

CHANGES IN ATTACHMENT ORIENTATION OVER A 59-YEAR PERIOD:
DETERMINANTS OF CHANGE AND IMPLICATIONS FOR HEALTH

by

William J. Chopik

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Psychology)
in the University of Michigan
2015

Doctoral Committee:

Associate Professor Robin S. Edelstein, Chair
Professor Richard Gonzalez
Assistant Professor Sara I. McClelland
Professor Abigail J. Stewart

“Romeo wants Juliet as the filings want the magnet; and if no obstacles intervene he moves towards her by as straight a line as they. But Romeo and Juliet, if a wall be built between them, do not remain idiotically pressing their faces against its opposite sides like the magnet and the filings with the card. Romeo soon finds a circuitous way, by scaling the wall or otherwise, of touching Juliet's lips directly. With the filings the path is fixed; whether it reaches the end depends on accidents. With the lover it is the end which is fixed, the path may be modified indefinitely.”

-William James

“Change is inevitable—except from a vending machine.”

-Robert C. Gallagher

© William J. Chopik 2015

DEDICATION

To my parents, Stephen and Donna, who taught me the value of working hard and the prototypes on which all of my relationships are modeled.

ACKNOWLEDGEMENTS

At its heart, this dissertation is about how relationships and the people in them change over time. When I think back to how I have arrived at this point in my intellectual life, I realize that I have been the recipient of many great relationships, which have changed me. Before a project that attempts to take such a broad perspective on relationships across the lifespan, I thought it was appropriate to acknowledge my own life and relationship history. First and foremost, I would like to thank my advisor, Robin Edelstein, for her generosity, patience, wisdom, and encouragement during my time at Michigan. She taught me how to be a researcher, a good colleague, and a good friend. I owe many of my successes to her and will likely be indebted to her forever. I look forward to many more years of collaboration.

I would also like to thank several other individuals who have served as advisors and mentors to me, both in the past and present. At Michigan, Chris Peterson, Sara Konrath, Jacqui Smith, Rich Gonzalez, David Winter, Abby Stewart, Phoebe Ellsworth, Sara McClelland, Fiona Lee, Colleen Seifert, and Dan Kruger were particularly encouraging, made my time at Michigan intellectually richer, and I'm happier for having them in my life. At Illinois, Chris Fraley, Claudia Brumbaugh, Grant Edmonds, Jennifer Fayard, Josh Jackson, Michael Marks, Brent Roberts, Glenn Roisman, and Mandy Vicary were the people who contributed to my earliest experiences in the field, and I've realized more and more that these experiences leave an

indelible mark on individuals.

Members of the Personality, Relationships, and Hormones Lab, the Interdisciplinary Program on Empathy and Altruism Research, the LIFE Program, the Psychosocial Aging Group, the SISPP alums, the EHAP interest group, Psychology SAA, and the ADVANCE Program should also be acknowledged for their welcoming atmospheres and intellectual contributions in my life. I would also like to thank my many collaborators for their input and strengthening each research project. My work was also done in collaboration with undergraduate research assistants. I'm always struck by the excitement that research sparks in people—research assistants sacrificed many hours, many times on projects that did not confirm our hypotheses, but the thrill of answering interesting questions kept them (and me) motivated.

The greatest moments of my time at Michigan were shared with the friends I made during the process, and the interactions with these people defined my time here. My memories of grad school and the people I have met are too numerous to list here. However, I would like to briefly thank Ed O'Brien, Amy Moors, Eric Kim, Britney Wardecker, (Cool) Ali Zeigler, Rob Kononowech, Eric Smith, Linda Hagen, Ryan Bremner, Dan Gosnell, Jes Matsick, Rita Seabrook, Shawn Beard, Kate Kuhlman, Mike Erwin, Lanice Avery, Teresa Nguyen, Emily Shipman, Natalie Lin, Jennifer Sun, Michael Shain, and Nicky Newton.

TABLE OF CONTENTS

DEDICATION.....	ii
ACKNOWLEDGEMENTS.....	iii
LIST OF FIGURES.....	vii
LIST OF TABLES.....	viii
ABSTRACT.....	ix
CHAPTER 1: INTRODUCTION.....	1
What is Attachment?.....	2
Attachment and Aging: Insights from Theory and Cross-Sectional Evidence.....	3
Possible Moderators of Changes in Attachment Orientation across the Lifespan.....	8
Social Relationships and Health.....	10
Predicting Health from Changes in Attachment Orientation.....	11
The Current Study.....	13
CHAPTER 2: MEASURING CHANGES IN ATTACHMENT USING THE CALIFORNIA Q-SORT.....	15
Current Limitations in Measuring Changes in Attachment Orientation across the	

Lifespan.....	15
The California Adult Q-Sort.....	16
Observer-Based Measures of Attachment Orientation.....	17
Validating a Measure of Attachment Orientation from the California Q-Sort.....	21
Method.....	22
Results.....	28
Conclusion.....	32
CHAPTER 3: METHOD.....	34
Participants.....	34
Measures.....	35
CHAPTER 4: RESULTS.....	38
How Do Attachment Orientations Change over Time?.....	38
Do Relationship Status and Relationship Satisfaction Moderate Changes in Attachment Orientation in Adulthood?.....	45
Are Changes in Attachment Orientation Associated with Health throughout Adulthood?.....	51
The Moderating Role of Sample Source.....	53
CHAPTER 5: DISCUSSION.....	58
Future Directions in the Study of Attachment and Health across the Lifespan.....	59
Considerations for Measuring Changes in Attachment Orientation Using the CAQ.....	62
Conclusion.....	65
REFERENCES.....	66

LIST OF FIGURES

Figures 1a-c. Longitudinal changes for anxiety (a), avoidance (b), and avoidance for men v. women (c).....	44
Figures 2a-b. Longitudinal changes in anxiety (a) and avoidance (b) among single v. partnered individuals.....	48

LIST OF TABLES

Table 1. Expert Ratings of top CAQ-Anxiety and CAQ-Avoidance items.....	26
Table 2. Associations between Observer-Reports of Attachment Orientation.....	29
Table 3. Correlations between Observer-Reported Attachment and Self-Reports of Attachment and Personality.....	31
Table 4. Means and Standard Deviations of Attachment Orientations at Every Wave.....	38
Table 5. Correlations among Primary Study Variables and Attachment Orientations.....	39
Tables 6a and 6b. Growth Curve Modeling Predicting Attachment Anxiety and Avoidance from Age and Gender.....	42-43
Tables 7a and 7b. Growth Curve Modeling Predicting Attachment Anxiety and Avoidance from Age, Gender, and Relationship Status.....	46-47
Tables 8a and 8b. Growth Curve Modeling Predicting Attachment Anxiety and Avoidance from Age, Gender, and Relationship Satisfaction.....	49-50
Tables 9a and 9b. Growth Curve Modeling Predicting Attachment Anxiety and Avoidance from Age, Gender, and Health.....	52-53
Tables 10a and 10b. Growth Curve Modeling Predicting Attachment Anxiety and Avoidance from Age, Gender, and Sample Source.....	55-56

ABSTRACT

More than forty years have passed since John Bowlby (1969/1982) proposed that the attachment system is influential “from the cradle to the grave” (p. 208). During those years, researchers have documented many important links between individual differences in attachment and behavior, emotion, and cognition in close relationships. Yet the majority of this work has focused on early childhood and young adulthood. Relatively little attention has been paid to attachment processes from a lifespan perspective—one that includes middle and older adulthood. Methodological limitations also prevent researchers from measuring how attachment changes over long intervals of time. In this dissertation, I developed a measure of attachment orientation using existing measures of personality and then used this method to examine changes in attachment orientation from age 3 to 62 using data from the Block and Block Longitudinal Study, the Intergenerational Studies, and the Radcliffe College Class of 1964 Sample. I also tested whether relationship status and satisfaction moderated changes in attachment orientation among adults. Finally, I examined how individual differences in change were related to subjective health across the lifespan. My findings demonstrate that attachment anxiety increased during childhood and adolescence before decreasing in adulthood. Attachment avoidance increased slightly until middle age before declining in older adulthood. Being in a relationship and having higher marital satisfaction predicted lower levels of anxiety and avoidance across adulthood, particularly in old age. Finally,

anxiety was consistently associated with poorer health across adulthood. Taken together, these findings provide much-needed insight into how attachment orientations change over long stretches of time, as well as information about what predicts these changes and the implications of these changes. My dissertation also serves as an illustrative example of how observer-reports of personality can be used to create measures of a construct that was not previously included in data collection. Considerations for measuring longitudinal changes in attachment with observer-based measures of personality are discussed, along with future directions and implications for studying changes in relationships over time.

CHAPTER 1

INTRODUCTION

More than forty years have passed since John Bowlby (1969/1982) proposed that the attachment system is influential “from the cradle to the grave” (p. 208). During those years, researchers have documented many important links between individual differences in attachment and behavior, emotion, and cognition in close relationships (Cassidy & Shaver, 2008). Yet the majority of this work has focused on early childhood and young adulthood. Relatively little attention has been paid to attachment processes from a lifespan perspective—one that includes middle and older adulthood (Magai, 2008). A lifespan perspective can provide a valuable framework for attachment research. Indeed, many attachment-relevant phenomenon are likely to occur after young adulthood (e.g., marriage, bereavement, caregiving for an elderly parent; see Magai, 2008). Attachment-relevant experiences also have important implications for health and well-being across the lifespan (House, Landis, & Umberson, 1988; Pietromonaco, DeBuse, & Powers, 2013; Sbarra & Nietert, 2009). However, few empirical studies have examined the effects of changes in an individual’s attachment orientation on health across the lifespan.

In this dissertation, I will examine three broad questions: (1) How does an individual’s attachment orientation change throughout the adult lifespan? (2) How are relationship status and relationship quality associated with changes in attachment orientation? (3) How do individual

differences in attachment predict health across the lifespan? Using three longitudinal samples, I will examine the rates of change in attachment orientation from age 3 to age 62. I will also test whether relationship status and quality moderate changes in attachment orientation among adults. Finally, I will relate individual differences in change to subjective health across the lifespan.

What is Attachment?

Close relationships enrich our lives and change us in transformative ways. Nearly every waking moment is spent in the presence of others (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004); when people are not with others they often watch them on televisions and movie screens and stages, an activity that consumes the vast majority of their free time (Bohn & Short, 2009). When people are not watching others, they think about them, of past events and of future interactions yet to come (Gilbert & Wilson, 2009). Interpersonal connections are so common that some scholars have argued they are the core of the human experience (Baumeister & Leary, 1995; Panksepp, 1998).

And yet not all close relationships, and the people in them, are the same. Some people form connections that are strong and supportive, with long-term mutual commitment. Others form connections that are superficial and fleeting, reaping benefits while giving little back in return. Still others seek to avoid social interactions altogether. Given such differences in how people connect to others, researchers have been interested in factors that promote healthy, satisfying relationships, the types of connections that are closely linked to well-being and other positive outcomes (Collins & Feeney, 2004; Collins & Read, 1990; Sarason, Sarason, & Gurung, 2001).

In the last 50 years, attachment theory has arisen as a popular framework for

understanding these close relationships (Cassidy & Shaver, 2008). Attachment theory was originally conceptualized as a framework for understanding the influence of early caregiving experiences on interpersonal behavior. However, researchers have proposed several ways in which attachment can explain why individuals differ in behavior, emotion, and cognition in adult romantic relationships as well (Hazan & Shaver, 1987). Many of the same researchers propose that individual differences in attachment orientation can explain variability in relationship behavior. An individual's attachment orientation is generally conceptualized as their position on two conceptually distinct dimensions: anxiety and avoidance (Fraley & Waller, 1998). Attachment-related anxiety reflects "hyperactivation" of the attachment system and preoccupation with the availability of close others (Mikulincer, Gillath, & Shaver, 2002). For instance, individuals with higher anxiety scores exhibit excessive reassurance-seeking and hypervigilance to signs of rejection and abandonment (Fraley, Niedenthal, Marks, Brumbaugh, & Vicary, 2006; Shaver, Schachner, & Mikulincer, 2005). The avoidance dimension is characterized by chronic attempts to inhibit attachment-system activation in an effort to minimize expressions of distress (Edelstein & Shaver, 2004; Fraley, Davis, & Shaver, 1998). For instance, individuals with higher avoidance scores generally tend to dislike intimacy and are less likely to provide emotional support for romantic partners (Brennan, Clark, & Shaver, 1998; Li & Chan, 2012). Individuals reporting low scores on both dimensions are generally considered secure.

Attachment and Aging: Insights from Theory and Cross-Sectional Evidence

Across the lifespan, we invest in different types of relationships, and interactions with these individuals likely change how we approach close relationships more generally. Several

relationship milestones occur during a particular life stage or age, and examining how attachment orientations change across the lifespan can capture how individuals tend to approach relationships at different life stages. Why would one expect attachment orientations to change across the lifespan? Roberts and colleagues (2005) have suggested that investing in and making commitments to social institutions are driving forces that can explain age differences in personality. Normative social roles (e.g., partnership, parenting) are often age-graded and come with sets of expectations that reward social maturity (Roberts et al., 2005). Because transitions in partnership and parenting generally occur throughout early and middle adulthood, one might therefore expect the largest differences in attachment to be observed during this time period.

Specific predictions about patterns of changes in attachment can also be made based on normative changes in social roles. For instance, close relationships in early adulthood likely facilitate and demand increases in emotion-regulatory skills, which may lead to decreases in negative emotional experiences (e.g., Gross et al., 1997). Indeed, there is consistent evidence for age-related decreases in neuroticism (Srivastava, John, Gosling, & Potter, 2003), a personality construct that shares some conceptual and empirical overlap with attachment anxiety (Nofle & Shaver, 2006). There is also some evidence that these changes are largest during early to middle adulthood (Terracciano, McCrae, Brant, & Costa, 2005). In a large cross-sectional sample of over 1 million participants, Soto and colleagues (2010) observed higher levels of neuroticism among young women compared to middle-aged and older women. Age differences in neuroticism were much less pronounced among men, but older men had the lowest levels of neuroticism in the sample. The few longitudinal studies of attachment anxiety show similar trends as those for neuroticism. Klohnen and John (1998) observed decreases in attachment anxiety among women from ages 27 to 52. In cross-sectional studies, middle-aged (i.e., ages 40-

60) and older (i.e., ages 60-88) individuals similarly report lower levels of attachment anxiety compared to their younger counterparts (i.e., ages 20-40, Diehl, Elnick, Bourbeau, & Labouvie-Vief, 1998).

Transitions in life roles may also have implications for how attachment avoidance changes with age. High levels of avoidance in early adulthood could prevent the formation of intimate relationships altogether (Schindler, Fagundes, & Murdock, 2010). However, literature on emerging adulthood (Arnett, 2000) suggests that changes during young adulthood could be accompanied by higher levels of attachment avoidance. Adolescents and young adults begin to explore their identities and develop more independence and autonomy as they approach their mid-twenties (Erikson, 1968; Whitbourne & Tesch, 1985). These individuation processes are also reflected in the shifting of attachment needs from parents to peers and romantic partners during adolescence and young adulthood (Fraley & Davis, 1997). Any observed changes in avoidance would therefore be consistent with theory and research pointing to people's ability to revise existing attachment orientations in light of new information and experiences (John Bowlby, 1973).

Increases in avoidance with age may also be consistent with developmental changes in other personality traits that have some seemingly maladaptive qualities but may nevertheless be useful for establishing one's identity during young adulthood. For instance, for identity- and individuation-related purposes, researchers suggest that higher levels of traits like narcissism are beneficial specifically among young adults but not among middle-aged and older adults (Hill & Roberts, 2011). Moreover, despite negligible correlations between avoidance and narcissism (e.g., Otway & Vignoles, 2006), Smolewska & Dion (2005) suggest that these two personality constructs are conceptually similar, share an underlying structure, and serve similar purposes, in

that both are the products of defense mechanisms employed to maintain a consistent self-concept. Thus, avoidance might be higher during time periods when this personality construct is considered more adaptive (i.e., during young adulthood).

