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The Development of Self-Perceptions of Aging:

The Interplay Between Society and the Self Across the Lifespan

By

Jordan Boeder

Claremont Graduate University
2021

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APPROVAL OF THE DISSERTATION COMMITTEE

This dissertation has been duly read, reviewed, and critiqued by the Committee listed below, which hereby approves the manuscript of Jordan Boeder as fulfilling the scope and quality requirements for meriting the degree of Doctor of Philosophy in Psychology.

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Abstract

The Development of Self-Perceptions of Aging:
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By
Jordan Boeder

Claremont Graduate University: 2021

Our thoughts and beliefs about our own aging, known as self-perceptions of aging, are found to greatly impact our health and well-being across the lifespan (Wurm et al., 2015). A large body of research suggests that positive and negative views on aging are associated with long-term health benefits and detriments, respectively. According to stereotype embodiment theory, stereotypes are incrementally internalized across the lifespan, forming our aging stereotypes, which then become self-stereotypes once we identify as older adults, eventually shaping our self-perceptions of aging (Levy, 2003b, 2009). Based on the postulates of this theory, it is unclear how individuals develop positive self-perceptions of aging when negative aging stereotypes are more prevalent than positive stereotypes in most societies. Two studies were conducted to understand how the internalization of negative aging stereotypes can potentially be reduced and identify factors associated with longitudinal changes in positive and negative self-perceptions of aging.

Using cross-sectional data from 612 U.S. citizens over the age of 60, Study 1 found that having a weak identification with the older adult social category or having positive affect towards the older adult social category was related to a weaker relationship between the negative aging stereotypes and the negative self-stereotypes endorsed by individuals. In addition, having more positive aging experiences was related to a weaker relationship between the two types of stereotypes. Thus, it appears that our identity and lived experiences may attenuate the degree to which negative stereotypes are internalized.

Utilizing parallel process growth curve models on four waves of data from the German Aging Study, Study 2 analyzed the average growth trajectories of positive and negative self-perceptions of aging and the factors associated with the growth trajectories. Differences in the development of self-perceptions of aging between middle- (40-59 years old), third- (60-74 years old), and fourth-aged adults (75 years old and higher) were also explored. Study 2 found that, on average, positive self-perceptions of aging declined linearly, while negative self-perceptions of aging increased linearly across measurement occasions. However, the opposite pattern was found for middle-aged adults. Furthermore, the intercept and slope of positive self-perceptions of aging were inversely related to the intercept and slope of negative self-perceptions of aging. Additionally, the intercept and slope within both perceptions of aging were inversely correlated, meaning that higher baseline positive self-perceptions of aging were related to steeper decreases in these self-perceptions across time, and higher baseline negative self-perceptions of aging were related to shallower increases in these views on aging across measurement occasions.

Beyond replicating certain findings from past studies, Study 2 uniquely identified satisfaction with life, older age identification, and perceived age discrimination as factors associated with the development of self-perceptions of aging. Moreover, when comparing results from parallel process growth curve models specific to each phase of adulthood, it was found that the factors most strongly associated with the development of self-perceptions of aging differed between the three age groups. Such differences suggest that future interventions aimed at enhancing self-perceptions of aging may be maximized if tailored to the participants' ages. However, with life satisfaction and depressive symptoms related to better and worse self-perceptions of aging for each age group, respectively, public policies designed to support mental health may be best for enhancing self-perceptions of aging at the population-level.

The findings from this dissertation further our empirical understanding of how self-perceptions of aging are internalized and develop across time. While stereotype embodiment theory has postulated that the harmfulness of negative aging stereotypes is more salient when one identifies as an older adult, Study 2 was the first to provide longitudinal evidence for the damaging association between older adult identification and self-perceptions of aging. However, results from Study 1 suggest the nuances of social identity must be taken into account as holding positive in-group affect may reduce the harm associated with identifying as an older adult. Additionally, whereas past research has found positive and negative self-perceptions of aging to be independent constructs, the use of parallel process growth curve models in Study 2 revealed that the development of the two are related. Lastly, Study 2 was the first to the author's knowledge to identify middle age as a period of life associated with the development of more positive and less negative self-perceptions of aging. Findings from the two studies provide evidence for how positive self-perceptions of aging can develop in light of ageism's pervasiveness and begin to suggest avenues for the creation of interventions to bolster self-perceptions of aging.

Dedication

This dissertation is dedicated to my late grandfather, Leonard Desman, who taught me that aging can take many things from us, but not our humor and charm.

Acknowledgements

As I sit at my desk, writing this acknowledgments section, I am able to look out my window and see Zurich's cityscape funnel towards its shimmering lake and the snow-capped Alps. This view reminds me how far our ideas and hard work can take us. However, ideas like people need to be nurtured and supported so they can wither the storms that are sure to come and shine bright when the clouds part—as they always do. My ideas and my character have had the utmost support throughout my Ph.D. journey. From my men's circle to the Moontower, the PAR-D never stopped, and the experience has been nothing short of EPIC(A).

I owe a great deal of my academic success to Dr. Thomas Chan. Whether Tom was my professor, colleague, or mentor, he has always been a dear friend. Without reluctance nor regret, I have followed in Tom's footsteps for many years. Yet, through his brilliant mentoring, I have become a unique researcher with distinct research interests and skillsets. Through Tom's guidance, I have been able to grow my professional and social network. Of particular importance was being introduced to Dr. Veronica Fruiht. The start of our Tri-Fecta within the PAR-D lab was the catalyst I needed to switch my identity from a student researcher to a full-fledged academic.

Within the realm of mentoring, nothing may be more sacred than lineages. Before my first semester at Claremont Graduate University (CGU) began, Tom helped me secure a position in the EPICA lab headed by his mentor, Dr. Jeanne Nakamura. From there, the lineage began. Jeanne has been a wonderful mentor and has helped me in too many ways to acknowledge in this brief section. However, I believe that her willingness to entertain all of my research interests has been particularly special and impactful on my development as a researcher. Jeanne has dedicated so much time to my personal and academic growth. So often have my quick questions turned

into hour-long meetings. I was never told to rein it in; instead, I was asked how I envisioned making it work. Jeanne's simple questions have led to the biggest insights.

Jeanne's acumen for letting ideas simmer until the fat burns away is undoubtedly tied to her work with Dr. Mihaly (Mike) Csikszentmihalyi. While I did not get to work with Mike as much as I would have liked, my encounters with him were always filled with the levity and insights that could only come from a seasoned academic. The Quality of Life Research Center (QLRC), led by Jeanne and Mike, was my home throughout my graduate education. It was a space where their mentees could work together and help one another build skills and share their experiences trying to navigate the Ph.D. program. In particular, Drs. Laura Graham and Dwight Tse, Kelsey Proctor, and Noah Ringler have been essential peer mentors throughout my time at CGU. Of course, the QLRC would not have felt like a home without Sherry Nissen, who provided us support and the best snacks that kept us going as we worked late into the evening.

