $p \leq .001$, Two-tailed tests.

Results of Within-Person Lagged Models with 10 Imputed Data for Daily Positive and Negative Affect on Daily Health- Goal Progress

Effect	Daily Health-Goal Progress					
	Lagged Model 1 B (SE)	Lagged Model 2 B (SE)	Lagged Model 3 B (SE)	Lagged Model 4 B (SE)	Lagged Model 5 B (SE)	Lagged Model 6 B (SE)
Fixed Effects						
Intercept	63.38*** (2.24)	63.37*** (2.24)	63.42*** (2.24)	63.29*** (2.25)	63.38*** (2.25)	63.48*** (2.27)
Day	.04** (.01)	.06**(.02)	.05**(.02)	.04**(.01)	.04**(.01)	.04**(.01)
Previous Day HGP	.21*** (.02)	—	—	.21*** (.01)	.21*** (.02)	.21*** (.02)
Previous Day PA	—	.11(.06)	—	.04(.10)	—	-.04(.11)
Previous Day NA	—	—	-.17(.11)	—	-.06(.12)	-.08(.13)
Random Effects (SD)						
Level 1 Within-person	18.28*** (.17)	18.71*** (.17)	18.74*** (.17)	18.25*** (.17)	18.20*** (.17)	18.19*** (.17)
Level 2 Between-person	19.42*** (1.60)	19.36*** (1.59)	19.37*** (1.59)	19.37*** (1.59)	19.49*** (1.60)	19.47*** (1.60)
Day	.08*** (.01)	.12*** (.01)	.12*** (.01)	.08*** (.01)	.08*** (.01)	.08*** (.01)
HGP	.14*** (.02)	—	—	.14*** (.02)	.14*** (.02)	.14*** (.02)
PA	—	.38*** (.07)	—	.35* (.16)	—	.13 (.41)
NA	—	—	.53*** (.10)	—	.61*** (.13)	.61*** (.14)
R^2 Within	.12	.07	.07	.12	.12	.13
R^2 Between	.01	.01	.01	.01	.01	.01

Note. n = 76, Number of observations = 5814, Imputation = 10. Dependent variable is Daily Health-Goal Progress. HGP = health-goal progress, PA = positive affect, NA = negative affect. *$p \leq .05$, **$p \leq .01$, and ***$p \leq .001$, Two-tailed tests.

Results of Models with 10 Imputed Data for Neuroticism and Conscientiousness on Daily Health Goal Progress

Effect	Daily Health-Goal Progress		
	Trait Model 1 B (SE)	Trait Model 2 B (SE)	Trait Model 3 B (SE)
Fixed Effects			
Intercept	63.15***(2.22)	63.01***(2.20)	63.00*** (2.18)
Day	.06***(.02)	.07*** (.02)	.07*** (.02)
Neuroticism	-.23(.22)	__	-.03(.27)
Neuroticism × Day	-.003(.00)	__	-.003†(.00)
Conscientiousness	__	.36(.22)	.34 (.27)
Conscientiousness × Day	__	.00 (.00)	-.00 (.00)
Random Effects (SD)			
Level 1 Within-person	19.02***(.17)	19.02*** (.17)	19.03*** (.17)
Level 2 Between-person	19.16***(1.57)	18.96*** (1.56)	18.96*** (1.56)
Day	.12***(.01)	.12***(.01)	.12***(.01)
R^2 Within	.04	.04	.04
R^2 Between	.01	.03	.03

Note. n = 76, Number of observations = 6523, Imputation = 10. Dependent variable is Daily Health-Goal Progress. Day, Neuroticism, and Conscientiousness are grand mean centered. †$p \leq .10$, *$p \leq .05$, **$p \leq .01$, and ***$p \leq .001$, Two-tailed tests.

Results of Models with 10 Imputed Data for Positive Affect, Neuroticism, and Conscientiousness on Health-Goal Progress

Effect	Daily Health-Goal Progress			
	Model 1 B (SE)	Model 2 B (SE)	Model 3 B (SE)	Model 4 B (SE)
Fixed Effects				
Intercept	53.25***(2.25)	52.68***(2.29)	53.32***(2.28)	52.71***(2.27)
Day	.05**(.02)	.05**(.02)	.05**(.02)	.05**(.02)
PA Within	1.66***(.22)	1.66***(.21)	1.68***(.21)	1.67***(.21)
PA Between	2.15***(.42)	2.37***(.45)	2.11***(.44)	2.32***(.45)
PA Within × Between	.09*(.04)	.09*(.05)	.08†(.04)	.09†(.05)
Neuroticism	—	.25 (.21)	—	.41†(.25)
Neuroticism × PA Within	—	.00(.02)	—	.02(.02)
Conscientiousness	—	—	.07(.20)	.28(.22)
Conscientiousness × PA Within	—	—	.01(.02)	.02(.02)
Random Effects (SD)				
Level 1 Within-person	18.08***(.16)	18.08***(.16)	18.08***(.16)	18.08***(.16)
Level 2 Between-person	16.24***(1.37)	16.12***(1.35)	16.26***(1.37)	15.98***(1.34)
Day	.12***(.01)	.12***(.01)	.12***(.01)	.12***(.01)
PA	1.36***(.18)	1.36***(.18)	1.35***(.18)	1.34***(.18)
R^2 Within	.14	.14	.14	.14
R^2 Between	.29	.30	.29	.31

Note. n = 76, Number of observations = 6523, Imputation = 10. Dependent variable is Daily Health-Goal Progress. PA Within = positive affect in the within-person level, PA Between = positive affect in the between-person level. $^{\dagger}p \leq .10$, $^{*}p \leq .05$, $^{**}p \leq .01$, and $^{***}p \leq .001$, Two-tailed tests.