Some support for the hypothesis that avoidance would increase over time comes from Mickelson and colleagues (1997), who found that avoidance was higher among middle-aged compared to young adults. Several other studies with large age ranges similarly find that avoidance is positively correlated with age (e.g., Birnbaum, 2007). Other studies show either no relationship or even a negative association with age (e.g., Nofhle & Shaver, 2006). However, many of these age differences are relatively small and/or utilize narrow age ranges, suggesting that large samples with wider age ranges may be necessary to detect them. Findings from another cross-sectional study suggest that attachment avoidance does not significantly differ among younger (ages 18-34) and older (ages 60-96) adults (Segal, Needham, & Coolidge, 2009). Longitudinal research also provides little evidence for changes in avoidance in women from young to middle adulthood (Klohn & John, 1998).

In an initial study of age differences in attachment orientation (Chopik, Edelstein, & Fraley, 2013), my colleagues and I examined associations among age, relationship status, gender, and attachment orientation in a sample of 86,555 participants ranging in age from 18 to 70. Our findings revealed that attachment anxiety was highest among younger adults and was lowest among middle-aged and older adults. Attachment avoidance showed less dramatic age differences, but was higher in middle-aged adults and lower in younger and older adults.

In a separate sample of 90,904 participants from 81 different countries, I replicated these age differences and showed that attachment developed in a similar way across different sociocultural contexts (Chopik & Edelstein, 2014a). By examining how attachment orientations

developed around the world, I was able to make additional inferences about how individuals age and change over time. Examining development in other cultures is important given the considerable variability in features related to social norms and behaviors, particularly those relevant to close relationships (Stewart & Healy, 1989). Further, it is impossible to know whether any age-related differences observed are the result of developmental changes in attachment orientation (Klohn & John, 1998) or cohort effects (Konrath, Chopik, Hsing, & O'Brien, 2013; Magai et al., 2001). For example, specific characteristics of one group of individuals (i.e., those born in the 1990s) could partially explain why younger adults are lower in attachment avoidance or higher in anxiety compared to middle-aged adults (as I observed in our first cross-sectional study). The possibility of cohort effects would undermine a developmental interpretation by attributing age differences to societal factors specific to a particular group (i.e., sociocultural norms).

However, the possibility of cohort effects arises not from the year an individual is born, but rather with the specific socio-cultural events and conditions to which that individual is exposed (Riley, Johnson, & Foner, 1972). Therefore, age differences can be interpreted as stemming from cohort/birth effects, cultural influences on personality development, or a combination of both. However, if *similar* patterns of age differences in attachment emerge in different cultural regions, the differences in socio-cultural history of individuals strengthens the case for interpreting them as indicative of intra-individual processes (McCrae et al., 1999). As McCrae et al. (1999) point out, one might argue that American college students today differ on a personality trait because they were socialized in an environment of increasing affluence in the 1990s. However, that argument cannot be extended to other regions that may have experienced economic declines over the same period. Because my data suggest that age differences in

attachment were consistent across geographic regions, a common developmental trajectory of attachment would offer a better explanation. Nevertheless, longitudinal data remains the gold standard for ruling out alternative hypotheses for interpreting data that takes only a snapshot (e.g., cross-section) or the population at different ages.

Possible Moderators of Changes in Attachment Orientation across the Lifespan

The expectations that come along with being a romantic partner can exert social control over behavior by rewarding appropriate behavior and admonishing inappropriate behavior (Roberts et al., 2005). By investing in these social roles, individuals “buy into” the contingencies of close relationships and are likely to change how they approach relationships to fit these contingencies and perhaps become more secure. Prior research consistently indicates that individuals in romantic relationships are less anxious and avoidant (i.e., more secure) compared to single individuals (e.g., Edelstein & Gillath, 2008). This may reflect the (potentially) security-enhancing effects of being in a relationship (Kirkpatrick & Hazan, 1994). Secure individuals have many of the characteristics desirable in a long-term partner (e.g., attentiveness, warmth, sensitivity), and as such may be more likely to be in a relationship at any given time (Zeifman & Hazan, 1997). Nevertheless, the extent to which being in a relationship is associated with attachment security across the lifespan is not yet clear. With age, individuals shift greater attention and resources towards maintaining intimate relationships (Carstensen, Isaacowitz, & Charles, 1999), making such relationships increasingly central to personality development and functioning. Thus, the association between age and attachment security might be stronger among older compared to younger adults.

In a longitudinal study of newlyweds, attachment security increased over the first few

years of the relationship, even in the context of overall decreases in marital satisfaction common among newlyweds (Davila, Karney, & Bradbury, 1999). After examining a variety of individual-difference and contextual factors, Davila and colleagues suggested that increases in security can be attributed to people becoming more comfortable in their relationships, gaining more evidence that the relationship will last, and/or having spouses who serve attachment functions that promote close and intimate relations. Any of these scenarios support the claim that relationships serve a security-enhancing function. Lower levels of avoidance prior to relationship initiation also predict whether an individual will initiate a committed relationship, even after controlling for relationship goals and prior dating experience (Schindler et al., 2010). These findings suggest that individuals in relationships should have lower levels of anxiety and avoidance than single individuals, but the association between age and security at different points in the lifespan is still an open question.

In the aforementioned cross-sectional study of age differences in attachment, individuals in relationships were indeed lower in anxiety and avoidance at every point in the adult lifespan (Chopik et al., 2013). Further, avoidance appeared to be higher in partnered individuals in middle age compared to partnered individuals in young adulthood. Although previous research and cross-sectional data suggest that relationship status and quality may have security-enhancing effects on individuals and relationships across the lifespan, the limited longitudinal frame and cross-sectional nature once again limit our ability to make definitive statements about changes over time. Do relationship status and relationship quality exert a *static* influence on attachment over time (Davila et al., 1999) or do relationships enhance security primarily during particular developmental periods (Chopik et al., 2013; Chopik, Moors, & Edelstein, 2014)? Using longitudinal data from different groups of individuals from age 18 to 62, I will be able to test the

relative influence of relationships on attachment orientations across much of the adult lifespan.

Social Relationships and Health

The literature specifically linking individual differences in *changes* in attachment orientation and physical health is much sparser. However, there are several reasons to expect that attachment orientations would predict physical health across the lifespan.

Social relationships are not only intrinsically rewarding and make us happy, but they also have important implications for health and wellness (House et al., 1988). There are several different pathways through which social networks and relationships can affect health. For example, social relationships can promote healthy behavior like eating, exercise, and adherence to medication while avoiding more deleterious risky behavior. Evidence that behaviors like alcohol consumption, loneliness, obesity, and smoking spread through our social networks suggests that the relationships in which we engage can have very real consequences on our physical health (Cacioppo, Fowler, & Christakis, 2009; Christakis & Fowler, 2007, 2008; Rosenquist, Fowler, & Christakis, 2011). Other research demonstrates that the dissolution of intimate bonds (measured as separation or divorce from a primary partner) predicts early mortality (Sbarra & Nietert, 2009). However, separated individuals who find another partner have a lower risk of mortality compared to remaining separated or divorced for the entire study. Yet more research suggests that the positive traits of our relationship partners can have lasting health benefits over and above our own traits (Chopik & O'Brien, 2015; Kim, Chopik, & Smith, 2014; Roberts, Smith, Jackson, & Edmonds, 2009).

The social relationships link with health is not only restricted to receiving care from those in your social network or engaging in health-promoting activities. Providing social support to

partners and neighbors is often a stronger (and independent) predictor of mortality than receiving support from these individuals (Brown, Nesse, Vinokur, & Smith, 2003). Given the large variability in relationship-relevant constructs (such as attachment orientation), one might expect individual differences in the degree to which social networks serve a protective function. However, studies linking relationship processes and physical health have been few and far between (Cohen & Syme, 1985). Despite the few empirical studies linking attachment orientation to health specifically, researchers are optimistic that by examining the nature, composition, and dynamics of social relationships, physical health can be enhanced (Cohen & Janicki-Deverts, 2009).

Predicting Health from Changes in Attachment Orientation

Pipp and Harmon (1987) speculate that “throughout the lifespan we are biologically connected to those with whom we have close relationships” (p. 651). Their statement that our very physiology and health vary as a function of our relationships is quite controversial. What is the evidence linking relationships and attachment to physical health? Diamond & Hicks (2004) outlined multiple ways through which attachment relationships can influence health outcomes. For example, they suggest that social relationships (particularly early ones) have the potential to “tune” normative biological responses to stress. Supportive caregiving is thought to provide for the appropriate activation (and deactivation) of stress-response systems (i.e., the Hypothalamic-Pituitary-Adrenocortical (HPA) axis) related to effective emotion regulation throughout the lifespan (Glaser, 2000; Gunnar, 1998; Liu & et al., 1997; Repetti & et al., 2002; Schore, 1996; Taylor, Dickerson, & Klein, 2002).

Further, Diamond and Hicks suggest that individual differences in responses to emotional

experiences also have implications for physical health. Hyperactivity of the HPA axis can lead to a host of negative health outcomes ranging from neural degeneration and memory deficits to impaired immune system functioning, cardiovascular disease, diabetes, hypertension, and cancer (Brindley & Rolland, 1989; Henry, 1983; Krantz & Manuck, 1984; Lupien et al., 1994; McEwen & Stellar, 1993; Truhan & Ahmed, 1989; Wuest, Federenko, Hellhammer, & Kirschbaum, 2000). Insecure individuals generally experience more intense negative emotions on a daily basis, make more hostile attributions about interpersonal behavior, and often twist memories of relationship behavior to cast it in a negative light (Feeney, 1995, 1999; Mikulincer, 1998; Simpson, 1990; Simpson, Rholes, & Winterheld, 2010). These individual differences in appraisal and coping with relationship events could also be tied to hyperactivation of stress response systems that can have deleterious effects on health. Indeed, Pietromonaco and colleagues (2013) demonstrate that attachment insecurity is linked with greater HPA activation following stressful interactions with their romantic partners (also see Powers, Pietromonaco, Gunlicks, & Sayer, 2006). Perhaps insecure individuals also engage in unhealthy behavior or are less likely to adhere to prescribed treatments by physicians. Thus, there are several reasons why insecure individuals may report worse health. This confluence of evidence linking individual differences in responses to emotional experiences and health suggests that attachment orientations and social relationships can predict health across the lifespan.

As attachment experiences and history are hypothesized to get “under the skin” and affect physical health (Pietromonaco, DeBuse, et al., 2013), it could be several years before aspects of one’s personality reliably predict their physical health (either through neuroendocrine channels or health behavior). As such, long-term longitudinal studies are needed to examine the approximate time at which attachment orientations begin to manifest their influence on physical

health. Further, it is also possible that the influence of attachment orientation on health is not fully realized until the time during which the onset of illness and physical problems is most common—older adulthood. The reliance of researchers on younger, convenience samples has left the question of how attachment exerts its influence on health in middle and older adulthood unexplored. One explicit way to test the effects of relationships on health is by examining not only whether mean levels of attachment predict health, but also if *changes* in attachment orientation predict health. Changes in personality are hypothesized to reflect the degree to which an individual invests in and makes commitments to social institutions (Roberts et al., 2005). As a result, more dramatic changes in attachment orientation could suggest a greater investment in social relationships (a question addressed in my dissertation). Investing more quickly in social relationships may lead to an earlier return on the health benefits afforded by close relationships. I test this hypothesis by examining whether individual differences in changes in attachment orientation predict subjective ratings of health across adulthood.

The Current Study

In this dissertation, I will examine general patterns of age-related change in attachment orientation. Based on previous cross-sectional work, I expect attachment anxiety to decrease and avoidance to slightly increase across the lifespan, particularly among partnered individuals. Further, because personality change is hypothesized to be driven by the adoption of social roles and investment (Chopik et al., 2013; Roberts et al., 2005), I also predict that higher relationship quality will be associated with more dramatic changes in attachment orientation. Specifically, people in satisfying relationships will experience larger decreases in anxiety and avoidance compared to single individuals and people in dissatisfying relationships. Finally, attachment

orientation is implicated in the activation of stress-response systems (Pietromonaco, DeBuse, et al., 2013), Over-activation of this system over many years may lead to the accumulation of risk factors for stress-related illnesses. As such, I predict that individual differences in changes in attachment (namely shaper decreases in anxiety and lower increases in avoidance) will be related to better subjective health across the lifespan.

Measuring changes in attachment across the lifespan presents several methodological challenges. Before testing my hypotheses about changes in attachment, relationships, and health, I will present the preliminary validation of an instrument that enabled me to use several archival data sets to study changes across the lifespan.

CHAPTER 2

MEASURING CHANGES IN ATTACHMENT USING THE CALIFORNIA Q-SORT

Current Limitations in Measuring Changes in Attachment Orientation across the Lifespan

As a theory about lifespan development, attachment theory makes several predictions about how relationships—and the people in them—change over time and across situations. Life experiences, such as partnering, separation, parenthood, and bereavement, can change people in meaningful ways. However, very little is known about how an individual's attachment orientation, or characteristic approach to close relationships, changes across the lifespan and with these relationship experiences (Chopik et al., 2013). One reason for this gap in knowledge is that few intensive longitudinal studies include validated measures of adult attachment orientation over large stretches of time. In fact, the most reliable measures of adult attachment orientation were validated in just the last decade or two (Crowell, Fraley, & Shaver, 2008). As such, the longest possible study of changes in adult attachment orientations over time using these materials would be at most about 20 years.

However, several longitudinal studies have examined how other personality characteristics (e.g., narcissism) change over several decades, during periods that predated the development of standardized self-report measures of these personality characteristics (Block, 1971; Block & Block, 2006; Helson & Wink, 1992; Stewart & Vandewater, 1993). In these

studies, personality constructs were measured using broad, descriptive measures of individual characteristics. The advantage of using these more general measures of personality in longitudinal studies is that a researcher can select items that map onto a construct that they are interested in (e.g., attachment orientation) that the original researchers may not have intended to measure. One such general measure that is commonly used in longitudinal studies is the California Adult Q-Sort. In this chapter, I report on the development and preliminary validation of a measure of attachment orientation from the California Adult Q-Sort (Block, 2008). The development of this instrument will enable me (and other researchers) to examine changes in attachment orientation over large intervals of time, during periods that pre-date the development of current measure of attachment orientation.

The California Adult Q-Sort

The California Adult Q-Sort (CAQ) is an observer-based method of personality assessment that relies on subjective judgments about a target within a forced item distribution (Block, 2008). Although Block's CAQ was one of the first instruments to employ the Q-Sort method to measure personality, researchers have also since used variants of Q-Sorts to describe the psychological properties of situations and behavior (Furr, Wagerman, & Funder, 2010; Sherman, Nave, & Funder, 2010).

The original CAQ consists of 100 descriptive items, which are sorted by an observer into forced-choice categories, depending on how well they describe a person (i.e., the "target" of the judgment). The forced-choice nature of the instrument ensures that only a few select items can characteristically describe an individual's personality. The CAQ items are descriptive and flexible, which has enabled researchers to use them to measure several personality

characteristics, including generativity, creativity and wisdom, narcissism, masculinity and femininity, and other, broader personality typologies (e.g., classifying a person as a "Traditional" *type* of person; Helson & Srivastava, 2002; Newton & Stewart, 2013; Peterson & Klohnen, 1995; Wink, 1992a; York & John, 1992). Typically, experts familiar with a particular construct will denote CAQ items that are highly characteristic of that construct. Composites of these characteristic items are then calculated and evaluated with respect to ratings using "criterion" measures of the construct (e.g., previously validated self-report scales). In the current chapter, I followed this process to generate a measure of adult attachment orientation from the California Adult Q-Sort (Block, 2008). Specifically, I compared observer-based CAQ scales of attachment orientation to criterion measures of both self- and observer-reports of attachment orientation and broader personality traits.

Observer-Based Measures of Attachment Orientation

Unlike contemporary measures of attachment orientation, the CAQ utilizes observer ratings of a target individual. As such, one assumption in the development of a CAQ measure of attachment orientation is that individual differences in attachment can be observed by others. Indeed, there is a rich history demonstrating that attachment orientation is an observable characteristic. Some of the earliest studies of attachment and human bonding are based entirely on observational accounts of children and non-human primates (Ainsworth, Blehar, Waters, & Wall, 1978; J. Bowlby, 1969/1982; Harlow, 1958). Contemporary research on adult attachment reaches similar conclusions about the observability of individual differences in attachment. For example, the internal structure of attachment scales is the same whether people are answering questions about themselves or a friend (Bartholomew & Horowitz, 1991). Self- and observer-

reports of attachment also show a large degree of correspondence with one another, particularly if the target and judge are well acquainted (Banai, Weller, & Mikulincer, 1998). Self-reports of attachment orientation also predict observable behavior in interpersonal settings (Edelstein et al., 2004; Fraley & Shaver, 1998).