When I was not trying to get Jeanne's attention in the QLRC, I could be found in Dr. Kendall Cotton-Bronk's office. Kendall has pushed me to see data as more than numbers and engage with the populations I study. Kendall has shown me how to give life to my research and tell stories from data, not just findings. I have received so much support from my professors at CGU. Without ever having a class with Dr. Saida Heshmati, she joined my support team and has been instrumental in the final phase of my degree. Her heart may be as rare as her intellect.

To the many life-long friends I have made throughout my graduate school journey, earning a Ph.D. would mean very little without you. I have always struggled to feel a part of a large group of friends until I came CGU. Our shared burdens as first-year students connected us, but our unwavering support of one another's character has bonded us. No matter where our lives take us, and surely that will be far and wide, we will always be connected by the Moontower.

Throughout my Ph.D. journey and long before it, I have been unconditionally supported by my parents. From little league baseball games to way too many graduations, they have always been there for me. Their love has been a propelling force throughout my life. So too has been the encouragement of my brothers—I am lucky to have been the youngest child. My older brothers never competed with me over success—Instead, they always treated me as if I were special. To the rest of my family members, thank you for always taking the time to make me feel loved.

Lastly, I would like to acknowledge the support of my wife, Amanda Boeder. We moved to Claremont from Whittier as boyfriend and girlfriend and are leaving as husband and wife. You are the life in my work-life balance. I have zero doubt that I would not have been able to complete my Ph.D. without your support. You have provided me with the love I needed to feel confident enough to pursue ever greater goals. I appreciate you allowing us to prioritize my work over our relationship at times and reminding me that we were strong enough to do so. I am so grateful to have moved away from my family to attend school, only to have your family support me just as mine has done. While it was difficult to leave both of our families and our home as we take on this new phase of my career in Switzerland, I know that wherever we go, we can make it our home.

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Chapter I: Introduction and Literature Review

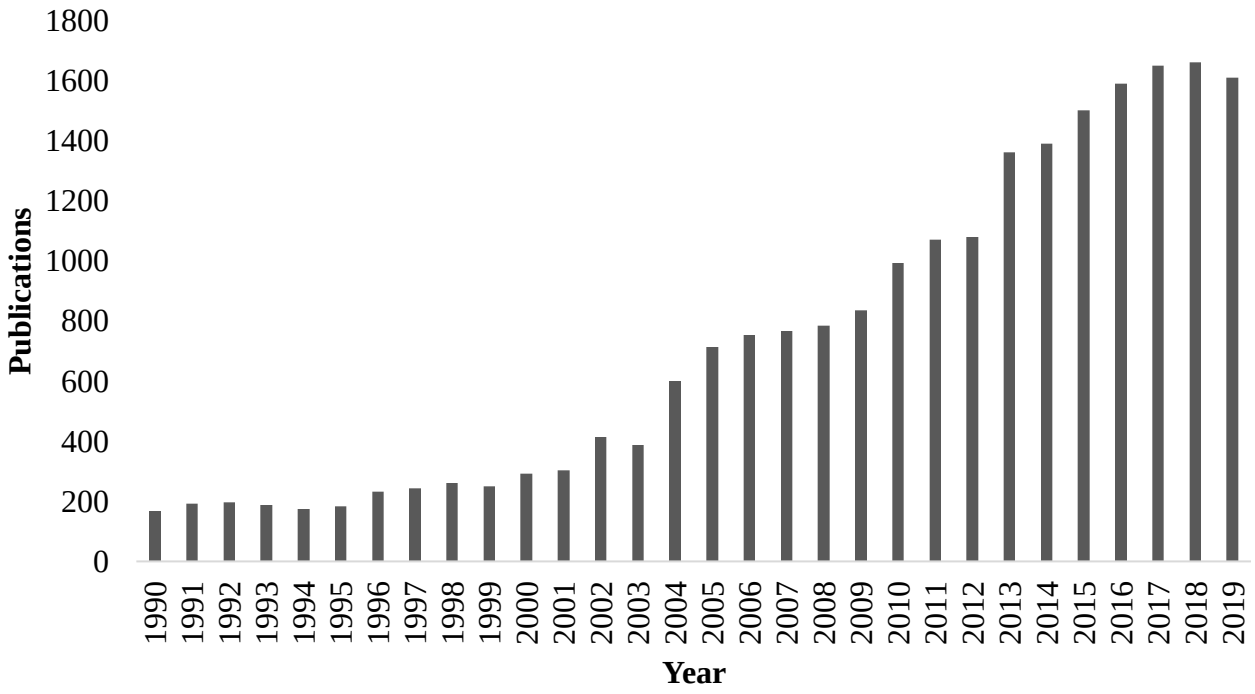
Aging is an active process, filled with both gains and losses (Baltes, 1987), that impacts our perceptions of the experience. Throughout the lifespan, we develop fundamental beliefs regarding the nature of the aging process (Dittman-Kohli et al., 1997). As we reflect on and interpret our own aging experiences throughout the lifespan, the seemingly objective calendar age becomes increasingly subjective as evidenced by the differences between subjective age and chronological age that increase across time (e.g., Berntsen & Rubin, 2006; Montepare, 2009; Westerhof et al., 2003). The combination of our thoughts and beliefs about our personal aging experience are called self-perceptions of aging. Although our aging beliefs can cover a diverse range of topics, most self-perceptions of aging are centered around the extent to which we believe our aging is a time of growth or loss across important life domains (Steverink et al., 2003).

Self-perceptions of aging are among the many constructs that fall under the superordinate construct, awareness of aging (Diehl et al., 2014). In general, awareness of aging represents the different conceptualizations of aging-related self-knowledge that are incorporated into our self-concept and identity across time (e.g., subjective age, age identity, self-perceptions of aging, attitude toward own aging, and awareness of age-related change). Amongst the various conceptualizations and operationalizations of awareness of aging, the self-perception of aging has become one of the most popular due to the multidimensionality of the construct that lends itself to researching different domains (e.g., psychological and physiological) and valences (e.g., positive and negative) of aging-related self-knowledge, which reflect the various aging stereotypes (i.e., beliefs about older people in general) found across cultures (Diehl et al., 2014). Additionally, the self-knowledge, the actual aging experiences, and the psychological processes

that are encompassed by self-perceptions of aging help connect subjective age ratings to health outcomes (Diehl et al., 2014). Due to the perceived benefits of self-perceptions of aging over earlier representations of awareness of aging, the number of publications using self-perceptions of aging as a keyword has steadily risen over the past two decades from 192 publications in the year 2000 to 1,610 publications in 2019 (see Figure 1). Moreover, the *Journal of Gerontology, Psychological Sciences* acknowledged the value of self-perceptions of aging research through their 2019 "Views on Aging and Health" special issue.