Results of Models with 10 Imputed Data for Negative Affect, Neuroticism, and Conscientiousness on Health-Goal Progress

Effect	Daily Health-Goal Progress			
	Model 5 B (SE)	Model 6 B (SE)	Model 7 B (SE)	Model 8 B (SE)
Fixed Effects				
Intercept	64.72***(2.19)	64.94***(2.22)	64.51***(2.17)	64.90***(2.18)
Day	.05**(.02)	.05**(.02)	.05**(.02)	.05**(.02)
NA Within	-.96***(.14)	-.97***(.14)	-.95***(.14)	-.96***(.13)
NA Between	-1.53*(.70)	-1.81*(.83)	-1.41*(.70)	-2.15*(.82)
NA Within × Between	01(.04)	.05(.05)	01(.04)	.06(.05)
Neuroticism	—	.16(.25)	—	.51†(.31)
Neuroticism × NA Within	—	-.02(.01)	—	-.03†(.02)
Conscientiousness	—	—	.22 (.21)	.48†(.26)
Conscientiousness × NA Within	—	—	.00(.01)	-.02(01)
Random Effects (SD)				
Level 1 Within-person	18.70***(.17)	18.70***(.17)	18.70***(.17)	18.70***(.17)
Level 2 Between-person	18.64***(1.53)	18.60***(1.52)	18.51***(1.51)	18.20***(1.50)
Day	.12***(.01)	.12***(.01)	.12***(.01)	.12***(.01)
NA	.77***(.12)	.75***(.16)	.77***(.13)	.73***(.13)
R^2 Within	.08	.08	.08	.08
R^2 Between	.07	.07	.08	.11

Note. n = 76, Number of observations = 6523. Dependent variable is Daily Health-Goal Progress. NA Within = negative affect in the within-person level, NA Between = negative affect in the between-person level. $^{\dagger}p \leq .10$, $*p \leq .05$, $**p \leq .01$, and $***p \leq .001$, Two-tailed tests.

Results of Multilevel Models with 10 Imputed Data for Positive Affect, Negative Affect, Neuroticism, and Conscientiousness on Health-Goal Progress

Effect	Daily Health-Goal Progress			
	Model 9 B (SE)	Model 10 B (SE)	Model 11 B (SE)	Model 12 B (SE)
Fixed Effects				
Intercept	52.20***(2.54)	52.26***(2.53)	52.32*** (2.55)	52.61***(2.52)
Day	.05**(.02)	.05**(.02)	.05**(.02)	.05**(.02)
PA Within	1.74***(.23)	1.75***(.24)	1.76***(.23)	1.75***(.24)
PA Between	2.33*** (.47)	2.43***(.48)	2.28***(.49)	2.32***(.48)
PA Within × Between	.09*(.04)	.09†(.05)	.08†(.04)	.08†(.05)
NA Within	.19(.14)	.19(.14)	.19(.14)	.18(.14)
NA Between	.25(.72)	-.23(.80)	.24(.72)	-.50 (.81)
NA Within × Between	-.03(.04)	-.01(.04)	-.03(.04)	-.01(.04)
Neuroticism	—	.32(.24)	—	.53†(.29)
Neuroticism × PA Within	—	-.00(.02)	—	.01(.03)
Neuroticism × NA Within	—	-.01(.01)	—	-.01(.02)
Conscientiousness	—	—	.04(.20)	.30(.24)
Conscientiousness × PA Within	—	—	.02(.02)	.02(.02)
Conscientiousness × NA Within	—	—	.01(.01)	00(.02)
Random Effects				
Level 1 Within-person	18.03***(.16)	18.03***(.16)	18.03***(.16)	18.03***(.16)
Level 2 Between-person	16.48***(1.40)	16.31***(1.39)	16.51***(1.41)	16.16***(1.38)
Day	.12***(.01)	.12***(.01)	.12***(.01)	.12***(.01)
PA	1.45***(.19)	1.45***(.19)	1.44***(.19)	1.44***(.19)
NA	.64***(.17)	.64***(.17)	.63***(.17)	.63***(.17)
R^2 Within	.14	.14	.14	.14
R^2 Between	.27	.28	.27	.30

Note. n = 76, Number of observations = 6523, Imputation = 10. Dependent variable is Daily Health-Goal Progress. PA Within = positive affect in the within-person level, PA Between = positive affect in the between-person level, NA Within = negative affect in the within-person level, NA Between = negative affect in the between-person level. $^{\dagger}p \leq .10$, $*p \leq .05$, $**p \leq .01$, and $***p \leq .001$, Two-tailed tests.