Although Block's CAQ was one of the first Q-Sorts to be used to measure personality, other types of observer-based Q-Sort measures (using items not found in the CAQ) have been developed to measure infant-caregiver attachment (e.g., the Attachment Q-Sort; Solomon & George, 2008; Waters & Deane, 1985) or adults' representations of their early relationships with parental figures (e.g., the Adult Attachment Interview Q-Set; Hesse, 2008; Kobak, 1993). Thus, individual differences in attachment are observable characteristics of a person that can be quantified using observer reports. In this dissertation, I examined the extent to which composites of CAQ items in particular could be used to measure individual differences in attachment.

Preliminary evidence suggests that observer ratings based on CAQ items correlate with prototype-generated scores of self-reported attachment orientation (Onishi, Gjerde, & Block, 2001). Onishi et al. created "prototypes" of attachment orientation, which are transformations of scale response scores to match an expert-generated "prototype" that exemplifies a particular attachment orientation (Bartholomew & Horowitz, 1991). In this procedure, experts first rated each item of a 48-item self-report attachment questionnaire on how well the item typified each of four attachment descriptions (i.e., Secure, Preoccupied, Fearful-Avoidant, and Dismissing Avoidant; Bartholomew & Horowitz, 1991; Hazan & Shaver, 1990). Participants' responses to each self-report attachment item were then correlated with the prototype ratings provided by experts to yield a continuous "prototype score" that measured the degree of matching or similarity of a participant's response to a particular prototype. For example, if a participant's

item-level responses on the questionnaire correlated highly with the Preoccupied prototype, that individual's responses were characteristic of a Preoccupied individual (an orientation similar to attachment anxiety). Finally, these prototype scores were correlated with individual CAQ items generated by study personnel.

Although this study provides some evidence for the utility of CAQ ratings, Onishi et al. focused on how *individual* CAQ items related to *transformed prototype scores of attachment*. Thus, they did not examine whether *composites* of CAQ items could *adequately represent attachment orientations*. For example, anxiety could be correlated with both “Is basically anxious” and “feels a lack of personal meaning in life.” However, the former is a strong descriptor of attachment anxiety but the latter is merely a correlate of attachment anxiety (Wei, Liao, Ku, & Shaffer, 2011). Moreover, as described above, when the CAQ is used to approximate more established measures of personality constructs, expert-selected CAQ items are typically validated against other, more established instruments of that construct (Wink, 1992a). In the absence of expert ratings and criterion measures, it is unclear which CAQ items can best describe attachment orientation in lieu of other established scales.

One study in particular demonstrates the possibilities of examining changes in attachment orientations using the CAQ. In a longitudinal study of middle-aged women, Klohnen and Bera (1998) examined how self-reported attachment at age 52 was associated with changes in three CAQ domains conceptually related to attachment from age 21 to 43: interpersonal closeness, defensiveness/repressiveness, and vulnerability/low stress tolerance. The items comprising these domains were chosen a priori by experts but not validated with criterion measures of attachment, which leaves their predictive validity in question. Further, the authors state that these domains were not meant to measure attachment orientations per se, but rather relational and behavioral

outcomes for individuals with a particular attachment style. In this chapter, I use expert ratings and a criterion sample to develop a measure from the CAQ that can reliably measure adult attachment orientations in place of contemporary attachment measures.

Moreover, the lack of convergent and divergent validity in Klohnen and Bera's study limits the extent to which any findings can be attributed to attachment orientations instead of other personality traits (e.g., agreeableness). For example, if a measure is *too broad* and strongly related to nearly every personality construct, it is relatively uninformative because it is not distinguishable from other constructs. On the other hand, if a measure is *too narrow* and unrelated to conceptually similar constructs, it is also uninformative because its specificity prevents it from being situated in a larger nomological network of observable personality traits. Thus, an appropriate measure of CAQ attachment orientation should be correlated with constructs related to attachment orientation (convergent validity) and uncorrelated with constructs not related to attachment orientation (divergent validity).

With respect to convergent and divergent validity, it is important to note that attachment orientations have shown reliable associations with broader personality traits (i.e., the Big 5; Nofhle & Shaver, 2006). Specifically, attachment anxiety is most strongly (negatively) correlated with emotional stability and is also negatively related to agreeableness, although to a lesser extent (Shaver & Brennan, 1992). Anxiety is also either minimally (negatively) correlated with or unrelated to extraversion, openness to experience, and conscientiousness. Avoidance is most often negatively correlated with agreeableness and extraversion and is generally unrelated to emotional stability, openness to experience, and conscientiousness (Nofhle & Shaver, 2006). Thus, I expected the CAQ measure of anxiety (hereafter CAQ-Anxiety) to be negatively related to emotional stability and agreeableness. I also expected the CAQ measure of avoidance (CAQ-

Avoidance) to be negatively related to agreeableness and extraversion. Finally, I expected conscientiousness and openness to experience to be unrelated to the CAQ measures of attachment orientation.

Because the expression of interpersonal behavior may change across the lifespan and/or differ by gender (Berscheid, 2010; Canary, Emmers-Sommer, & Faulkner, 1997), attachment might be expressed differently between younger and older adults or between men and women. Thus, I also conducted supplementary analyses to examine whether any of the associations between self- and observer- reports of attachment orientation differed by age or gender. These supplementary analyses test whether attachment orientation is less “observable” at certain ages or among men/women, an important consideration in the development of a tool to be used in studies of lifespan development.

Validating a Measure of Attachment Orientation from the California Q-Sort

In order to validate a measure of CAQ-Attachment Orientation, expert ratings of CAQ items were used to generate composites for observer-rated CAQ-Anxiety and CAQ-Avoidance. These composites were compared to a) observer-based reports of attachment orientation, using an adapted version of the Experiences in Close Relationships (ECR) Inventory, one of the most widely used measures of attachment orientation, b) self-reports of attachment orientation (using the traditional ECR), and c) self-reports of broader personality traits (using a brief measure of the Big Five personality factors). Observers completed the CAQ and an adapted version of the ECR in relation to someone they knew well (i.e., the target). A subsample of these targets then filled out self-report measures of attachment and the Big Five.

Method

Participants

Participants were 265 undergraduate students and members from the community ($Mage = 24.09$, $SD = 11.03$). Students ($N = 229$; 75.5% Female; $Mage = 20.48$, $SD = 4.73$) completed an online study as part of a class exercise; community members ($N = 37$; 54.1% Female; $Mage = 46.41$, $SD = 12.61$) received \$10 in compensation for their participation. Participants first nominated an individual they knew well (the “target”) and then evaluated that individual’s personality using the CAQ and observer-report measures of attachment. Target names and gender (provided by the participants) were piped into all survey questions. Approximately half of the targets were female (57.9%) and they ranged in age from 13 to 80 ($Mage = 28.28$, $SD = 14.43$). At the end of the survey, participants provided the email address of the target, who was later contacted and asked to complete self-report measures of attachment and broader personality. Self-report data on 118 (target) participants (72.1% Female, $Mage = 24.79$, $SD = 11.58$) are available for the current report. (Response rate for student sample: 40.2%; community sample: 70.3%). Based on previous research demonstrating a range of correlations between .28 and .62 between self- and observer-reports of attachment (Banai et al., 1998), a power analysis suggested a recommended sample size of at least 98 to detect a significant effect of $r = .28$ at 80% power. Thus, I had sufficient power to replicate the effects of previous research.

Observer-Reported Attachment Orientation

California Adult Q-sort (CAQ). Participants first rated the personality of targets using the California Q-sort (CAQ; Block, 1961; Block, 2008). The CAQ consists of 100 descriptive statements that are sorted in terms of how characteristic they are of the target’s personality and

behavior. CAQ items cover a wide range of personality attributes, such as “Is vulnerable to real or fancied threat, generally fearful,” “Is cheerful,” and “Enjoys esthetic impressions; is esthetically reactive.” Participants sorted each of the 100 descriptive statements into one of nine categories according to how characteristic the statement was of the target, ranging from 1 (*extremely uncharacteristic*) to 9 (*extremely characteristic*). The nine categories force the sorter to implement a normal distribution, such that only a designated number of statements can be placed into each of nine categories (5, 8, 12, 16, 18, 16, 12, 8 and 5 statements, respectively).

Observer-Reported Attachment Orientation was assessed with a modified version of the Experiences in Close Relationships (ECR) Inventory (Brennan et al., 1998). The ECR is a widely used measure of attachment-related avoidance and anxiety. Participants answered the ECR items in reference to how the *target* generally approaches close relationships. The 18-item *avoidance* subscale ($\alpha = .91$) reflects the target individual’s discomfort with closeness. The 18-item *anxiety* subscale ($\alpha = .95$) reflects the target individual’s concern about abandonment. Sample items include “[Target] doesn’t feel comfortable opening up to others” (avoidance), and “[Target] worries a lot about his/her relationships” (anxiety). Participants rated the extent to which they agree with each statement, using a 7-point Likert scale, ranging from 1 (*disagree strongly*) to 7 (*agree strongly*). The internal consistencies of this adapted version of the ECR closely match the traditional self-report version of the ECR (Brennan et al., 1998).

Targets’ Self-Reported Attachment Orientation and Broader Personality Traits

Study personnel emailed the target with a survey that included self-report measures of attachment orientation and the Big Five. Data on the 118 targets (see descriptives above) who completed this survey were available for examining associations between self- and observer-reports. The 118 targets who completed the self-report measures did not significantly differ from

non-respondents on age, $t(264) = .40, p = .69$, or any of the attachment measures, $ts > 1.43, ps > .15$. However, female targets (72.1%) responded to the follow-up questionnaire at a higher rate than male targets (29.8%) compared to the total targets eligible (57.9% female), $\chi^2(1, N = 383) = 7.09, p = .007$.

Self-Reported Attachment Orientation was assessed with the ECR, but from the target's own perspective. The internal consistency of the avoidance subscale was .87 and the internal consistency of the anxiety subscale was .92.

Self-Reported Big Five Personality was measured with Ten Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003), which assesses the Big Five facets of emotional stability, extraversion, openness to experience, agreeableness, and conscientiousness. The TIPI has strong convergent and discriminant validity with longer measures of personality (Furnham, 2008). Participants rated the degree to which 10 sets of adjectives described how they saw themselves using a 7-point Likert scale, ranging from 1 (*disagree strongly*) to 7 (*agree strongly*). The TIPI has shown high test-retest reliability comparable to longer measures of personality (Gosling et al., 2003; Romero, Villar, Gómez-Fraguela, & López-Romero, 2012).

Development of the CAQ Anxiety and Avoidance Scales

The CAQ-Anxiety and CAQ-Avoidance scales were developed based on expert ratings of the 100 items of the CAQ. Five expert raters—faculty and advanced doctoral student attachment researchers—were recruited to rate CAQ items. These experts were blind to the purpose of the larger study and to all other study data. The current authors did not provide expert ratings. Raters assessed each of the 100 CAQ items according to how characteristic each item was with respect to attachment anxiety and avoidance, respectively, using a 9-point scale ranging from -4 (*very*

uncharacteristic) to 4 (*very characteristic*). The midpoint of the scale was labeled “*not characteristic*.” The absolute values of the ratings were used prior to the aggregation of ratings to ensure the inclusion of contra-indicative items. Inter-rater reliability (calculated as Cronbach's alpha; see Wink, 1992b) was high for the aggregate judgments of anxiety ($\alpha = .93$) and avoidance ($\alpha = .93$). For several items, expert raters were in perfect agreement (as noted by the standard deviations of zero; see Table 1). A scale score of 2.50 (i.e., a 7.50 on the original 9-point scale) was used as an initial cut-off for item inclusion. An additional item for anxiety ($M_{rating} = 2.40$) was included to yield an equal number of items for each subscale. In the current study of observer reports of attachment orientation, the 14 items from each scale that surpassed this cut-off were averaged to create scales for CAQ-Anxiety ($\alpha = .75$) and CAQ-Avoidance ($\alpha = .82$). The 14 most characteristic and uncharacteristic items are presented in Table 1.

Table 1.

Expert ratings of top CAQ-Anxiety and CAQ-Avoidance items

CAQ Anxiety		CAQ Avoidance	
Item	Mean (SD)	Item	Mean (SD)
Seeks reassurance from others. (19)	3.80 (.45)	Keeps people at a distance; avoids close interpersonal relationships (48)	4.00 (0.00)
Tends to ruminate and have persistent; preoccupying thoughts. (79)	3.80 (.45)	Values own independence and autonomy (96)	4.00 (0.00)
Has a brittle ego-defense system; vulnerable to stress. (45)	3.60 (.89)	Has warmth; has the capacity to form close relationships; compassionate.* (35)	3.80 (.45)
Is thin skinned; sensitive to criticism. (13)	3.40 (.89)	Is basically distrustful of people in general; questions their motivations. (49)	3.80 (.45)
Is calm, relaxed in manner.* (33)	3.40 (.89)	Creates dependency in people.* (61)	3.60 (.89)
Is vulnerable to real or fancied threat; generally fearful. (40)	3.40 (1.34)	Repressive; refuses to acknowledge anxiety and conflict (86)	3.60 (.55)
Is basically anxious. (68)	3.20 (1.10)	Arouses nurturant feelings in others.*	3.20 (1.79)

		(21)	
Interprets basically simple and clear-cut situations in complicated and particularizing ways. (87)	3.20 (.45)	Prides self on being “objective,” rational. (24)	3.20 (.84)
Is uncomfortable with uncertainty and complexities. (9)	2.80 (1.10)	Is self-dramatizing; exaggerates emotion.* (99)	3.20 (1.10)
Over-reactive to minor frustrations; irritable. (34)	2.80 (1.64)	Is protective of those close to him/her.* (11)	3.00 (1.00)
Is self-defeating. Acts in ways which undermine his/her own goals and desires. (55)	2.80 (.84)	Behaves in a sympathetic or considerate manner.* (17)	3.00 (1.23)
Is impulsive; has little self-control; unable to postpone pleasure. (53)	2.60 (1.52)	Is emotionally bland; has flattened affect. (97)	3.00 (1.73)
Has doubts about adequacy as a person. (72)	2.60 (1.14)	Tends to be self-defensive. (12)	2.80 (1.79)
Develops physical symptoms in reaction to stress/anxiety. (10)	2.40 (1.52)	Emphasizes being with others; prefers to be with others.* (54)	2.60 (1.67)

Note. Asterisks denote contra-indicative items. Numbers in parentheses represent the numbered item in the original CAQ for easy calculation in future work.

Results

Correspondence amongst Observer Reports of Attachment Orientation

To examine the degree of correspondence between the two observer reports of attachment orientation (CAQ-Attachment Orientation and ECR-Attachment Orientation), I correlated the subscales of both measures. I predicted that CAQ-Anxiety and CAQ-Avoidance would be related to ECR-Anxiety and ECR-Avoidance, respectively. Further, the associations between equivalent constructs from different measures (e.g., the association between CAQ-Anxiety and ECR-Anxiety) should be stronger than the associations between different constructs from the same measure (e.g., the association between CAQ-Anxiety and CAQ-Avoidance).

As shown in Table 2, as predicted, the two observer measures showed a high degree of correspondence. Correlations between equivalent constructs are bolded. CAQ-Anxiety and ECR-Anxiety were positively correlated; as were CAQ-Avoidance and ECR-Avoidance. ECR-Anxiety and ECR-Avoidance were positively related, which is common in research using self-reports of the ECR (Brennan et al., 1998). CAQ-Anxiety and CAQ-Avoidance were not significantly correlated. In sum, the subscales from the CAQ measure of attachment showed a strong degree of correspondence to the subscales from the ECR measure of attachment. Further, CAQ-Anxiety and CAQ-Avoidance are more strongly correlated with their corresponding ECR subscales than with each other, $Z_s > 4.84$, $p_s < .001$.