Figure 1

Rise in Publications That Use the Keyword "Self-Perceptions of Aging"



Note. Number of publications with "self-perceptions of aging" as a keyword by year.

Self-perceptions of aging are particularly strong predictors of health and well-being in later life, with those having more positive views on aging exhibiting better health than those with more negative views on aging. The research in this field is exemplified by the seminal studies conducted by Levy and her colleagues, which dichotomize individuals into either positive views

on aging or negative views on aging groups based on a mean split on the Attitudes Towards Aging subscale and follows the health trajectories of these groups across decades. Using U.S. longitudinal data on aging and retirement, the researchers found that individuals with positive views on aging at baseline had better functional health (after 18 years; Levy, Slade, et al., 2002) and lived on average 7.5 years longer (after 23 years; Levy, Slade, Kunkel, et al., 2002) compared to those with negative views on aging, even after controlling for baseline functioning health and other demographic variables. Not surprisingly, a surge in self-perceptions of aging research occurred after the publication of Levy's functional health and mortality findings (see Figure 1).

The impact of self-perceptions of aging on health has been extensively researched in Germany, as well as other countries including Australia (e.g., physical functioning; Sargent-Cox et al., 2012), China (e.g., medication adherence; Hou et al., 2016), France (e.g., quality of life; Ingrand et al., 2018), Ireland (e.g., walking speed; Robertson et al., 2015), Israel (e.g., physical functioning; Tovel et al., 2019), Korea (e.g., chronic health problems; Jang et al., 2004), and Switzerland (e.g., vulnerability to adverse health outcomes; Moser et al., 2011). Not only does research substantiate a direct effect of self-perceptions of aging on health across cultures, but evidence supports an indirect effect, such that self-perceptions of aging affect preventative health practices (Levy & Myers, 2004), eating behaviors (Klusmann et al., 2019), physical activity (Wurm et al., 2010), and even financial planning for retirement (Heraty & McCarthy, 2015).

More recent research has provided evidence that self-perceptions of aging are modifiable, meaning interventions can enhance self-perceptions of aging to support healthy development. For example, Wolff and colleagues (2014) demonstrated the effectiveness of a self-perception of aging intervention using a randomized controlled trial with individuals over the age of 65. Three

groups were created and compared over the course of 8.5 months: The views-on-aging group was provided information on the importance of physical activity as well as lessons and activities aimed at enhancing positive self-perceptions of aging; the physical activity group only received the information pertaining to the importance of physical activity; and the active control group were provided information on the benefits of volunteering instead of physical activity. Not only did the views-on-aging group significantly increase their level of physical activity, but these changes were linked to their more positive attitudes toward aging (Wolff et al., 2014). The reverse effect has also been found using the same rigorous methodology over a six-month period—increased physical activity amongst women over the age of 70 was linked to decreases in aging dissatisfaction (Klusmann et al., 2012). Additionally, one intervention study found that exposing older adults to implicit and explicit positive age primes once a week for four weeks increased positive views on aging, decreased negative views on aging, and led to better physical functioning when assessed three weeks after the final intervention session (Levy et al., 2014). Lastly, randomized controlled trials have evidenced the effectiveness of savoring positive aspects of aging (Smith & Bryant, 2019) and mindfulness meditation (Turner, 2014) for enhancing self-perceptions of aging. Both savoring and mindfulness were believed to enhance self-perceptions of aging through aiding emotion regulation in relation to the aging process.

Although longitudinal research across different nations has provided a strong empirical foundation to substantiate both the direct and indirect effects of self-perceptions of aging on health, the development of self-perceptions of aging has largely gone unexamined. Stereotype embodiment theory provides a theoretical framework for how self-perceptions of aging are developed and how they affect older adults (Levy 2003a, 2009), but only the pathways by which they impact health and well-being have received substantial empirical testing. How aging

stereotypes are internalized across the lifespan has been mostly restricted to a conceptual understanding. Based on the theoretical framework set forth by stereotype embodiment theory, it is unclear how individuals within the same culture can develop drastically different positive and negative views on aging (Steverink et al., 2003). Currently, the theory lacks the integration of agentic behaviors and naturally occurring ego defense mechanisms that allow individuals to maintain a positive self-perception in the face of negative stimuli. Moreover, the factors that contribute to the rise and fall of our different views on aging throughout early, middle, and late adulthood have not been analyzed. Understanding the various developmental processes that impact the internalization of self-perceptions of aging throughout the lifespan can allow for more targeted interventions to better enhance positive views on aging and decrease negative views on aging.

Stereotype Embodiment Theory: Empirically Supported Components

Combining decades of research on self-perceptions of aging, as well as implicit and explicit ageism, stereotype embodiment theory provides a psychosocial approach to understanding the ways in which self-perceptions of aging affect the health of older adults. The theory relies heavily on the idea that aging is a social construct influenced by cultural aging stereotypes and perpetuated by inter-generational group processes. In general, stereotype embodiment theory proposes that stereotypes are internalized when cultural aging stereotypes lead to self-stereotypes that, in turn, influence one's health and well-being. The theory (Levy, 2009) has four core components: stereotypes (1) become internalized across the life span, (2) can operate unconsciously, (3) gain salience from self-relevance, and (4) utilize multiple pathways to affect health. Of the four components, two through four have the most empirical support.

The unconscious operation of stereotypes is evidenced by a number of experimental studies that use a priming paradigm (Costin, 1988, as cited by Levy, 1996). During these studies, participants are primed with either positive or negative age-stereotype words (e.g., positive=*learned*; negative=*confused*; Levy, 1996) flashed on the screen for typically 55 ms, allowing the brain time to encode the word, but not enough time for the participant to perceive it consciously. Results from these studies consistently show that priming can directly affect behavior and produce a physiological response. Using pre-/post- differences, positive primes are associated with better handwriting, a fine motor skill that is known to deteriorate with age (Levy, 1996); faster walking speeds, a sign of functional health in later life (Hausdorff et al., 1999); and better memory recall (Hess et al., 2004). Additionally, positive primes were associated with a higher probability of accepting a lifesaving medical intervention in a hypothetical situation where treatment for a potentially fatal illness came at the cost of losing one's savings and needing extensive care from family (Levy et al., 2000). Generally, the opposite effect was found for those primed with a negative age stereotype across the four studies.