Table 2. *Associations between Observer-Reports of Attachment Orientation*

	Mean (SD)	1	2	3
1. CAQ-Anxiety	4.42 (.89)			
2. CAQ-Avoidance	4.57 (.69)	.10		
3. ECR-Anxiety	3.32 (1.15)	.55**	.20	
4. ECR-Avoidance	2.84 (1.26)	.14	.48**	.36**

Note. $N = 265$. ** $p < .01$. Bolded coefficients denote matching subscales from different measures.

Associations between Observer-Reported Attachment Orientation and Self-Report Ratings of Attachment and Broader Personality Traits

To assess the convergent and divergent validity of observer-based measures of attachment, I correlated the observer-reported attachment orientations with self-reported attachment orientations and broader personality. Establishing convergent and divergent validity situates our measure in a broader nomological network of personality traits while also distinguishing it from other, related personality traits. I predicted that observer-reported anxiety and avoidance would be related to self-reported anxiety and avoidance, respectively. I also predicted that observer-reported anxiety would be negatively correlated with emotional stability and agreeableness. Avoidance was expected to be negatively correlated with agreeableness and extraversion. Further, I expected that observer reports of attachment would be unrelated to openness to experience and conscientiousness (Nofle & Shaver, 2006).

As shown in Table 3, the observer-rated anxiety and avoidance subscales of both the

CAQ and the ECR were significantly related to their respective self-report subscales. It is also worth noting that both observer-based attachment measures were associated to similar degrees with self-reported attachment orientation. Thus, observer-based measures (from both the CAQ and the ECR) are significantly associated with self-reported attachment orientation.

Also as predicted, observer-reported anxiety and avoidance were consistently negatively correlated with self-reported agreeableness. Observer-reported attachment anxiety was negatively correlated with emotional stability and observer-based avoidance was negatively correlated with extraversion and agreeableness, as hypothesized (Nofhle & Shaver, 2006).

Table 3. Correlations between Observer-Reported Attachment and Self-Reports of Attachment and Personality

		Observer Reports				
		CAQ-	ECR-	CAQ-	ECR-	
		Anxiety	Anxiety	Avoidance	Avoidance	
Mean (SD)						
Self-Reports	ECR-Anxiety	3.63 (1.00)	.51**	.50**	.18	.31*
	ECR-Avoidance	2.85 (.99)	.19	.27*	.46**	.47**
	Emotional Stability	4.57 (1.33)	-.49**	-.41**	-.19	-.13
	Extraversion	4.44 (1.61)	-.16	-.13	-.23*	-.18
	O. to Experience	4.96 (1.20)	.02	-.08	.04	-.10
	Agreeableness	5.04 (1.05)	-.23*	-.20*	-.34**	-.25*
	Conscientiousness	5.57 (1.16)	.04	.13	.10	.09

Note. $N = 118$. * $p < .05$, ** $p < .01$. Bolded coefficients denote matching subscales from different measures.

Do the Associations between CAQ-Attachment Measures and ECR-Attachment Measures Vary by Age and Gender?

Supplementary analyses were conducted to examine whether any of the associations between CAQ-attachment orientations and self-/observer-reported ECR-attachment orientations were moderated by the target's age and gender. Significant moderation would suggest that the degree of correspondence between the measures is different between people of different ages or between men and women. Any moderation of the associations between measures by age and gender is particularly important in examining longitudinal changes in attachment orientation using the CAQ, as it would suggest that attachment orientation is less "observable" at certain ages or among men/women. To examine this possibility, I ran eight regressions in which CAQ-attachment orientation, age, and the interaction between these two variables were regressed onto self-/observer-reported ECR-attachment orientations. I also did the same for gender. Target age, $\beta s < .12$, $p s > .17$, and gender, $\beta s < .07$, $p s > .34$, did not moderate the association between CAQ measures of attachment and either self-reported or observer-reported ECR-attachment. That is, the utility of the CAQ was unrelated to targets' age or gender.

Conclusion

This new CAQ-based measure will enable researchers to measure changes in romantic attachment orientation across the adult lifespan. Measures of CAQ-attachment orientation were related to both self- and observer-reported ECR-attachment orientation. Further, CAQ-attachment orientation was related to self-reported Big Five traits in predictable ways based on previous research. The cross-measure associations of romantic attachment orientations were also invariant across age and gender, suggesting that romantic attachment orientation is equally

observable at different ages and between men and women. Taken together, the findings from this chapter demonstrate that an individual's romantic attachment orientation can be reliably measured with the CAQ. In the next chapter, I will describe the data sets that will be used to measure changes in attachment orientations across the lifespan using this CAQ measure of attachment orientation.

CHAPTER 3

METHOD

Participants

Block and Block Longitudinal Study of Cognitive and Ego Development. One hundred and three individuals (50.4% female, 47.15% partnered at age 18) were participants in the Block and Block Longitudinal Study of Cognitive and Ego Development, which was initiated in 1968 at the University of California at Berkeley (for full description, see Block & Block, 2006). The sample was recruited from two preschools. Q-Sort Measures of attachment orientation were collected at ages 3, 4, 5, 7, 11, 14, 18, and 23. The ethnic composition of the sample was 68.3% Caucasian, 24% African-American, 4.8% Asian-American, and 2.9% other ethnicities.

Intergenerational Studies. Two hundred and ninety one individuals (52.9% female; 88.2% partnered at first adult wave (~ages 30-40) were participants in the Intergenerational Studies, an umbrella study combining participants from the Berkeley Guidance Study ($N = 142$), the Oakland Growth Study ($N = 99$), and the Berkeley Growth Study ($N = 50$). The three longitudinal studies were started in the late 1920s and early 1930s and continued for over 70 years. The Berkeley Guidance and Growth Studies sampled infants born in the Berkeley area in 1928-1929. The Oakland Growth Study began in 1932 and sampled fifth and sixth graders

(approximate birth year = 1921). Frequency of assessments was high in each study: Berkeley Guidance (ages 7, 10, 13, 16, 30, 40, 52), Oakland Growth (ages 13, 16, 40, 50, 60), and Berkeley Growth (ages 10, 13, 16, 36, 52), respectively. Eighty-eight percent of participants were married at the first adult wave of each study. All participants from the Berkeley Growth and Oakland Growth Study were Caucasian; a small percentage of participants from the Guidance Study were African American (3%). Socioeconomic status was similar across the three samples: Forty percent of Oakland Guidance Study participants came from households classified as working-class and 33% of participants from the remaining two samples came from working-class households. The history and sampling of the Intergenerational Studies has been heavily documented and is one of the landmark studies in human development (Block, 1971; Eichorn, Clausen, Haan, Honzik, & Mussen, 1981; Haan, Millsap, & Hartka, 1986).

Radcliffe College Class of 1964. One hundred and nine individuals (all female, 72% partnered at age 43) were participants in a longitudinal study of members of the graduating class of Radcliffe College in 1964 (see Stewart & Vandewater, 1993, for full description). Measures of attachment orientation were collected at ages 43, 53, and 62. All but one woman was European American. Eighty percent of the sample had completed at least some graduate-level education.

Measures

Attachment Orientation. At each wave, attachment orientation was assessed using subscales developed from the California Adult Q-Sort (CAQ; Block, 1961, 2008). The CAQ includes 100 descriptive items, which are sorted by trained observers into nine forced-choice categories, ranging from 1 (*extremely uncharacteristic*) to 9 (*extremely characteristic*). Evaluations were based on in-depth interviews and observations conducted during a variety of experimental tasks. In each sample, Q-Sorts were completed by study personnel, comprised of

psychologists, clinicians, and graduate students in psychology and other related fields. Q-Sorts from the multiple observers were averaged, and the composites were then used to create scales for anxiety and avoidance. Measures of anxiety and avoidance using the CAQ were developed in a separate sample of participants in consultation with expert ratings (Chopik & Edelstein, 2014b). Anxiety (r 's > .50) and avoidance (r 's > .46) composites from the CAQ correlate highly with widely used self-report measures of attachment and demonstrate convergent and divergent validity with other personality traits (see Chapter 2). The 14-item CAQ-Anxiety scale reflects an individual's concern about abandonment. The 14-item CAQ-Avoidance subscale reflects an individual's discomfort with closeness. Sample items include "Seeks reassurance from others" (anxiety) and "Keeps people at a distance; avoids close relationships" (avoidance).

For participants in the Block and Block Study of Cognitive and Ego Development, Q-Sorts were completed by study personnel using the California Child Q-Set (CCQ; Block & Block, 1980), an instrument with many overlapping items with the CAQ. All but three items from the anxiety and avoidance scales are available in the CCQ. At age 14, both the CAQ and CCQ were generated for study participants, allowing for direct comparison between the two measures. The CAQ-attachment measure and the reduced CCQ measure correlated highly ($r = .94, p < .001$) at age 14, suggesting that these measures have near equivalence. CAQ attachment measures were used at age 14 and CCQ measures were used at ages 3, 4, 5, 7, 11. In the childhood waves of the Intergenerational Studies (ages 7 through 16), CAQ (not CCQ) data was available for participants. Internal consistency of the anxiety and avoidance scales were high at each wave and within each sample (α 's > .74).

Relationship Satisfaction. Relationship satisfaction was measured differently in each sample at the first adult wave. In the Block and Block Study, participants rated their general

satisfaction with their partners on a 5-point scale ranging from 1(*not at all satisfied*) to 5(*very satisfied*). In the Berkeley Guidance Study, a member of the study personnel rated the relationship satisfaction of the participant and partner on a 5-point Likert scale ranging from 1(*extreme conflict, considering separation/divorce, disrupting*) to 5(*exceptionally happy adjustment, frankness, affection, interests, agreement over finances, discipline, sex, etc.*) using information from the participant interview. In the Oakland Growth Study, study personnel rated the quality of the participants' relationship on a 4-point Likert scale ranging from 1(*little, if any happiness*) to 4(*very harmonious marriage*). In the Berkeley Growth Study, participants responded to the item, "In general, how satisfactory and happy is your marriage?" on a 9-point Likert scale ranging from 1(*very unhappy*) to 9(*almost perfect*). In the Radcliffe College Sample, participants rated their marital satisfaction on a 3-point scale with choices of 1(*unhappy*), 2(*mixed*), or 3(*happy*). Ratings of relationship satisfaction were standardized (within each sample) to equate associations between attachment orientations and satisfaction across samples for multi-level analyses.

Overall Health. At the age 23 wave, the Block and Block participants were asked to rate their physical health on a 5-point scale ranging from 1(*poor*) to 5(*good*). At the last adult waves of the Intergenerational Studies, participants from each sample self-reported on the quality of their general health on a 10-point Likert scale ranging from 1(*very poor*) to 10(*excellent*). At the age 62 wave, the Radcliffe College participants rated their general health in the past 12 months on a 5-point scale ranging from 1(*poor*) to 5(*excellent*). Ratings of health were standardized (within each sample) to equate associations between attachment orientations and health across samples.

CHAPTER 4

RESULTS

How Do Attachment Orientations Change over Time?

Means and standard deviations of anxiety and avoidance at every assessment are presented in Table 4. Correlations among primary study variables collected during the adult waves (relationship status, relationship satisfaction, and health) and attachment orientations are presented in Table 5.

Table 4. *Means and Standard Deviation of Attachment Orientations at Every Wave*

Age	Anxiety M (SD)	Avoidance M (SD)
Age 3	4.10 (1.08)	4.76 (.79)
Age 4	4.12 (1.10)	4.63 (.81)
Age 7	4.29 (1.23)	4.60 (1.11)
Age 10	5.12 (1.00)	4.85 (1.01)
Age 11	3.99 (1.19)	4.42 (1.39)
Age 13	5.11 (.90)	4.67 (.97)
Age 14	4.67 (.85)	4.78 (.90)
Age 16	5.05 (.97)	4.76 (1.02)
Age 18	4.22 (.91)	4.53 (.72)
Age 23	4.93 (1.17)	4.59 (1.20)
Age 30	5.06 (.88)	4.90 (.91)
Age 36	5.01 (1.02)	5.00 (.87)
Age 40	4.73 (.99)	4.81 (.93)
Age 43	4.19 (.97)	4.65 (1.10)
Age 50	4.60 (1.00)	4.42 (.94)

Age 52	4.57 (1.01)	4.67 (1.02)
Age 53	4.00 (.56)	4.35 (.84)
Age 60	4.49 (.94)	4.43 (.94)
Age 62	3.99 (.63)	4.27 (.65)

Table 5. Correlations among Primary Study Variables and Attachment Orientations

		Gender	Relationship Status	Relationship Satisfaction	Health
	Gender				
	Relationship Status	-.03			
	Rel. Satisfaction	.10	--		
	Health	-.22**	.06	.05	
Age 18	Anxiety	-.09	-.02	-.36 ^t	-.16
	Avoidance	-.30**	-.09	-.19	.03
Age 23	Anxiety	-.10	-.27**	-.45*	-.17 ^t
	Avoidance	-.18 ^t	-.17 ^t	-.52*	-.05
Age 30	Anxiety	.03	.06	-.36**	-.21 ^t
	Avoidance	-.24**	-.02	-.07	.23*
Age 36	Anxiety	-.18	-.08	-.22	-.15
	Avoidance	-.34**	-.38*	-.08	.14
Age 40	Anxiety	.01	-.02	-.36**	-.11
	Avoidance	-.43**	-.12 ^t	-.14 ^t	.16*
Age 43	Anxiety	--	-.35**	-.34**	-.27*
	Avoidance	--	-.35**	-.29*	-.10
Age 50	Anxiety	.19 ^t	.06	-.27*	-.04
	Avoidance	-.49**	-.07	-.28*	.13
Age 52	Anxiety	.12 ^t	-.15*	-.37**	-.16 ^t
	Avoidance	-.37**	-.20*	-.25**	.15 ^t
Age 53	Anxiety	--	-.21*	-.39*	-.03
	Avoidance	--	-.38**	-.31*	-.17
Age 60	Anxiety	.16	-.13	-.20	-.07
	Avoidance	-.27**	.02	-.32*	.19 ^t
Age 62	Anxiety	--	-.21 ^t	-.44**	-.15
	Avoidance	--	-.24*	-.42**	-.11

Note. ^t $p < .10$, * $p < .05$, ** $p < .01$.

The five samples were combined for the purposes of multi-level analyses in a variant of

an accelerated longitudinal design, which is often used to combine data sets with overlapping ages to estimate growth curves across the entirety of the data (Hirschberger, Srivastava, Marsh, Cowan, & Cowan, 2009; Miyazaki & Raudenbush, 2000; Raudenbush & Chan, 1992; Terracciano et al., 2005). The samples were combined because of the similarity and overlap between the samples, to maximize power, and to present the data in the most parsimonious way. Sample source was added as a covariate in all the analyses reported below. This variant of accelerated longitudinal designs allows for testing broader developmental questions (i.e., how does attachment change from age 3 to 62?) and more specific, cohort-sequential questions (i.e., does the attachment orientation of participants born in the late 1920s change at a different rate than the attachment orientation of participants born in the late 1960s?). Below, I focus on the former question and moderators of changes in attachment from age 3 to 62. The latter question—assessing if there are historical period influences on the development of attachment—is the subject of another project and is discussed elsewhere (Chopik, Edelstein, Stewart, & Grimm, 2014).

I hypothesized that anxiety would increase in childhood and adolescence and then decline across the lifespan. I also hypothesized that avoidance would increase throughout young adulthood, reach a plateau in middle age, and then decline in older adulthood. To test these hypotheses, I used growth curve modeling, which enabled me to model intra-individual changes and moderators of these changes (Roberts & Chapman, 2000; Willett, 1988). Age at assessment (ages 3 through 62) was treated as a within-subjects factor and participant gender was treated as time invariant. Attachment orientation (anxiety, avoidance) was predicted from age, age², age³, gender, and the interaction between these variables. Age was grand-mean centered based on the mean from the overall combined sample and gender was contrast coded prior to computing the

interaction terms. Prior research suggests that the most complex age-personality relations that can be meaningfully interpreted involve cubic patterns (i.e., third-order terms; e.g., Terracciano et al., 2005), so we did not test more complex models. Given that men tended to be higher in avoidance in the preliminary correlations and in prior work using CAQ measures of attachment orientation (Chopik, Moors, et al., 2014), and that gender often moderates age differences in attachment in cross-sectional work (Chopik et al., 2013), participant gender was included as a covariate in all analyses.