Directly related to the unconscious operation of stereotypes is the hypothesis that stereotypes gain salience with self-relevance (Rothermund, 2005). For example, it is presumed that the more strongly an individual identifies as an older adult the more their health and well-being will be affected by the negative stereotypes they hold. This presumption is based on the fact that the aforementioned effects of age-stereotype priming were found only for older adults. Younger participants in the same experimental protocol either showed no effect or a much weaker effect than older adults (Hausdroff et al., 1999; Levy, 1996, 2000; Levy et al., 2000). Social identity theories conceptually support explanations for why the effect only works for older adults. Through societal cues like senior discounts and age-based social security, adults are

reminded of social prescriptions of what it means to be old, and they are eventually pushed to accept the "old" identity. Although feeling old is subjective, social pressures over time force the identity on aged adults. Thus, it is believed that age-based effects of experimental studies are, in part, attributable to stereotypes activating adults' old age identity. Support for this identity hypothesis comes from longitudinal studies that found adults' stereotypes of a "typical old person" eventually become a part of their self-view (Rothermund & Brandstädter, 2003; Rothermund, 2005; Kornadt et al., 2015). However, there is not a direct link between age-group identification and the effect of implicit age-related primes.

Stereotype threat studies provide further evidence for stereotypes gaining self-relevance with age. Stereotype threat occurs when known negative stereotypes about one's social group regarding performance on a particular activity are made salient and this leads to a decrement in performance on said task (Steele & Aronson, 1995). Decades of social psychological research demonstrate that stereotype threat only affects those who identify with the social category that is relevant to the performance task being investigated (for a review on stereotype threat see Pennington et al., 2016). The more one identifies with being old, the larger the impact stereotypes have on one's well-being and functioning (Popham & Hess, 2015). When older adults believe they are being measured on a performance task that is stereotypically difficult for older adults (e.g., memory recall) or being compared to younger adults on a task, those who identify more strongly as "old" do much worse on the task (Popham & Hess, 2015). This finding further supports the notion that stereotypes gain salience with self-relevance but does not directly link identification with self-perceptions of aging as age-group identification was not directly assessed in the aforementioned priming studies—chronological age was used as a proxy instead.

Extensive research has supported the fourth component of stereotype embodiment theory, which states that stereotypes utilize multiple pathways to affect the health and well-being of older adults. The theory posits the existence of three pathways: psychological, behavioral, and physiological (Levy, 2009). The psychological pathway describes the process whereby age stereotypes produce expectations that act as self-fulfilling prophecies. Evidence for this pathway comes from studies using the previously discussed priming methodology, with an added focus on matching the stereotype with domain-related outcomes. In these experiments, older individuals are randomly assigned to be primed with either a positive-cognitive (e.g., wise), negative-cognitive (e.g., senile), positive-physical (e.g., spry), or negative-physical (e.g., frail) age-related stereotype, followed by a cognitive and a physical task (Levy & Leifheit-Limson, 2009). A "stereotype-matching effect" has been found, such that the greatest effects occur when the content of the stereotype prime matched the subsequent task being performed (e.g., positive-cognitive prime paired with cognitive task). In other words, the expectations created by the primes had the largest effect when the task was relevant to the expectations. This study provides convincing evidence for the link between stereotype priming and subsequent task performance, but the relationship between explicit age expectations, self-perceptions of aging, and health is mostly unexplored.

In contrast, the behavioral pathway connects self-perceptions of aging to healthy practices by assuming those with negative views on aging are more likely to believe that engaging in healthy behaviors is futile, as aging is inherently negative. Support for this pathway comes from longitudinal studies finding those with positive views on aging were more likely to practice preventative health behaviors (e.g., routine physical examinations; Levy & Myers, 2004), have better eating habits (Klusmann et al., 2019), and engage in adaptive behaviors after a

serious health event (Wurm et al., 2013). In general, those with positive views on aging are found to have higher self-efficacy than those with negative views on aging (Klusmann et al., 2019), which is believed to be responsible for the increased use of healthy practices.

Lastly, the physiological pathway connects the autonomic nervous system to age-related stereotypes. This pathway is evidenced by heightened cardiovascular responses that occur during a difficult task following a negative age-stereotype prime (Levy et al., 2000). This study is used to explain the significant increase in the risk of a cardiovascular event for older adults with negative views on aging compared to those with positive views on aging (Levy, 2009). Those with negative views on aging are also found to recover more slowly after an acute cardiovascular event (Levy et al., 2006). Research on the three pathways is growing at a rapid pace, with the majority of recent self-perceptions of aging studies directly testing each pathway.

Three of the four components of stereotype embodiment theory have received empirical support over the past few decades, including stereotypes: operate unconsciously, gain salience from self-relevance, and utilize multiple pathways to affect health. However, the first component of stereotype embodiment theory, which is concerned with the internalization of aging stereotypes and the development of self-perceptions of aging, is mostly supported by conceptual reasoning and does not have the same empirical backing as the other postulates within stereotype embodiment theory.

Stereotype Embodiment Theory: The Development of Self-Perceptions of Aging

The conceptual framework for the internalization and development of self-perceptions of aging falls within the first component of stereotype embodiment theory: Stereotypes become internalized across the lifespan. To date, there is not a general theory describing how stereotypes are internalized. Instead, stereotype embodiment theory relies on several findings regarding the

formation of stereotypes in youth and theories on intergenerational processes to uphold the internalization hypothesis. Stereotyping based on age, like gender and race, is considered a primitive categorization (Nelson, 2009), meaning the ability to categorize individuals into different age groups is a basic function of human cognition. Research with youth has supported this idea, finding that children in second grade can differentiate between attributes of older and younger adults (for review, see Gilbert & Rickets, 2008). Unfortunately, young children across Western and Eastern cultures typically develop ageist attitudes (Seefeldt, 1984) and a generally negative view of older adults (Chasteen et al., 2002; Davidson et al., 2008; Lichenstein et al., 2003). Children's views on aging are believed to be shaped by elderly characters in children's media being portrayed negatively (Fillmer, 1984), their parents' views on aging, and an adoption of the general negative cultural attitudes toward aging (Gilbert & Rickets, 2008).

Stereotype embodiment theory suggests that negative aging stereotypes are not discredited in early adulthood because they provide short-term benefits, such as receiving priority for limited resources like government funded programs (e.g., municipal programs; Levy, 2009). The pervasiveness of ageism amongst young adults is attributed to processes posited by two social psychological paradigms: Terror management theory (Greenberg et al., 1986; Solomon et al., 1991) and the succession, identity, and consumption model (North & Fiske, 2012, 2013a, 2013b). Both terror management theory and the succession, identity, and consumption model provide conceptual support for inter-generational tension, but neither has been rigorously tested. Terror management theory proposes that ageism is linked to an innate fear and anxiety towards our own mortality. Maintaining one's self-esteem is believed to be a buffer against these negative emotions as it helps one deny their mortality. To maintain self-esteem, young adults are believed to distance themselves from older adults, since older adults are

a symbolic representation of mortality. Psychological distancing also occurs through victim-blaming, where young adults blame older adults for their physical state in order to deny the inevitability of their own aging (Nelson, 2005).

The succession, identity, and consumption model focuses on the prescriptive aging stereotypes that pervade cultures and create tensions between younger and older adults. This model describes three prescriptive age stereotypes that underlie ageism: (1) "*Succession* of enviable resources," (2) "avoiding symbolic *Identity* invasions," and (3) "limiting *Consumption* of shared resources" (North & Fiske, 2013a, p. 720). Essentially, young adults do not like older adults who do not pass on resources to which they feel entitled (e.g., staying in a job past retirement age). Nor do young adults condone older adults taking part in culture that is characteristic of youthhood (e.g., attending night clubs). Lastly, tensions can rise when young adults feel older adults are using finite resources (e.g., depleting social security funds). North and Fiske (2013a) found some support for each aspect of the succession, identity, and consumption model, as young adults, compared to middle-aged and older adults, most resented older adults for violating prescriptive stereotypes regarding succession, identity, and consumption in hypothetical situations.

Terror management theory and the succession, identity, and consumption model provide a basis for understanding cultural processes that promote ageism amongst young adults and the benefits that are associated with holding negative age stereotypes. However, little empirical research has been done to test the claims of terror management theory. Some experimental research on the succession, identity, and consumption model has found that young adults are most critical of older adults who break prescriptive age stereotypes compared to individuals in their own age group or middle-aged adults (North & Fiske, 2013). In fact, young adults were

found to be most polarized when it comes to older adults; rewarding and punishing the elderly the most in hypothetical situations when they adhered to or broke prescriptive stereotypes (e.g., saving medical resources for youth vs. accepting resource-intensive treatment), respectively.

Although more research is needed on the reasons for ageism, it is clear that negative attitudes towards older adults predominate over positive attitudes (e.g., Gordon & Arvey, 2004; Hummert, 1999; Kite et al., 2005). Ageism researchers in the U.S. have found that roughly 60% of older adult stereotypes, based on stereotypical traits, are negative (Hummert et al., 1994; Schmidt & Boland, 1986). Additionally, there are more negative stereotype categories to describe older adults than positive. While the number of positive and negative aging stereotypes differs across cultures, the disproportion of negative to positive stereotypes appears to be consistent between Western and Eastern cultures (U.S. compared to East Asia; Boduroglu et al., 2006). However, aging stereotypes do differ by domain between collectivist and individualist cultures, with collectivist cultures being more concerned with declines in emotion regulation (e.g., becoming more irritable) that may disturb one of these culture's most important values, social harmony (Nelson, 2009). In contrast, aging stereotypes in individualistic cultures are primarily centered around physical and mental declines that may impede one's ability to be independent (Nelson, 2009).

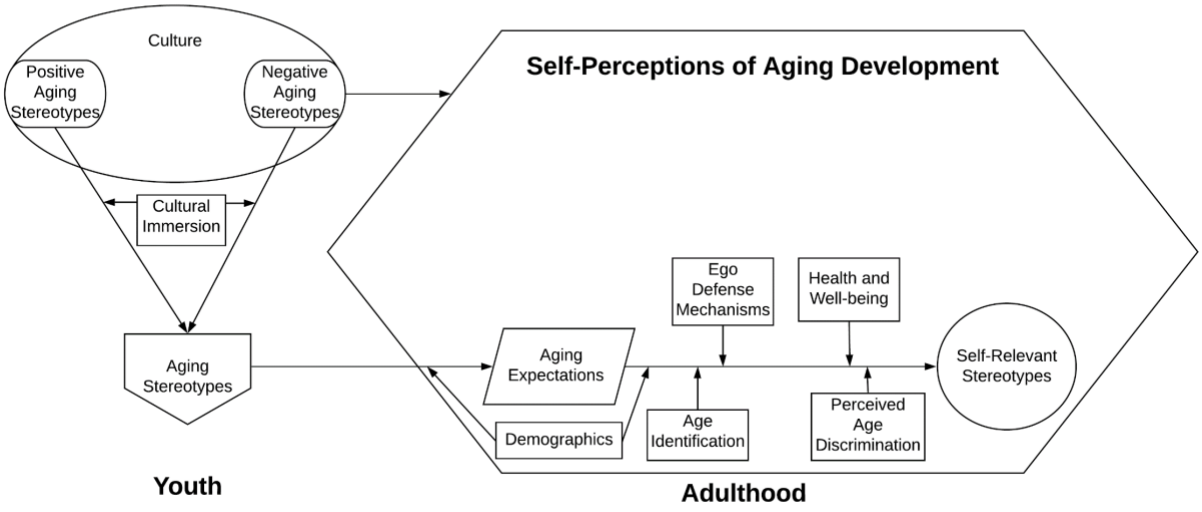
Fiske and colleagues' (2002) found that social groups are judged based on their perceived warmth and competence, which related to the groups' competitiveness for scarce resources and their social status, respectively. When assessing the content of explicit old age stereotypes through this model, older adults are most often placed in the high warmth and low competence category, along with blind and mentally challenged individuals. Individuals high in warmth and low in competence are seen as non-competitive and low status. Social groups in this category are

held often to be recipients of aid in return for lower societal status—a phenomenon known as benevolent prejudice (North & Fiske, 2012). Aging stereotypes can also be unconsciously held in the form of attitudes, known as implicit stereotypes. Implicit stereotypes can differ from explicit stereotypes, often with implicit attitudes towards older adults being worse than explicit stereotypes, since explicit stereotypes are subject to social judgment (Levy & Banaji, 2002).

Since negative aging stereotypes are not rejected in youth, they are hypothesized to become internalized across the lifespan and eventually become self-stereotypes (see Figure 2). The internalization of positive and negative aging stereotypes can be found in the explicit and implicit age-related beliefs held by older adults. For instance, explicit aging stereotypes become more complex with age, as older adults identify more stereotype groupings within the superordinate "old" category than younger adults (Hummert et al., 1994). Regarding implicit attitudes, older adults are one of the few social groups amongst those that have been studied that show out-group favoritism. In other words, older adults have more positive attitudes towards younger age groups than toward their own age group (Hummert et al., 2002; Levy, 2003). According to stereotype embodiment theory, internalized positive and negative aging self-stereotypes lead to the development of positive views on aging and negative views on aging, respectively. Acknowledging the substantial variability in positive and negative stereotypes held by older adults, stereotype embodiment theory contends such differences are due to the extent individuals are immersed in culture throughout the lifespan. Evidence for this claim comes from one study, which found a positive association between the amount of television viewed and negative aging stereotypes held (Donlon et al., 2005).