Results from the growth curve analyses for anxiety and avoidance are presented in Table 6. For anxiety, the effects of age, age², age³ were statistically significant. As seen in Figure 1a, anxiety increased in childhood and adolescence and then declined across the lifespan, leveling off in older adulthood. For avoidance, the effects of age³, gender, and age × gender emerged as significant predictors. Consistent with the bivariate correlations from each sample, men were higher in avoidance overall. As seen in Figure 1b, avoidance increased slightly throughout young adulthood, reached a plateau in middle age, and then declined sharply in older adulthood. The significant age × gender interaction suggests that the linear effect of age differs between men and women. Simple slopes analyses were conducted to compare changes over time in men and women. For men, the effects of age ($b = .01, p = .007$) and age³ ($b = .00002, p = .04$) emerged as significant; none of the age trends for women emerged as significant. As seen in Figure 1c, men increased in avoidance throughout young adulthood, reaching a plateau in middle age, and then declining in older adulthood. Women did not show significant changes in avoidance across the lifespan.

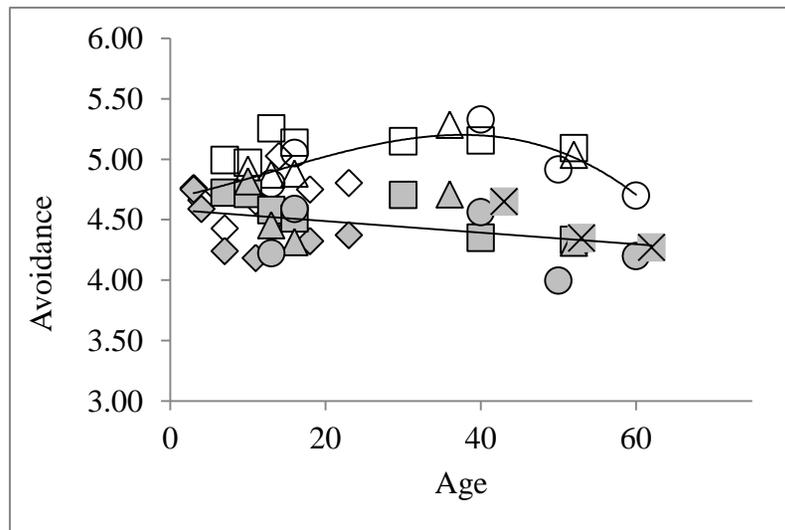
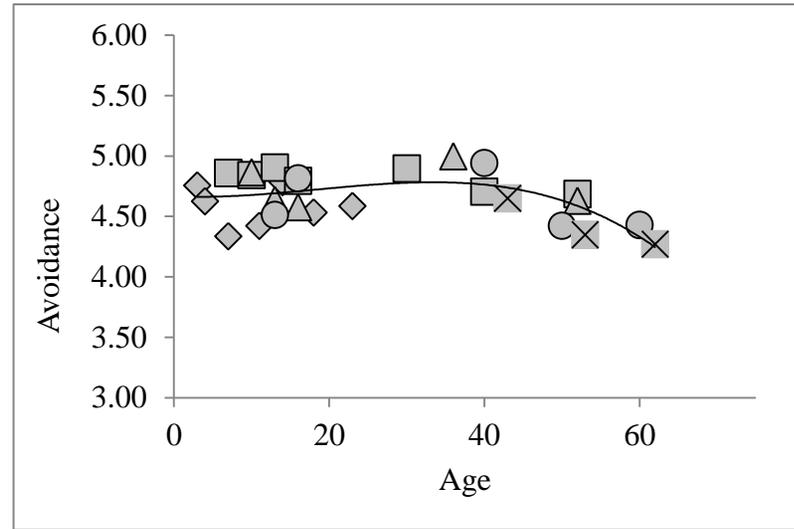
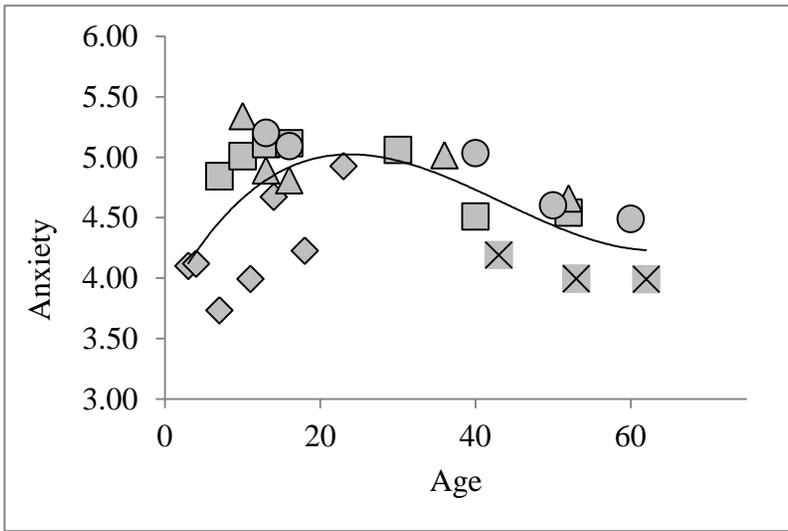
Table 6a and 6b

Growth Curve Modeling Predicting Attachment Anxiety and Avoidance from Age and Gender

	Anxiety					
	<i>b</i>	<i>SE (b)</i>	<i>df</i>	<i>t</i>	<i>p</i>	<i>r</i>
Intercept	4.47	.09				
Age	-.012	.003	1989.96	-3.60	< .001	.08
Gender	-.01	.04	1293.26	-.35	.73	.01
Age × Gender	.001	.003	1979.32	.20	.84	.004
Age ²	-.001	.0001	2107.18	-6.51	< .001	.14
Age ² × Gender	.0001	.0001	2090.19	.78	.44	.02
Age ³	.00001	.000005	2404.87	2.60	.01	.05
Age ³ × Gender	.000003	.000005	2404.82	.68	.50	.01
Block & Block	-.07	.11	1225.37	-.61	.54	.02
Guidance	.56	.09	1323.31	5.94	< .001	.16
Growth	.68	.11	1265.88	6.09	< .001	.17
Oakland	.71	.10	1235.80	7.42	< .001	.21

	Avoidance					
	<i>b</i>	<i>SE (b)</i>	<i>df</i>	<i>t</i>	<i>p</i>	<i>r</i>
Intercept	4.98	.09				
Age	.003	.003	2164.16	1.22	.22	.03
Gender	-.30	.04	1283.01	-7.28	< .001	.20
Age × Gender	-.01	.003	2144.14	-3.14	.002	.07
Age ²	-.0001	.0001	2286.83	-.75	.45	.02
Age ² × Gender	.0001	.0001	2260.72	1.18	.24	.02
Age ³	-.00001	.000005	2500.26	-2.42	.02	.05
Age ³ × Gender	.000005	.000005	2499.06	.99	.32	.02
Block & Block	-.36	.11	1200.22	-3.28	.001	.09
Guidance	-.12	.09	1234.45	-1.27	.21	.04
Growth	-.14	.11	1143.50	-1.23	.22	.04
Oakland	-.23	.10	1139.28	-2.44	.02	.07

Gender: -1 = men, 1 = women.



Figures 1a-c. Longitudinal changes for anxiety (a), avoidance (b), and avoidance for men v. women (c). Different markers denote the different samples (diamond = Block and Block; square = Berkeley Guidance; triangle = Berkeley Growth; crossed square = Radcliffe)

Do relationship status and relationship satisfaction moderate changes in attachment orientation in adulthood?

I hypothesized that individuals in relationships, particularly satisfying relationships, would show declines in anxiety and avoidance in adulthood. To test these hypotheses, I ran two separate growth curve models examining if relationship status (Model 1) and relationship satisfaction (Model 2) moderated changes in attachment orientation. Age at the adult assessments (ages 30 through 62) was treated as a within-subjects factor and participant gender, relationship status at the first adult wave of each sample, and relationship satisfaction at the first adult wave of each sample were treated as time invariant. Attachment orientation (anxiety, avoidance) was predicted from age, age², age³, relationship status (Model 1), relationship satisfaction (Model 2), and the interaction between these variables. Gender was included as a covariate.

Results from the growth curve analyses are presented in Table 7 (for relationship status) and Table 8 (for relationship satisfaction).

In Model 1, relationship status was associated with lower anxiety and avoidance throughout adulthood. For anxiety, a significant age³ × relationship status interaction emerged as significant. As seen in Figure 2a, partnered participants ($b = .00006, p < .001$) tended to decrease in anxiety at a faster rate than single participants ($b = .0001, p < .001$). The difference between single and partnered people for anxiety was largest in older adulthood. For avoidance, a significant age³ × relationship status interaction emerged as significant. As seen in Figure 2b, single individuals ($b = -.001, p < .001$) increased in avoidance throughout young adulthood and middle age before declining to the levels of their partnered peers ($b = .0001, p < .001$). The difference between single and partnered people for avoidance was largest in middle adulthood.

In Model 2, relationship satisfaction was associated with lower anxiety and avoidance

throughout adulthood. However, relationship satisfaction had a static influence on attachment orientation such that it did not moderate any age-related trends in attachment orientation.

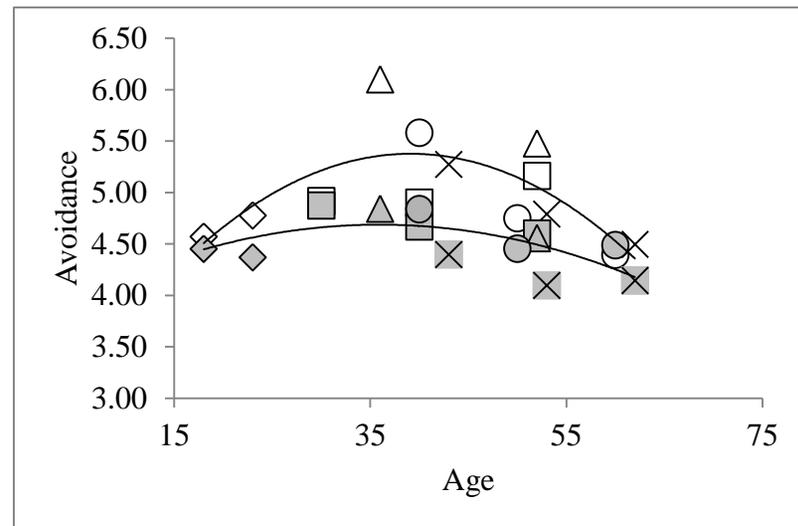
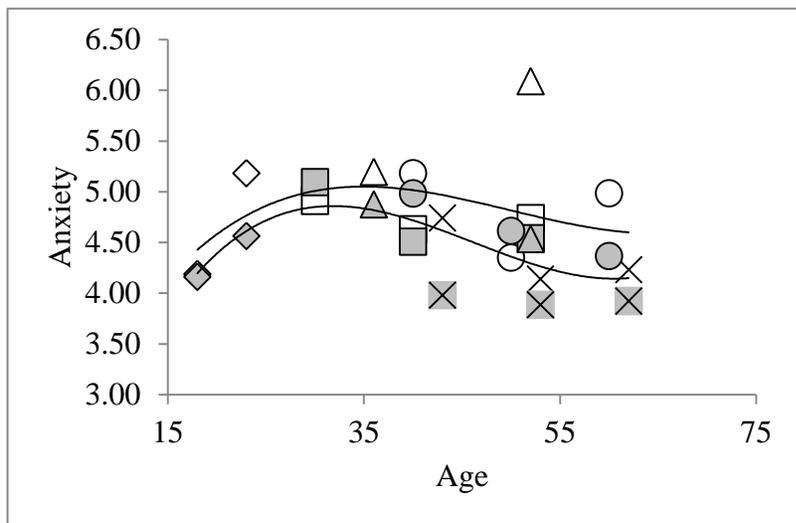
Tables 7a and 7b

Growth Curve Modeling Predicting Attachment Anxiety and Avoidance from Age, Gender, and Relationship Status

	Anxiety					
	<i>b</i>	<i>SE (b)</i>	<i>df</i>	<i>t</i>	<i>p</i>	<i>r</i>
Intercept	4.31	.09				
Age	-.04	.01	1022.94	-7.16	< .001	.22
Gender	.04	.04	520.36	1.03	.31	.05
Relationship Status	-.25	.06	841.67	-4.16	< .001	.14
Age × R. Status	.01	.01	971.77	1.78	.08	.06
Age ²	-.0003	.0003	912.52	-1.16	.25	.04
Age ² × R. Status	.0002	.0002	1119.98	.75	.45	.02
Age ³	.0001	.00001	730.80	8.21	< .001	.29
Age ³ × R. Status	-.00003	.00001	692.79	-2.42	.02	.09
Block & Block	.49	.20	110.27	2.50	.01	.23
Guidance	.61	.10	608.85	6.02	< .001	.24
Growth	.72	.13	606.11	5.53	< .001	.22
Oakland	.72	.11	506.73	6.65	< .001	.28

	Avoidance					
	<i>b</i>	<i>SE (b)</i>	<i>df</i>	<i>t</i>	<i>p</i>	<i>r</i>
Intercept	5.02	.09				
Age	-.02	.01	1012.52	-3.06	.002	.10
Gender	-.31	.04	497.88	-8.46	< .001	.35
Relationship Status	-.34	.06	823.57	-5.86	< .001	.20
Age × R. Status	-.002	.005	963.76	-.42	.68	.01
Age ²	-.0003	.0003	895.74	-1.34	.18	.04
Age ² × R. Status	.0004	.0002	1114.56	2.02	.04	.06
Age ³	.00001	.00001	713.54	1.10	.27	.04
Age ³ × R. Status	.000005	.00001	672.83	.36	.72	.01
Block & Block	-.53	.19	1103.27	-2.81	.005	.08
Guidance	.01	.10	584.21	.14	.89	.01
Growth	.11	.13	578.81	.86	.39	.04
Oakland	.01	.10	484.17	.12	.91	.01

Note. Gender: -1 = men, 1 = women.



Figures 2a-b. Longitudinal changes in anxiety (a) and avoidance (b) among single v. partnered individuals. Different markers denote the different samples (diamond = Block and Block; square = Berkeley Guidance; triangle = Berkeley Growth; crossed square = Radcliffe)

Tables 8a and 8b

Growth Curve Modeling Predicting Attachment Anxiety and Avoidance from Age, Gender, and Relationship Satisfaction

	Anxiety					
	<i>b</i>	<i>SE (b)</i>	<i>df</i>	<i>t</i>	<i>p</i>	<i>r</i>
Intercept	3.99	.10				
Age	-.04	.01	622.26	-7.02	< .001	.27
Gender	.08	.04	351.72	1.97	.05	.10
Satisfaction	-.35	.05	522.51	-7.43	< .001	.31
Age × Satisfaction	.005	.005	653.00	.95	.34	.04
Age ²	.00005	.0003	491.71	.18	.86	.01
Age ² × Satisfaction	.0003	.0002	761.55	1.09	.28	.04
Age ³	.00007	.00002	346.75	4.23	< .001	.22
Age ³ × Satisfaction	-.00001	.00002	561.36	-.70	.49	.03
Block & Block	.42	.30	728.12	1.40	.16	.05
Guidance	.70	.11	414.97	6.18	< .001	.29
Growth	.71	.14	430.43	4.91	< .001	.23
Oakland	.80	.12	347.40	6.84	< .001	.34

	Avoidance					
	<i>b</i>	<i>SE (b)</i>	<i>df</i>	<i>t</i>	<i>p</i>	<i>r</i>
Intercept	4.70	.10				
Age	-.02	.005	589.00	-4.12	< .001	.17
Gender	-.32	.04	313.91	-7.63	< .001	.40
Satisfaction	-.18	.05	484.01	-3.80	< .001	.17
Age × Satisfaction	-.002	.005	616.58	-.48	.63	.02
Age ²	.00007	.0003	461.80	.28	.78	.01
Age ² × Satisfaction	-.00005	.0002	737.86	-.22	.83	.01
Age ³	.00002	.00002	326.41	1.41	.16	.08
Age ³ × Satisfaction	-.00001	.00001	520.39	-.81	.42	.04
Block & Block	-.26	.29	753.37	-.93	.35	.03
Guidance	.04	.11	369.32	.36	.72	.02
Growth	.13	.14	376.86	.91	.36	.05
Oakland	.80	.12	347.40	6.84	< .001	.34

Note. Gender: -1 = men, 1 = women.