Figure 2

Illustration of the Development of Self-Perceptions of Aging Across the Lifespan



Note. This illustration combines aspects of stereotype embodiment theory (Levy, 2009) with the addition of factors suggested by the author of the current paper. Constructs in squares depict key moderators of development. The illustrated process continues throughout adulthood as many of these factors continue to change throughout development.

Issues with Passive Internalization

Although stereotype embodiment theory provides an important guiding framework for the internalization and development of self-perceptions of aging, it is difficult to understand how an individual can develop positive views on aging as the theory is currently stated. With most individuals around the world growing up in an ageist culture (e.g., more negative aging stereotypes than positive; Boduroglu et al., 2006) and opting at a subconscious level to garner the short-term benefits of such prejudices, the ways in which individuals internalize more positive stereotypes, or even a proportionate number of positive and negative aging stereotypes, is largely unknown. When looking at the distributions of positive and negative views on aging in self-perceptions of aging studies, it is evident that some additional processes may be at play in the

internalization process, as individuals are just as likely to have positive views on aging as negative ones (Levy & Myers, 2004, 2005).

While there are many different ways to operationalize self-perceptions of aging, two methods have emerged as being the most common. The first, adopted by Levy and colleagues (Levy, Slade, et al., 2002; Levy, Slade, Kunkel, et al., 2002), uses the attitudes towards own aging subscale from the Philadelphia Geriatric Center Morale Scale to measure self-perceptions of aging globally (i.e., both without domain specificity and also combining positive views on aging and negative views on aging into a single score). This subscale is used to assign individuals to either a positive or negative view on aging group based on whether they have above or below average self-perceptions of aging ratings, respectively. Due to differences in the scoring of the attitudes towards own aging subscale over the years, the possible high and low values for the scale have changed (scale ranged from 0-5, Levy & Myers, 2004; Levy, Slade, Kunkel, et al., 2002; scale ranged from 5-19, Levy, Slade, et al., 2002). Regardless of the scaling of the items, the mean tends to be slightly higher than the mid-point of the scale, indicating that the positive groups do indeed have predominantly positive views on aging. In contrast, researchers in Germany most often use the age-related cognition scales of ongoing development and physical loss to represent domain-specific aging beliefs that are positive and negative, respectively. This method produces independent scores for positive views on aging and negative views on aging. Regardless of the method being used, older adults from within the same macro culture (nationality, individualistic/collectivist, etc.) have a range of positive and negative aging beliefs. For instance, in a series of studies by Levy and Myers (2004, 2005) using the Ohio Longitudinal Study of Aging and Retirement, 54% (2004), and 40% (2005) of participants were placed in the positive views on aging group. Although these individuals came from the same

nation and even the same state, they internalized a significantly different number of positive and negative aging stereotypes. Similarly, using two waves of the German Aging Survey, Wurm and colleagues (2007) observed similar scores for positive views on aging and negative views on aging at their baseline (n= 4,034; positive views on aging: 2.79; negative views on aging: 2.90 out of a total possible score of 4) and longitudinal samples (n=1,286; positive views on aging: 2.96; negative views on aging: 2.81). Moreover, positive views on aging was found to increase over the 6-year period, while negative views on aging decreased. To note, the self-perceptions of aging becoming more positive over time is largely due to attrition and healthier adults continuing in the study. In general, the ratio of positive and negative age stereotypes held by older adults has a considerable amount of inter- and intra- individual variability (Levy & Langer, 1994; Levy et al., 2006).

The observed proportion of positive and negative aging beliefs held by older individuals in the discussed studies is at odds with stereotype embodiment theory's internalization claim. With individuals from similar cultures exhibiting vastly different ratios of positive views on aging and negative views on aging, the internalization process cannot be solely due to the pervasiveness of positive and negative aging stereotypes that exist in a culture (see Figure 2). Levy (2009) contends that variability in self-perceptions of aging comes from the extent to which one is immersed in their culture (e.g., the amount of television viewing). Although cultural immersion is found to influence self-perceptions of aging (Donlon et al., 2005), this is still an overly passive view on internalization that does not align with other empirical findings on identity development. Social psychological research has shown that the self protects an individual from having a poor self-conception (i.e., how one thinks about oneself) and experiencing declines in one's self-evaluations (Greenwald, 1980). The various cognitive biases

used to protect one's self-conception should play an active role in preventing negative aging stereotypes being applied to the self.

Social psychology has a long history of understanding the development of the self in relation to societal beliefs. Dating back to the early 1900s, the looking glass self theory (Cooley, 1902; Mead, 1934) states that the self can only exist in a social environment, as the self is created through reflections from other individuals and symbols within one's environment. Naturally, the foundations of self-perceptions of aging are rooted within the self, reflecting aspects of one's self-concept. For an individual to be able to make a positive or negative claim regarding their aging process, they need a sense of self to evaluate. Although the process of defining oneself through others appears to align with Levy's (2009) description of a passive internalization process, social psychological research maintains several core mechanisms within the self that protect it from internalizing negative information. These "defense mechanisms" describe the internal processes used to protect our self-concept from stimuli that may undermine a preferred way to view the self. Defense mechanisms are essential as they help us maintain the primary goal of the self: to feel good about oneself, evaluate oneself positively, and feel that one is a person of worth (James, 1890/1950). These empirically supported defense mechanisms should not be confused with the less rigorous conceptualizations offered by Freud (Baumeister et al., 1998). There is substantial empirical support for the various ways in which individuals bias the processing of information to keep a positive image of themselves and their in-groups (e.g., Kunda, 1987, 1990; Schaller, 1992; Taylor & Brown, 1988).