Are changes in attachment orientation associated with health throughout adulthood?

I hypothesized that sharper decreases in anxiety and avoidance would be associated with better overall health at the conclusion of each study. To test this hypothesis, I utilized growth curve modeling in a similar way to that employed for the previous hypotheses. However, modeling how changes in a construct (i.e., attachment) over time predict an outcome at a future time point using multi-level modeling can seem slightly counterintuitive: Health at the final wave of each study was included as a between-subject independent variable predicting longitudinal changes in attachment. Importantly, health \times age interactions are also included. These interactions test whether the association between age and health differs according to different levels of anxiety/avoidance (i.e., a highly anxious person may have very poor health at age 60 compared to an individual low in anxiety at the same age). Put another way, this association conceptually examines how healthy and unhealthy individuals (measured in the future) changed in attachment retrospectively over the duration of the study. This retrospective approach is common in assessing the consequences of changes in a construct in a multi-level framework (Hahn-Holbrook, Schetter, Arora, & Hobel, 2013; Quas, Yim, Edelstein, Cahill, & Rush, 2011).

Thus, age at the adult assessments (ages 30 through 62) was treated as a within-subjects factor and participant gender and general health at the final wave were treated as time invariant. Attachment orientation (anxiety, avoidance) was predicted from age, age², age³, health, and the interaction between these variables. Gender was included as a covariate.

The results of these growth curve models are presented in Table 9. Higher levels of anxiety were associated with worse health across the lifespan. Avoidance was unrelated to health. Further, the effects of attachment on health were static across the lifespan; namely, there

were no health \times age interactions.

Tables 9a and 9b

Growth Curve Modeling Predicting Attachment Anxiety and Avoidance from Age, Gender, and Health

	Anxiety					
	<i>b</i>	<i>SE (b)</i>	<i>df</i>	<i>t</i>	<i>p</i>	<i>r</i>
Intercept	4.14	.10				
Age	-.04	.01	808.50	-7.49	< .001	.25
Gender	.02	.04	425.13	.55	.59	.03
Health	-.15	.05	627.97	-3.12	.002	.12
Age \times Health	.006	.005	756.24	1.19	.24	.04
Age ²	-.0003	.0002	642.96	-1.55	.12	.06
Age ² \times Health	.00004	.0002	924.60	.23	.82	.01
Age ³	.0001	.00001	522.38	8.97	< .001	.37
Age ³ \times Health	-.00001	.00001	547.51	-1.05	.29	.04
Block & Block	.73	.20	910.14	3.76	< .001	.12
Guidance	.59	.11	486.41	5.26	< .001	.23
Growth	.67	.15	498.68	4.55	< .001	.20
Oakland	.66	.11	409.06	5.89	< .001	.28

	Avoidance					
	<i>b</i>	<i>SE (b)</i>	<i>df</i>	<i>t</i>	<i>p</i>	<i>r</i>
Intercept	4.81	.10				
Age	-.02	.005	755.70	-4.39	< .001	.16
Gender	-.30	.04	401.45	-6.83	< .001	.32
Health	.01	.05	614.22	.23	.82	.01
Age × Health	-.001	.004	749.52	-.23	.82	.01
Age ²	.0001	.0002	608.74	.60	.55	.02
Age ² × Health	.00001	.0002	894.24	.08	.93	.002
Age ³	.00002	.00001	514.58	1.78	.08	.08
Age ³ × Health	.000003	.00001	526.26	.30	.76	.01
Block & Block	-.59	.19	938.26	-3.18	.002	.10
Guidance	-.02	.12	451.11	-.21	.84	.01
Growth	-.07	.15	447.63	-.50	.62	.02
Oakland	-.07	.12	384.16	-.63	.53	.03

Note. Gender: -1 = men, 1 = women.

The moderating role of sample source

In accelerated longitudinal designs of human development, “linkages” (i.e., where one study sample ends and the other begins; Miyazaki & Raudenbush, 2000) between studies are often tested by sample × age interactions. These parameters estimate if the rate of change (age/age²/age³) of attachment orientations differs between the samples. Significant moderation by sample source would suggest that the samples differ with respect to how attachment

orientation develops over a given interval of time. To test this possibility, the Radcliffe College sample was chosen as the reference group against which comparisons were made. The Radcliffe sample has the oldest participants of the combined sample, so the comparisons can be interpreted as relative to how individuals change from age 43 to 62. The Radcliffe sample was chosen arbitrarily, but multi-level modeling also allows researchers to specify direct contrasts if they have specific hypotheses for how one sample would change compared to another. Only interactions involving age² were tested as one of the samples (Radcliffe) had only three time points and thus age² was the highest order trend that could possibly be tested.

The results of the growth curve models for anxiety and avoidance estimated from age, gender, and sample source are presented in Table 10. For anxiety, the effects of age and age² differed between these Block and Block and Radcliffe College samples. The Block and Block participants increased in anxiety on average from age 3 to 23 (age: $b = .13, p < .001$; age²: $b = .003, p = .001$); however, the Radcliffe College participants decreased in anxiety on average from age 43 to 62 (age: $b = -.07, p = .05$; age²: $b = .0031, p = .09$). For avoidance, the effect of age differed between these two samples as well. The Block and Block participants did not significantly change with respect to avoidance from age 3 to 23 (age: $b = .03, p = .22$), whereas the Radcliffe College sample significantly decreased in avoidance from age 43 to 62 (age: $b = -.06, p = .04$).

Tables 10a and 10b

Growth Curve Modeling Predicting Attachment Anxiety and Avoidance from Age, Gender, and

Sample Source

	Anxiety					
	<i>b</i>	<i>SE (b)</i>	<i>df</i>	<i>t</i>	<i>p</i>	<i>r</i>
Intercept	4.95	.68				
Age	-.07	.06	1976.06	-1.16	.25	.03
Gender	.02	.03	846.62	.75	.46	.03
Block & Block	.54	.70	2088.19	.78	.44	.02
Guidance	.01	.68	2096.94	.02	.99	.0004
Growth	.03	.69	2133.87	.05	.96	.001
Oakland	.16	.68	2104.34	.24	.81	.01
Age × Block/Block	.23	.06	1984.35	3.77	< .001	.08
Age × Guidance	.06	.06	1981.68	1.00	.32	.02
Age × Growth	.06	.06	1991.97	.98	.33	.02
Age × Oakland	.06	.06	1986.51	1.01	.31	.02
Age ²	.001	.001	1901.83	1.00	.32	.02
Age ² × Block/ Block	.003	.001	2017.34	2.53	.01	.06
Age ² × Guidance	-.002	.001	1935.78	-1.37	.17	.03
Age ² × Growth	-.0001	.001	2005.52	-.98	.33	.02
Age ² × Oakland	-.001	.001	1940.41	-1.30	.19	.03

	Avoidance					
	<i>b</i>	<i>SE (b)</i>	<i>df</i>	<i>t</i>	<i>p</i>	<i>r</i>
Intercept	5.82	.63				
Age	-.08	.05	1945.78	-1.47	.14	.03
Gender	-.24	.03	809.32	-8.98	< .001	.30
Block & Block	-1.09	.64	2070.50	-1.69	.09	.04
Guidance	-.95	.63	2079.10	-1.51	.13	.03
Growth	-.89	.64	2124.26	-1.38	.17	.03
Oakland	-.96	.63	2089.50	-1.51	.13	.03
Age × Block/Block	.12	.06	1945.91	2.06	.04	.05
Age × Guidance	.07	.05	1952.16	1.41	.16	.03
Age × Growth	.08	.05	1963.67	1.53	.13	.03
Age × Oakland	.08	.05	1956.47	1.62	.11	.04
Age ²	.001	.001	1873.46	1.11	.27	.03
Age ² × Block/ Block	.001	.001	1968.95	.41	.68	.01
Age ² × Guidance	-.001	.001	1906.33	-1.28	.20	.03
Age ² × Growth	-.002	.001	1972.85	-1.54	.12	.03
Age ² × Oakland	-.002	.001	1909.80	-1.80	.07	.04

Note. Gender: -1 = men, 1 = women.

In traditional accelerated longitudinal designs, these interactions are often interpreted as how individuals differentially change during different developmental periods (an individual changes at a given rate x from age 10-20 and changes at a given rate y from age 20-30). However, with the current example, the different age intervals are also confounded with cohort (and, to a certain extent, collinear with age). For instance, one sample that has continuous data from age 3 to 23 is linked with another sample that has continuous data from age 7 to 52. However, one sample was born in 1969 and the other was born in 1929, leading to some interpretational difficulties: if the samples significantly differ with respect to how attachment changes over time, are the effects attributable to how people normatively develop over that age window or do changes partially reflect the special circumstances to which an individual cohort was exposed? To a certain extent, this question cannot be answered definitively with this particular data. However, some researchers have offered explanations for how societal circumstances specific to participants from the Intergenerational Studies (e.g., the Great Depression) and Radcliffe College (e.g., the Civil Rights Movement) samples affect development (Elder, 1999; Elder, Downey, & Cross, 1986; Stewart & Gold-Steinberg, 1990). The few significant sample \times age interactions suggest that, with respect to attachment orientation, historical period may exert little influence over development. However, comparisons of how individuals change over shorter intervals that are more comparable between samples (comparing how the Block and Block sample changes from age 7 to 18 to how the Guidance sample changes from age 7 to age 16) may be more appropriate for detecting the effects of cohort on development rather than the large-scale approach employed here. This micro-level approach is currently being explored in an ongoing project on the historical influences on the development of attachment orientation (Chopik, Edelstein, et al., 2014).

CHAPTER 5

DISCUSSION

In the current dissertation, I validated a measure of attachment orientation from the CAQ and then combined data from multiple longitudinal data sets to examine how attachment orientation changed from age 3 to age 62. Overall, anxiety increased in childhood and adolescence and then declined across the lifespan. Avoidance increased slightly throughout young adulthood, reached a plateau in middle age, and then declined sharply in older adulthood. Men experienced some of the largest changes in avoidance, increasing dramatically until middle age before declining in older adulthood. Individuals in relationships were lower in attachment anxiety and avoidance. These differences between single and partnered individuals were most evident in middle age (for avoidance) and older adulthood (for anxiety). Relationship satisfaction was associated with lower anxiety and avoidance at every point in the adult lifespan. Finally, higher levels of anxiety were associated with poorer health across the adult lifespan.

The combined longitudinal studies in this dissertation constitute the longest window over which changes in attachment orientation have been observed. Mapping normative changes (and the moderators of these changes) in attachment orientation is an important step toward contextualizing changes in personality and relationships within a lifespan framework (Chopik et al., 2013). Throughout the lifespan, people enter and exit several relationship transitions that

have the potential to change them and how they approach close relationships. The timing and duration of changes in attachment orientation provide insight into the mechanisms driving change at particular points in the lifespan. For example, increases in anxiety in young adulthood could capture the anxiety and stress that accompanies the uncertainties in forming romantic relationships for the first time (Chopik, Moors, et al., 2014). After young adulthood, decreases in anxiety could reflect individuals gaining evidence that their relationships will last, thus becoming less preoccupied with the availability of their partners. Indeed, the largest differences between single and partnered people occurred later in life, presumably when these individuals have been in relationships for longer periods of time.

Avoidance remained relatively stable until older adulthood when individuals decreased in avoidance. These decreases in avoidance could reflect that people mobilizing efforts towards better emotion regulation in older adulthood, primarily through managing the size and closeness of their relationships (Carstensen, Fung, & Charles, 2003; Carstensen et al., 1999).

Individuals low in anxiety showed life-long detriments in health, such that anxiety predicted lower health at a consistent level across the adult lifespan. The link between individual differences in anxiety and poorer health has been theorized by some models (Pietromonaco, DeBuse, et al., 2013; Pietromonaco, Uchino, & Dunkel Schetter, 2013) and has received some empirical support (Lee, Sbarra, Mason, & Law, 2011). Moreover, anxiety exerted a static influence on health across the lifespan, highlighting the importance of anxiety in the regulation of emotion and health at every age.

Future Directions in the Study of Attachment and Health across the Lifespan

I examined how attachment orientations changed from age 3 to age 62 and whether

individual differences in these changes predicted better health across adulthood using a variant of an accelerated longitudinal design. Although the samples used in my dissertation were collected over longer (and variant) time frames compared to the typical samples using this approach, many of the same limitations that befall accelerated longitudinal designs are also present in these data. The largest consideration that must be made is that this design combined data from (1) different sources, (2) from different researchers collected during (3) different time periods from (4) different participants on which CAQ judgments were made on (5) different source material. Thus, there is no single individual for whom there are data available at both age 3 and age 62. Rather, the data were combined to estimate age-related trends as if it was one contiguous sample. Sample source was added as a covariate in every analysis and was the subject of its own analysis (in examining if sample moderated any of the associations between age and attachment). Despite the many ways in which these samples differed, the amount of consistency across the samples in estimating changes over time in attachment is even more remarkable. The converging evidence is a testament to the robustness of these results, such that they were found under different conditions in samples collected between 1927 and 2005.

Due to the limited number of variables that were present across studies, I relied on single item self-reports of general health. Although this single item is a strong indicator of health and mortality (Idler & Benyamini, 1997; Schnittker & Bacak, 2014), a broader set of health outcomes—both physical and psychological—should be included in future studies of attachment and health across the lifespan. However, there are reasons to expect that these results would generalize to other indicators of health and well-being. For example, in a related study, memories of affectionate experiences with caregivers predicted better subjective health, fewer chronic conditions (e.g., cancer, diabetes, strokes), and lower depression in two large samples of middle-

aged and older adults followed over intervals of approximately nine and four years, respectively (Chopik & Edelstein, 2015). Similar to the studies presented here, the link between attachment experiences and health persisted across the lifespan but was also found in reports of chronic illness and depression in both middle-aged and older adults. Future studies that have repeated measures of both attachment orientations (and/or experiences) and health can examine whether mean levels and changes in attachment predict the onset of major health illnesses and conditions, as is the case with other personality traits (Weston, Hill, & Jackson, 2014).

Future research can also situate the development of attachment orientations and health within a dyadic framework (Oriña et al., 2011). Indeed, many of the mechanisms theorized to link relationships to health occur during the interactions between two members in a close relationship (Pietromonaco, Uchino, et al., 2013). Further, the personality characteristics of romantic partners have been shown to confer benefits for the individual, even when the individual lacks these beneficial personality characteristics (Kim et al., 2014; Roberts et al., 2009). Future research can extend the dyadic effects of attachment orientation on health among partners over time (Powers et al., 2006). As social networks have been shown to be associated with health and well-being over time (Cacioppo et al., 2009; Christakis & Fowler, 2007, 2008; Rosenquist et al., 2011), the mechanisms linking these processes within a relationship can be explored more deeply. Modern relationship research has done an excellent job showing how one partner's mean levels of a psychological characteristic affect the health and well-being of their partner. However, these partners (just like individuals) are not static entities over time and the ways in which close loved ones change could have implications for individuals. For example, in a study of 2,758 couples, increases in an *individual's* level of optimism were associated with better self-rated health and fewer chronic illnesses for that same individual over a four-year

period. Further, *partner* increases in optimism were also uniquely associated with better self-rated health and fewer chronic illnesses for an individual over a four-year period, demonstrating that the ways in which individuals and partners change in concert over time can have implications for the health of both couple members (Chopik, 2015).