Greenwald (1980) suggests that the self acts as a governing body that biases the internalization of information that surrounds us, with the primary goal of protecting our self-concept. Bias mostly occurs through three mechanisms known as egocentricity, beneffectance,

and conservatism. Each of these mechanisms was derived from social psychological research on cognitive biases (e.g., efficiency of processing self-relevant information, Markus, 1977; increased memory performance when information pertains to the self, Rogers et al., 1977; confirmation bias, Snyder & Swann, 1978). Egocentricity is a cognitive bias that makes people believe they are more central to events than they are in actuality (Greenwald, 1980). In terms of self-perceptions of aging, egocentricity may help individuals maintain the idea that their health and well-being throughout the aging process is a reflection of their own actions, not a futile attempt as suggested by negative cultural aging stereotypes. Similarly, beneffectance is the idea that individuals believe they are more responsible for positive outcomes, and less so for negative outcomes that are attached to their participation in some domain. This may be particularly important for maintaining positive views on aging through the aging process as individuals may be more likely to feel that they are responsible for the aspects of life that get better with age. Finally, conservatism describes how the self is protected from cognitive change by maintaining existing knowledge structures, schemas, and memories (Greenwald, 1980). Essentially, conservatism defends the self from sudden negative changes in self-conceptions by maintaining long-term positive self-definitions in the face of counter-information. Conservatism may protect individuals from experiencing a large negative shift in their self-conception when they begin to identify with the older adult social group. All of these mechanisms are used to uphold the self-esteem assumptions, which include preferring to feel good about oneself and defining oneself in ways that maintain positive self-feelings (Oyserman, 2001; Steele, 1988). Each defense mechanism biases the information we process (Markus & Wurf, 1987; Wurf & Markus, 1991) and the appraisals we make (i.e., downward social comparison; Beauregard & Dunning, 1998; Taylor & Brown, 1989) to help us maintain our self-esteem. Thus, it is unlikely for an individual

to have a drastic shift from a positive to a negative sense of self due to transitioning from identifying as a young person to identifying as an older person.

Not only does the developmental component of stereotype embodiment theory neglect the role of the self, but it also fails to incorporate the active role individuals play in their own development. Other researchers have directly commented on the issues with Levy's (2009) proposition that self-perceptions of aging comes from the internalization of cultural aging stereotypes that become self-relevant once one inevitably joins the social category of "old." Notably, Zebrowitz (2003) responded to the initial conceptualization of this component (Levy, 2003a) and presented three core issues: the role of agency in identification, the use of preventative behaviors to avoid negative aging expectations, and the use of life experiences to counter our aging expectations.

First, identification with the social category of "elderly" is a choice as one can maintain a youthful identity throughout one's life; not everyone is susceptible to aging stereotypes becoming self-relevant (Hummert, 2003; Zebrowitz, 2003). Although the pressure to adopt the "older" adult identity increases with age and societal cues, research shows that identity is fluid and can be altered to protect individuals from ageism in their environment (Weiss & Lang, 2012). There are also different forms of identification that may differentially impact the extent to which age stereotypes become self-relevant and internalized. Specifically, the amount an individual thinks about their group membership (cognitive centrality), one's feelings towards their group membership (in-group affect), and perceptions of similarity and belongness to the group (in-group ties) can greatly impact the consequences associated with one's social identity (Cameron, 2004). Studies have shown that many older adults do not acknowledge their ties to the older adult category, as older adults typically feel younger than their chronological age and

perceive themselves as younger both explicitly (Heckhausen, 1997; Montepare & Lachman, 1989) and implicitly (Levy & Banaji, 2002). Research has not directly explored the role of social group identification in the internalization of stereotypes. Instead, age is primarily used as a proxy for one's social group (i.e., those above 60 years of age are assumed to identify as an older adult), which the aforementioned research would suggest is, at best, a loose indicator of one's social identity. Research exploring the mediating impact of old age identification on the internalization of aging stereotypes is needed to begin to substantiate the role of identity in the internalization process. Additionally, longitudinal research assessing changes in one's social identity and, subsequent changes in one's self-perceptions of aging would allow for ecologically valid claims regarding the impact of identification on the internalization of aging stereotypes.

Second, individuals can take compensatory actions to avoid falling victim to self-fulfilling prophecies (Zebrowitz, 2003). For instance, when thinking about the future, we develop a model of our possible future selves (Cross & Markus, 1991), and can avoid feared future selves through intentional choices (Brandtstädter, 1998; Markus & Herzog, 1991). In this sense, utilizing possible future selves is a selection mechanism (Baltes, 1987; Freund & Baltes, 2000) that allows individuals to adapt and respond to life circumstances, in an attempt to maintain well-being throughout the lifespan (Hooker, 1992; Markus & Herzog, 1991; Ryff, 1991). In a study of age differences in feared future selves, roughly a third of older adults feared losing their memory or general cognitive decline (Dark-Freudeman et al., 2006). The third of older adults who reported fearing memory failure in the future also stated that they engage in physical and mental exercise to avoid the materialization of their fear. Moreover, mentoring literature provides reason to believe that seeing unhealthy older adults may prompt action instead of apathy. Adults often benefit from negative mentors, as this type of mentor serves as a basis for what one does not

want to become (Gibson, 2003). In fact, due to a balance of prevention and promotion motivations, older adults compared to younger adults prefer negative role models when it comes to models of health (Lockwood et al., 2005). More research is needed to see whether the increased use of preventative health behaviors by those with positive views on aging is related to their knowledge of aging stereotypes. Stereotype embodiment theory states that those with negative views on aging are less likely to engage in preventative health practices because they believe it is futile. Although research substantiates the increased use of preventative health behaviors amongst those with positive views on aging (e.g., Heraty & McCarthy, 2015; Klusmann et al., 2017; Levy & Myers, 2004; Wurm et al., 2010), whether such differences are due to knowledge of aging stereotypes has not been tested. To fully understand the compensatory action process, research should investigate whether preventative health behaviors that come from known aging stereotypes are enacted because one's fear of aging, and results in fewer negative aging stereotypes being internalized.

Lastly, Zebrowitz (2003) contends that adults can use individuating information about the self to curb the passive internalization of cultural aging stereotypes. Unlike gender and racial stereotypes, individuals can readily utilize a lifetime's worth of experiences to combat aging stereotypes (Zebrowitz, 2003). Older adults are found to have more complex views of old age compared to middle-aged and young adults (Heckhausen et al., 1989; Hummert et al., 1994). This finding indicates that older adults do not passively internalize the various stereotypes in their environment, but rather use their experiences to interact with previously held stereotypes and create a more complex understanding of what it means to be "old." Additionally, resilience theory upholds the idea that older adults are prone to making downward social comparisons when subjected to negative aging stereotypes, such that they compare themselves to older adults

with lower status to maintain their self-esteem (Heidrich & Ryff, 1993). When confronted with negative stereotypes centered around competence in an experimental study, older adults actually had better self-perceptions of their competence after the trial compared to the control group that received neutral stereotypes (Pinquart, 2002). This finding only held for those who did not attribute the negative stereotype to their own competence, suggesting that individuals' prior experiences interact with negative stereotypes in their environment and can have positive outcomes. Future research can test the impact of lived experiences by assessing whether perceived age-related gains reduce the extent to which aging stereotypes become self-stereotypes.