Studies of how attachment influences health and well-being across specific transitions that occur across the lifespan are also warranted. People undergo many relationship transitions across the lifespan that may be influenced by individual differences in attachment—marriage (Davila et al., 1999), divorce (Hirschberger et al., 2009), parenthood (Simpson, Rholes, Campbell, Tran, & Wilson, 2003), changes in caregiving (Magai, 2008), bereavement (Fraley & Bonanno, 2004). However, studies examining changes in attachment orientation specifically and how these changes correspond to changes in health and well-being are much rarer (Hudson, Fraley, Brumbaugh, & Vicary, 2014; Simpson, Rholes, Campbell, & Wilson, 2003).

Considerations for Measuring Changes in Attachment Orientation Using the CAQ

Several considerations should be noted with respect to measuring changes in attachment orientation with the CAQ in future studies. These considerations focus mainly on the nature of observer-based judgments—the information that can be gained from their use and how their use can be tailored to answer research questions from different perspectives. As described in Chapter 2, observers rated targets with whom they were very familiar. These observers were often a friend or family member of the target and likely based their judgments on several interactions spanning several years. Normally, and with nearly all observer-based measures, participants may give overly positive evaluations of their close others (Vonk & Konst, 1998).

The ipsative nature of the CAQ partially reduces concerns about enhancement of close

others. By requiring raters to organize the 100 CAQ statements into a forced distribution, only a select few statements that quintessentially describe an individual can be chosen for the “highly characteristic” and “highly uncharacteristic” categories; the majority of statements must fall in the middle category of “not characteristic.” Longitudinal studies that utilize the CAQ, like those described in Chapters 3 and 4, often rely on Q-sorts generated by study personnel, who do not personally know study participants, using source material to make their judgments (Block, 1971; Block & Block, 2006; Helson & Wink, 1992; Stewart & Vandewater, 1993). In this way, the validation study in Chapter 2 employs a slightly different method than the traditionally administered CAQ. In my case, five experts rated CAQ items, and *one* rater filled out the CAQ on a close other. In the aforementioned longitudinal studies, *multiple* raters who are blind to the hypotheses (and the participants’ identities) complete the CAQ and then researchers later select items to form a composite that they hope measured their construct of interest. As such, rater bias may be present in the current case (Chapter 2’s validation study) but not the typical case in which the CAQ is used in longitudinal data (the data used in Chapters 3 and 4). In the typical case, CAQ judgments are also entirely dependent on the quality of the source material (interviews, interactions, open-ended questionnaires) available to the raters, rather than a long history of shared experiences and interactions with a friend or family member. The impersonal practice of raters being blind to participants’ identities can be juxtaposed against a growing literature suggesting that close others might have more insight into an individual’s personality and behavior than strangers and at times even the individuals themselves (Vazire & Carlson, 2011). Future research can determine which characteristics are more suitable to be rated by impersonal judges, close others (e.g., romantic partners), or the self, and the implications of different sources for examining changes in personality over time, as multiple perspectives can

provide additional information about an individual.

A final consideration is the degree to which measures of CAQ-attachment orientation overlap with measures of broader personality. In most cases, these associations were small and consistent with prior research (Nofhle & Shaver, 2006). However, in Chapter 2, CAQ-Anxiety was correlated with emotional stability ($r = -.49$) almost as highly as it was with ECR-Anxiety across informants ($r_s > .51$). Experts in attachment theory rated items from the CAQ that were characteristic of attachment anxiety. However, several of the items from the CAQ-Anxiety subscale also appear to measure emotional stability more generally. Although emotional stability and attachment anxiety are often strongly correlated in the literature (e.g., Nofhle & Shaver, 2006), there are reasons to believe that attachment anxiety and emotional stability are unique constructs associated with unique outcomes. For instance, attachment anxiety predicts relationship quality even after controlling for the variance attributable to emotional stability (i.e., in regression analyses; Nofhle & Shaver, 2006). That is, despite the strong association between the two constructs, emotional stability was unrelated to relationship quality while attachment anxiety was a strong predictor. Attachment anxiety also predicts interpersonal problems even after controlling for variation in positive and negative affect (Wei, Vogel, Ku, & Zakalik, 2005). In the data presented in Chapter 4, the longitudinal trajectory of CAQ-Anxiety replicated the cross-sectional age patterns of ECR-Anxiety across these same ages (Chopik et al., 2013). This replication of cross-sectional data suggests that CAQ-Attachment measures also reliably capture variation in attachment anxiety across developmental periods (Chopik, Moors, et al., 2014; Klohnen & Bera, 1998). Together, the findings in which emotional stability is controlled for and the replicable age trends of attachment anxiety suggest that the two constructs are distinct and that attachment anxiety is more closely related to relational outcomes than emotional stability.

Nevertheless, in future studies of intra-individual change in romantic attachment orientation, it will be important to control for changes in other constructs related to romantic attachment orientation.

Conclusion

Mapping changes in psychological constructs over time is a difficult task, particularly when faced with practical limitations, like a construct's measure not being included in data collection. My hope is that the current study demonstrates how researchers might overcome the methodological roadblocks that limit mapping changes in psychological constructs over time. I validated a measure from the CAQ to assess how attachment changes over a 59-year period. I also examined moderators of age-related changes in attachment—relationship status and satisfaction. Relationship status and satisfaction were both associated with lower anxiety and avoidance across the lifespan. Finally, I related individual differences in changes attachment to health across the lifespan. The findings related to changes in attachment across the lifespan highlight not only the enduring effects of our relationships, but also how we are sensitive to and change in response to some of the most important events in our lives. I hope that this new measure and approach can be used in the future to test theoretical predictions made from theories of lifespan development and attachment theory and clarify how relationships—and the individuals in them—change over time.

REFERENCES

- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation*. Oxford England: Lawrence Erlbaum.
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, 469-480.
- Banai, E., Weller, A., & Mikulincer, M. (1998). Inter-judge agreement in evaluation of adult attachment style: The impact of acquaintanceship. *Br J Soc Psychol*, 95-109.
- Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology*, 226-244.
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 497-529.
- Berscheid, E. (2010). Love in the fourth dimension. *Annual Review of Psychology*, 1-25.
- Birnbaum, G. E. (2007). Attachment orientations, sexual functioning, and relationship satisfaction in a community sample of women. *Journal of Social and Personal Relationships*, 21-35.
- Block, J. (1961). *The q-sort method in personality assessment and psychiatric research*. Springfield, Il: Charles C Thomas.
- Block, J. (1971). *Lives through time*. Berkeley, CA: Bancroft Books.

- Block, J. (2008). *The q-sort in character appraisal: Encoding subjective impressions of persons quantitatively*. Washington, DC: American Psychological Association.
- Block, J., & Block, J. H. (1980). *The California Child Q-Set*. Palo Alto, CA: Consulting Psychologists Press.
- Block, J., & Block, J. H. (2006). Venturing a 30-year longitudinal study. *American Psychologist*, 315-327.
- Bohn, R. E., & Short, J. E. (2009). *How much information? 2009 report on American consumers*. San Diego, CA: Global Information Industry Center.
- Bowlby, J. (1969/1982). *Attachment and loss: Vol. 1. Attachment*. New York: Basic Books.
- Bowlby, J. (1973). *Attachment and loss: Vol. 2. Separation: Anxiety and anger*. New York: Basic Books.
- Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships*. (pp. 46-76). New York, NY US: Guilford Press.
- Brindley, D., & Rolland, Y. (1989). Possible connections between stress, diabetes, obesity, hypertension and altered lipoprotein metabolism that may result in atherosclerosis. *Clin. Sci.*, 453-461.
- Brown, S. L., Nesse, R. M., Vinokur, A. D., & Smith, D. M. (2003). Providing social support may be more beneficial than receiving it: Results from a prospective study of mortality. *Psychological Science*, 320-327.

- Cacioppo, J. T., Fowler, J. H., & Christakis, N. A. (2009). Alone in the crowd: The structure and spread of loneliness in a large social network. *Journal of Personality and Social Psychology, 977-991*.
- Canary, D. J., Emmers-Sommer, T. M., & Faulkner, S. (1997). *Sex and gender: Differences in personal relationships*. New York, NY, US: Guilford Press.
- Carstensen, L. L., Fung, H. H., & Charles, S. T. (2003). Socioemotional selectivity theory and the regulation of emotion in the second half of life. *Motivation and Emotion, 103-123*.
- Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychologist, 165-181*.
- Cassidy, J., & Shaver, P. R. (2008). *Handbook of attachment: Theory, research, and clinical applications (2nd ed.)*. New York, NY US: Guilford Press.
- Chopik, W. J. (2015). Just the way you aren't: How changes in individual psychological characteristics are associated with changes in partner health. *Manuscript in preparation*.
- Chopik, W. J., & Edelstein, R. S. (2014a). Age differences in romantic attachment around the world. *Social Psychological and Personality Science, 892-900*.
- Chopik, W. J., & Edelstein, R. S. (2014b). Preliminary validation of a romantic attachment orientation measure from the california adult q-sort. *Manuscript submitted for publication*.
- Chopik, W. J., & Edelstein, R. S. (2015). Parental support in childhood is associated with physical and mental health trajectories in middle-age and older adulthood. *Manuscript in preparation*.

- Chopik, W. J., Edelstein, R. S., & Fraley, R. C. (2013). From the cradle to the grave: Age differences in attachment from early adulthood to old age. *Journal of Personality*, 171-183.
- Chopik, W. J., Edelstein, R. S., Stewart, A. J., & Grimm, K. J. (2014). Historical and cohort influences on the development of attachment orientations over time. *Manuscript in preparation*.
- Chopik, W. J., Moors, A. C., & Edelstein, R. S. (2014). Maternal nurturance predicts decreases in attachment avoidance in emerging adulthood. *Journal of Research in Personality*, 47-53.
- Chopik, W. J., & O'Brien, E. (2015). Does a happy you make a healthy me? *Manuscript under review*.
- Christakis, N. A., & Fowler, J. H. (2007). The spread of obesity in a large social network over 32 years. *The New England Journal of Medicine*, 370-379.
- Christakis, N. A., & Fowler, J. H. (2008). The collective dynamics of smoking in a large social network. *The New England Journal of Medicine*, 2249-2258.
- Cohen, S., & Janicki-Deverts, D. (2009). Can we improve our physical health by altering our social networks? *Perspectives on Psychological Science*, 375-378.
- Cohen, S., & Syme, S. L. (1985). Issues in the study and application of social support. In S. Cohen & S. L. Syme (Eds.), *Social support and health*. (pp. 3-22). San Diego, CA US: Academic Press.
- Collins, N. L., & Feeney, B. C. (2004). Working models of attachment shape perceptions of social support: Evidence from experimental and observational studies. *Journal of Personality and Social Psychology*, 363-383.

- Collins, N. L., & Read, S. J. (1990). Adult attachment, working models, and relationship quality in dating couples. *Journal of Personality and Social Psychology*, 644-663.
- Crowell, J. A., Fraley, R. C., & Shaver, P. R. (2008). Measurement of individual differences in adolescent and adult attachment. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications (2nd ed.)*. (pp. 599-634). New York, NY US: Guilford Press.
- Davila, J., Karney, B. R., & Bradbury, T. N. (1999). Attachment change processes in the early years of marriage. *Journal of Personality and Social Psychology*, 783-802.
- Diamond, L. M., & Hicks, A. M. (2004). Psychobiological perspectives on attachment: Implications for health over the lifespan. In W. S. Rholes & J. A. Simpson (Eds.), *Adult attachment: Theory, research, and clinical implications*. (pp. 240-263). New York, NY US: Guilford Publications.
- Diehl, M., Elnick, A. B., Bourbeau, L. S., & Labouvie-Vief, G. (1998). Adult attachment styles: Their relations to family context and personality. *Journal of Personality and Social Psychology*, 1656-1669.
- Edelstein, R. S., Alexander, K. W., Shaver, P. R., Schaaf, J. M., Quas, J. A., Lovas, G. S., & Goodman, G. S. (2004). Adult attachment style and parental responsiveness during a stressful event. *Attachment & Human Development*, 31-52.
- Edelstein, R. S., & Gillath, O. (2008). Avoiding interference: Adult attachment and emotional processing biases. *Personality and Social Psychology Bulletin*, 171-181.
- Edelstein, R. S., & Shaver, P. R. (2004). Avoidant attachment: Exploration of an oxymoron. In D. J. Mashek & A. P. Aron (Eds.), *Handbook of closeness and intimacy*. (pp. 397-412). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.

- Eichorn, D. H., Clausen, J. A., Haan, N., Honzik, M. P., & Mussen, P. H. (1981). *Present and past in middle life*. New York: Academic Press.
- Elder, G. H., Jr. (1999). *Children of the great depression: Social change in life experience (25th anniversary ed.)*. Boulder, CO, US: Westview Press.
- Elder, G. H., Jr., Downey, G., & Cross, C. E. (1986). Family ties and life chances: Hard times and hard choices in women's lives since the 1930s. In N. Datan, A. L. Greene & H. W. Reese (Eds.), *Life-span developmental psychology: Intergenerational relations*. (pp. 151-183). Hillsdale, NJ, England: Lawrence Erlbaum Associates, Inc.
- Erikson, E. H. (1968). *Identity: Youth and crisis*. New York: Norton.
- Feeney, J. A. (1995). Adult attachment and emotional control. *Personal Relationships*, 143-159.
- Feeney, J. A. (1999). Adult romantic attachment and couple relationships. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 355-377).
- Fraley, R. C., & Bonanno, G. A. (2004). Attachment and loss: A test of three competing models on the association between attachment-related avoidance and adaptation to bereavement. *Personality and Social Psychology Bulletin*, 878-890.
- Fraley, R. C., & Davis, K. E. (1997). Attachment formation and transfer in young adults' close friendships and romantic relationships. *Personal Relationships*, 131-144.
- Fraley, R. C., Davis, K. E., & Shaver, P. R. (1998). Dismissing-avoidance and the defensive organization of emotion, cognition, and behavior. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships*. (pp. 249-279). New York, NY US: Guilford Press.

- Fraley, R. C., Niedenthal, P. M., Marks, M., Brumbaugh, C., & Vicary, A. (2006). Adult attachment and the perception of emotional expressions: Probing the hyperactivating strategies underlying anxious attachment. *Journal of Personality*, 1163-1190.
- Fraley, R. C., & Shaver, P. R. (1998). Airport separations: A naturalistic study of adult attachment dynamics in separating couples. *Journal of Personality and Social Psychology*, 1198-1212.
- Fraley, R. C., & Waller, N. G. (1998). Adult attachment patterns: A test of the typological model. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships*. (pp. 77-114). New York, NY US: Guilford Press.
- Furnham, A. (2008). Relationship among four big five measures of different length. *Psychological Reports*, 312-316.
- Furr, R. M., Wagerman, S. A., & Funder, D. C. (2010). Personality as manifest in behavior: Direct behavioral observation using the revised riverside behavioral q-sort (rbq-3.0). In C. R. Agnew, D. E. Carlston, W. G. Graziano & J. R. Kelly (Eds.), *Then a miracle occurs: Focusing on behavior in social psychological theory and research*. (pp. 186-204). New York, NY, US: Oxford University Press.
- Gilbert, D. T., & Wilson, T. D. (2009). Why the brain talks to itself: Sources of error in emotional prediction. *Philosophical Transactions of the Royal Society of Biological Sciences*, 1335-1341.
- Glaser, D. (2000). Child abuse and neglect and the brain-a review. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 97-116.
- Gosling, S. D., Rentfrow, P. J., & Swann, W. B., Jr. (2003). A very brief measure of the big-five personality domains. *Journal of Research in Personality*, 504-528.

- Gross, J. J., Carstensen, L. L., Pasupathi, M., Tsai, J., Skorpen, C. G., & Hsu, A. Y. C. (1997). Emotion and aging: Experience, expression, and control. *Psychology and Aging, 590-599*.
- Gunnar, M. (1998). Quality of early care and buffering of neuroendocrine stress reactions: Potential effects on the developing human brain. *Preventive Medicine, 208-211*.
- Haan, N., Millsap, R., & Hartka, E. (1986). As time goes by: Change and stability in personality over fifty years. *Psychology and Aging, 220-232*.
- Hahn-Holbrook, J., Schetter, C. D., Arora, C., & Hobel, C. J. (2013). Placental corticotropin-releasing hormone mediates the association between prenatal social support and postpartum depression. *Clinical Psychological Science, 253-265*.
- Harlow, H. F. (1958). The nature of love. *American Psychologist, 673-685*.
- Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology, 511-524*.
- Hazan, C., & Shaver, P. R. (1990). *Experiences in close relationship scale (1990 version)*. Available from Cindy Hazan, Department of Human Development and Family Studies, Van Rensselaer Hall, Cornell University, Ithaca, NY 14853-4401.
- Helson, R., & Srivastava, S. (2002). Creative and wise people: Similarities, differences and how they develop. *Personality and Social Psychology Bulletin, 1430-1440*.
- Helson, R., & Wink, P. (1992). Personality change in women from the early 40s to the early 50s. *Psychology and Aging, 46-55*.
- Henry, J. P. (1983). Coronary heart disease and the arousal of the adrenal cortical axis. In T. M. Dembroski, T. H. Schmidt & G. Blumchen (Eds.), *Biobehavioral bases of coronary heart disease* (pp. 365-381).

- Hesse, E. (2008). The adult attachment interview: Protocol, method of analysis, and empirical studies. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications (2nd ed.)*. (pp. 552-598). New York, NY US: Guilford Press.
- Hill, P. L., & Roberts, B. W. (2011). Narcissism, well-being, and observer-rated personality across the lifespan. *Social Psychological and Personality Science*.
- Hirschberger, G., Srivastava, S., Marsh, P., Cowan, C. P., & Cowan, P. A. (2009). Attachment, marital satisfaction, and divorce during the first fifteen years of parenthood. *Personal Relationships*, 401-420.
- House, J., Landis, K., & Umberson, D. (1988). Social relationships and health. *Science*, 540-545.
- Hudson, N. W., Fraley, R. C., Brumbaugh, C. C., & Vicary, A. M. (2014). Coregulation in romantic partners' attachment styles: A longitudinal investigation. *Personality and Social Psychology Bulletin*, 845-857.
- Idler, E. L., & Benyamini, Y. (1997). Self-rated health and mortality: A review of twenty-seven community studies. *Journal of Health and Social Behavior*, 21-37.
- Kahneman, D., Krueger, A. B., Schkade, D. A., Schwarz, N., & Stone, A. A. (2004). A survey method for characterizing daily life experience: The day reconstruction method. *Science*, 1776-1780.
- Kim, E. S., Chopik, W. J., & Smith, J. (2014). Are people healthier if their partners are more optimistic? The dyadic effect of optimism on health among older adults. *Journal of Psychosomatic Research*, 447-453.
- Kirkpatrick, L. A., & Hazan, C. (1994). Attachment styles and close relationships: A four-year prospective study. *Personal Relationships*, 123-142.

- Klohnen, E. C., & Bera, S. (1998). Behavioral and experiential patterns of avoidantly and securely attached women across adulthood: A 31-year longitudinal perspective. *Journal of Personality and Social Psychology*, 211-223.
- Klohnen, E. C., & John, O. P. (1998). Working models of attachment: A theory-based prototype approach. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships*. (pp. 115-140). New York, NY US: Guilford Press.
- Kobak, R. R. (1993). *The adult attachment interview q-set*. University of Delaware.
- Konrath, S. H., Chopik, W. J., Hsing, C., & O'Brien, E. (2013). Dismissing attachment styles are increasing in american college students over time: A meta-analysis. *Manuscript submitted for publication*.
- Krantz, D. S., & Manuck, S. B. (1984). Acute psychophysiologic reactivity and risk of cardiovascular disease: A review and methodologic critique. *Psychological Bulletin*, 435-464.
- Lee, L. A., Sbarra, D. A., Mason, A. E., & Law, R. W. (2011). Attachment anxiety, verbal immediacy, and blood pressure: Results from a laboratory-analogue study following marital separation. *Personal Relationships*, 285-301.
- Li, T., & Chan, D. K. S. (2012). How anxious and avoidant attachment affect romantic relationship quality differently: A meta-analytic review. *European Journal of Social Psychology*, 406-419.
- Liu, D., & et al. (1997). Maternal care, hippocampal glucocorticoid receptors, and hypothalamic-pituitary-adrenal responses to stress. *Science*, 1659-1662.
- Lupien, S., Lecours, A. R., Lussier, I., Schwartz, G., Nair, N. P., & Meaney, M. J. (1994). Basal cortisol levels and cognitive deficits in human aging. *J. Neurosci.*, 2893-2903.

- Magai, C. (2008). Attachment in middle and later life. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications (2nd ed.)*. (pp. 532-551). New York, NY US: Guilford Press.
- Magai, C., Cohen, C., Milburn, N., Thorpe, B., McPherson, R., & Peralta, D. (2001). Attachment styles in older european american and african american adults. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences*, S28-S35.
- McCrae, R. R., Costa, P. T., de Lima, M. P., Simoes, A., Ostendorf, F., Angleitner, A., . . . Piedmont, R. L. (1999). Age differences in personality across the adult life span: Parallels in five cultures. *Developmental Psychology*, 466-477.
- McEwen, B., & Stellar, E. (1993). Stress and the individual. Mechanisms leading to disease. *Arch Intern Med*, 2093-2101.
- Mickelson, K. D., Kessler, R. C., & Shaver, P. R. (1997). Adult attachment in a nationally representative sample. *Journal of Personality and Social Psychology*, 1092-1106.
- Mikulincer, M. (1998). Adult attachment style and individual differences in functional versus dysfunctional experiences of anger. *Journal of Personality & Social Psychology*, 513-524.
- Mikulincer, M., Gillath, O., & Shaver, P. R. (2002). Activation of the attachment system in adulthood: Threat-related primes increase the accessibility of mental representations of attachment figures. *Journal of Personality and Social Psychology*, 881-895.
- Miyazaki, Y., & Raudenbush, S. W. (2000). Tests for linkage of multiple cohorts in an accelerated longitudinal design. *Psychological Methods*, 44-63.
- Newton, N. J., & Stewart, A. J. (2013). The road not taken: Women's life paths and gender-linked personality traits. *Journal of Research in Personality*, 306-316.

- Noftle, E. E., & Shaver, P. R. (2006). Attachment dimensions and the big five personality traits: Associations and comparative ability to predict relationship quality. *Journal of Research in Personality*, 179-208.
- Onishi, M., Gjerde, P. F., & Block, J. (2001). Personality implications of romantic attachment patterns in young adults: A multi-method, multi-informant study. *Personality and Social Psychology Bulletin*, 1097-1110.
- Oriña, M. M., Collins, W. A., Simpson, J. A., Salvatore, J. E., Haydon, K. C., & Kim, J. S. (2011). Developmental and dyadic perspectives on commitment in adult romantic relationships. *Psychological Science*, 908-915.
- Otway, L. J., & Vignoles, V. L. (2006). Narcissism and childhood recollections: A quantitative test of psychoanalytic predictions. *Pers Soc Psychol Bull*, 104-116.
- Panksepp, J. (1998). *Affective neuroscience: The foundations of human and animal emotions*. New York, NY US: Oxford University Press.
- Peterson, B. E., & Klohnen, E. C. (1995). Realization of generativity in two samples of women at midlife. *Psychology and Aging*, 20-29.
- Pietromonaco, P. R., DeBuse, C. J., & Powers, S. I. (2013). Does attachment get under the skin? Adult romantic attachment and cortisol responses to stress. *Current Directions in Psychological Science*, 63-68.
- Pietromonaco, P. R., Uchino, B., & Dunkel Schetter, C. (2013). Close relationship processes and health: Implications of attachment theory for health and disease. *Health Psychology*, 499-513.
- Pipp, S., & Harmon, R. J. (1987). Attachment as regulation: A commentary. *Child Development*, 648-652.

- Powers, S. I., Pietromonaco, P. R., Gunlicks, M., & Sayer, A. (2006). Dating couples' attachment styles and patterns of cortisol reactivity and recovery in response to a relationship conflict. *Journal of Personality and Social Psychology*, 613-628.
- Quas, J. A., Yim, I. S., Edelstein, R. S., Cahill, L., & Rush, E. B. (2011). The role of cortisol reactivity in children's and adults' memory of a prior stressful experience. *Developmental Psychobiology*, 166-174.
- Raudenbush, S. W., & Chan, W.-s. (1992). Growth curve analysis in accelerated longitudinal designs. *Journal of Research in Crime and Delinquency*, 387-411.
- Repetti, R., & et al. (2002). Risky families: Family social environments and the mental and physical health of offspring. *Psychological Bulletin*, 330-366.
- Riley, M. W., Johnson, M., & Foner, A. (1972). *Aging and society Vol. 3. A sociology of age stratification*. New York: Russell Sage.
- Roberts, B. W., & Chapman, C. N. (2000). Change in dispositional well-being and its relation to role quality: A 30-year longitudinal study. *Journal of Research in Personality*, 26-41.
- Roberts, B. W., Smith, J., Jackson, J. J., & Edmonds, G. (2009). Compensatory conscientiousness and health in older couples. *Psychological Science*, 553-559.
- Roberts, B. W., Wood, D., & Smith, J. L. (2005). Evaluating five factor theory and social investment perspectives on personality trait development. *Journal of Research in Personality*, 166-184.
- Romero, E., Villar, P., Gómez-Fraguela, J. A., & López-Romero, L. (2012). Measuring personality traits with ultra-short scales: A study of the ten item personality inventory (tipi) in a spanish sample. *Personality and Individual Differences*, 289-293.

- Rosenquist, J. N., Fowler, J. H., & Christakis, N. A. (2011). Social network determinants of depression. *Molecular Psychiatry*, 273-281.
- Sarason, B. R., Sarason, I. G., & Gurung, R. A. R. (2001). Close personal relationships and health outcomes: A key to the role of social support. In B. R. Sarason & S. Duck (Eds.), *Personal relationships: Implications for clinical and community psychology*. (pp. 15-41). New York, NY US: John Wiley & Sons Ltd.
- Sbarra, D. A., & Nietert, P. J. (2009). Divorce and death: Forty years of the charleston heart study. *Psychological Science*, 107-113.
- Schindler, I., Fagundes, C. P., & Murdock, K. W. (2010). Predictors of romantic relationship formation: Attachment style, prior relationships, and dating goals. *Personal Relationships*, 97-105.
- Schnittker, J., & Bacak, V. (2014). The increasing predictive validity of self-rated health. *PLoS ONE*, e84933.
- Schore, A. N. (1996). Effects of a secure attachment relationship on right brain development, affect regulation, and infant mental health. *Infant Mental Health Journal*, 269-276.
- Segal, D. L., Needham, T. N., & Coolidge, F. L. (2009). Age differences in attachment orientations among younger and older adults: Evidence from two self-report measures of attachment. *International Journal of Aging and Human Development*, 119-132.
- Shaver, P. R., & Brennan, K. A. (1992). Attachment styles and the big five personality traits: Their connections with each other and with romantic relationship outcomes. *Personality and Social Psychology Bulletin*, 536-545.

- Shaver, P. R., Schachner, D. A., & Mikulincer, M. (2005). Attachment style, excessive reassurance seeking, relationship processes, and depression. *Personality and Social Psychology Bulletin*, 343-359.
- Sherman, R. A., Nave, C. S., & Funder, D. C. (2010). Situational similarity and personality predict behavioral consistency. *Journal of Personality and Social Psychology*, 330-343.
- Simpson, J. A. (1990). Influence of attachment styles on romantic relationships. *Journal of Personality & Social Psychology*, 971-980.
- Simpson, J. A., Rholes, W. S., Campbell, L., Tran, S., & Wilson, C. L. (2003). Adult attachment, the transition to parenthood, and depressive symptoms. *Journal of Personality and Social Psychology*, 1172-1187.
- Simpson, J. A., Rholes, W. S., Campbell, L., & Wilson, C. L. (2003). Changes in attachment orientations across the transitions to parenthood. *Journal of Experimental Social Psychology*, 317-331.
- Simpson, J. A., Rholes, W. S., & Winterheld, H. A. (2010). Attachment working models twist memories of relationship events. *Psychological Science*, 252-259.
- Smolewska, K., & Dion, K. L. (2005). Narcissism and adult attachment: A multivariate approach. *Self and Identity*, 59-68.
- Solomon, J., & George, C. (2008). The measurement of attachment security and related constructs in infancy and early childhood. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications (2nd ed.)*. (pp. 383-416). New York, NY US: Guilford Press.

- Soto, C. J., John, O. P., Gosling, S. D., & Potter, J. (2010). Age differences in personality traits from 10 to 65: Big five domains and facets in a large cross-sectional sample. *Journal of Personality and Social Psychology*, 330-348.
- Srivastava, S., John, O. P., Gosling, S. D., & Potter, J. (2003). Development of personality in early and middle adulthood: Set like plaster or persistent change? *Journal of Personality and Social Psychology*, 1041-1053.
- Stewart, A. J., & Gold-Steinberg, S. (1990). Midlife women's political consciousness: Case studies of psychosocial development and political commitment. *Psychology of Women Quarterly*, 543-566.
- Stewart, A. J., & Healy, J. M. (1989). Linking individual development and social changes. *American Psychologist*, 30-42.
- Stewart, A. J., & Vandewater, E. A. (1993). The radcliffe class of 1964: Career and family social clock projects in a transitional cohort. In K. D. Hulbert & D. T. Schuster (Eds.), *Women's lives through time: Educated american women of the twentieth century*. (pp. 235-258). San Francisco, CA US: Jossey-Bass.
- Taylor, S. E., Dickerson, S. S., & Klein, L. C. (2002). Toward a biology of social support. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of positive psychology* (pp. 556-569).
- Terracciano, A., McCrae, R. R., Brant, L. J., & Costa, P. T. (2005). Hierarchical linear modeling analyses of neo-pi-r scales in the baltimore longitudinal study of aging. *Psychology and Aging*, 493-506.
- Truhan, A. P., & Ahmed, A. R. (1989). Corticosteroids: A review with emphasis on complications of prolonged systemic therapy. *Annals of Allergy*, 375-391.

- Vazire, S., & Carlson, E. N. (2011). Others sometimes know us better than we know ourselves. *Current Directions in Psychological Science*, 104-108.
- Vonk, R., & Konst, D. (1998). Intergroup bias and correspondence bias: People engage in situational correction when it suits them. *British Journal of Social Psychology*, 379-385.
- Waters, E., & Deane, K. E. (1985). Defining and assessing individual differences in attachment relationships: Q-methodology and the organization of behavior in infancy and early childhood. *Monographs of the Society for Research in Child Development*, 41-65.
- Wei, M., Liao, K. Y., Ku, T. Y., & Shaffer, P. A. (2011). Attachment, self-compassion, empathy, and subjective well-being among college students and community adults. *Journal of Personality*, 191-221.
- Wei, M., Vogel, D. L., Ku, T.-Y., & Zakalik, R. A. (2005). Adult attachment, affect regulation, negative mood, and interpersonal problems: The mediating roles of emotional reactivity and emotional cutoff. *Journal of Counseling Psychology*, 14-24.
- Weston, S. J., Hill, P. L., & Jackson, J. J. (2014). Personality traits predict the onset of disease. *Social Psychological and Personality Science*.
- Whitbourne, S. K., & Tesch, S. A. (1985). A comparison of identity and intimacy statuses in college students and alumni. *Developmental Psychology*, 1039-1044.
- Willett, J. B. (1988). Questions and answers in the measurement of change. *Review of Research in Education*, 345-422.
- Wink, P. (1992a). Three narcissism scales for the california q-set. *Journal of Personality Assessment*, 51-66.
- Wink, P. (1992b). Three types of narcissism in women from college to mid-life. *Journal of Personality*, 7-30.

Wuest, S., Federenko, I. S., Hellhammer, D. H., & Kirschbaum, C. (2000). Genetic factors, perceived chronic stress, and the free cortisol response to awakening.

Psychoneuroendocrinology, 707-720.

York, K. L., & John, O. P. (1992). The four faces of eve: A typological analysis of women's personality at midlife. *Journal of Personality and Social Psychology*, 494-508.

Zeifman, D., & Hazan, C. (1997). Attachment: The bond in pair-bonds. In J. A. Simpson & D. T. Kenrick (Eds.), *Evolutionary social psychology* (pp. 237-263). Hillsdale, NJ: Erlbaum.