Moreover, most people are found to feel younger (i.e., subjective age) throughout the aging process (Kaufman & Elder, 2002), meaning our understanding of what it means to be old updates with personal experiences (e.g., positive and negative changes in health and well-being), and does not simply integrate into our sense of self when we enter certain age groups. In other words, aging stereotypes do not passively become self-relevant once we enter the old age social category, as our lived positive and negative aging experiences interact with our internalized cultural expectations of aging. This interaction leads to the continual development of our self-perceptions of aging. On average, adults over 50 years of age believe that "old age" begins when one is in their mid-70s (Kaufman & Elder, 2002), which is only a decade less than the typical life expectancy found across industrialized nations (2010: 79.01, 2030 projection: 82.78; Thomas, 2017); that is, most older adults do not identify as old until they are about five years away from the typical life expectancy. Older adults also think that their aging experience is more favorable than others', as evidenced by beliefs that they will experience less decline in desirable attributes, and fewer increases in undesirable attributes than their peers (Heckhausen & Brim, 1997;

Heckhausen & Kreuger, 1993). The fact that individuals do not believe all older adults are subjected to the same age-related decline supports the notion that aging stereotypes are not passively internalized without some negotiation with personal experiences. Although there is substantial evidence supporting the interaction between aging stereotypes and our own experience, the developmental factors that alter one's views of aging across adulthood have mainly been studied with adults over the age of 70. There is need for investigation of how positive views on aging prevails in the face of cultural ageism across the entirety of adulthood.

In response to the critiques made by Hummert (2003) and Zebrowitz (2003), Levy (2003b) provided three clarifications to her conceptualization of the internalization process. Aspects of these three additional postulates can be found in Levy's (2009) overview of stereotype embodiment theory, while other components were seemingly dropped from the theory. First, it is argued that stereotypes are acquired in an incremental fashion throughout the lifespan. This is evidenced by experimental studies that show repeated exposure to primes increases the strength of unconscious stereotypes (Dijksterhuis & van Knippenberg, 1998; Levy et al., 2000; Murphy et al.,1995). Although laboratory studies show that priming age-stereotyped words can activate unconscious aging stereotypes and produce temporary physiological and behavioral changes, these studies lack the necessary ecological validity to show that such effects occur in daily experiences. Additionally, the research paradigm across these studies relies on posttests within the same experimental session and does not establish lasting effects.

The second clarification Levy offers to explain the variability of self-perceptions of aging across studies is the notion that a variety of positive and negative aging stereotypes exist in a culture. This statement is connected to the idea that the positive and negative aging stereotypes in one's culture become internalized, leading to self-stereotypes of aging (i.e., the extent to which

old-age stereotypes are perceived as accurately describing one's self-image), and in turn, positive views on aging and negative views on aging (i.e., the extent to which one's aging experience is perceived as positive and negative). Undoubtedly, this position furthers the notion that the internalization process is passive. Taking issue with previous studies that use priming activation as a method of measuring stereotype self-relevance, one study tested the pathway of aging stereotypes leading to self-stereotypes, which subsequently become self-perceptions of aging (Fernández-Ballesteros et al., 2017). The results showed that this internalization pathway only held for positive views on aging, not negative views on aging. Additionally, the moderate association between self-stereotypes of aging and self-perceptions of aging indicates that other factors play a role in the internalization process.

Lastly, Levy (2003b) states that "individual, group, and institutional circumstances determine the degree to which stereotypes travel from out there to in there" (p. 216). However, the circumstances that promote positive views on aging and diminish negative views on aging were not reviewed by Levy. It is imperative for future research to address this issue and elucidate the possible mechanisms that reduce the internalization of negative aging stereotypes and promote the development of positive aging stereotypes throughout adulthood.

The Development of Self-Perceptions of Aging Across Adulthood

As suggested by Levy (2003b), individual factors play a role in whether known aging stereotypes become internalized. Factors beyond cultural immersion that shape individual-level development are likely to explain some of the differences in positive and negative self-perceptions of aging (see Figure 2). For example, factors that contribute to health and well-being trajectories may influence changes in self-perceptions of aging across adulthood, with such trajectories providing an individual with feedback to assess their own aging process in relation to

expectations. Although aging expectations are derived from cultural stereotypes (Levy, 2009), individuals can use their own experiences to negotiate an updated view that aligns with their actual experience (externalization hypothesis; Bennett & Gains, 2010). This interaction is exemplified by 70% of a sample of adults 50 years of age and older agreeing with the statement "As I grow older, things seem better than I thought they would be" (Rothermund & Brandtstädter, 2003). In fact, one of the fundamental principles of social psychology proffers that the interaction between the self and society is dynamic and continuously negotiated (Turner, 1976). These developmental factors are likely to influence the endorsement of positive and negative stereotypes that individuals are subjected to in their culture. Unlike other forms of stereotypes and prejudice, generalizations about aging are not easy to maintain through avoidance, as it is the only social category we will all potentially join one day. Although developmental factors can help prevent the passive internalization of aging stereotypes, self-perceptions of aging and these life factors are bidirectional and can never be completely teased apart (Han & Richardson, 2014; Wurm et al., 2007). In other words, I recognize that developmental factors can strongly influence the development of an individual's self-perceptions of aging, but also acknowledge that self-perceptions of aging have an effect on these developmental factors.

Developmental Changes in Self-Perceptions of Aging in Older Adulthood

Although only representing a small body of research, longitudinal findings indicate that self-perceptions of aging do in fact change across later stages of adulthood, based on personal characteristics, health factors, and social resources. This evidence supports the notion that the internalization of aging stereotypes is affected by individual-specific aging experiences. Across studies, changes in self-perceptions of aging are found to be almost equally attributable to

between- and within- person differences across time, representing personal characteristics (e.g., age, ethnicity, gender, marital status), health-related changes (e.g., physical health and cognitive health), and social resources (e.g., social support and aging role models). It appears that personal characteristics provide the context that shapes aging experiences, whereas the quality one's health, well-being, and social resources is the yardstick used to assess the quality of one's aging experience.

Using four waves of the Berlin Aging Study, initial research on changes in self-perceptions of aging found that, on average, individuals between the ages of 70 and 104 less positive self-perceptions of aging across time—experiencing an average decrease of .68 standard deviations over a six-year period (Kleinspehn-Ammerlahn et al., 2008). Although self-perceptions of aging were, on average, found to worsen across time, there was significant within-person variation where some individuals experience better self-perceptions of aging over time. Gender, physical health, loneliness, and cognitive functioning were found to predict changes in self-perceptions of aging. Specifically, being a man in good physical and cognitive health with low perceptions of loneliness was associated with more positive self-perceptions of aging across time. Multilevel analysis showed that 43% of the variance in self-perceptions of aging across time was within person while 57% was between persons (Kleinspehn-Ammerlahn et al., 2008).

Another study using 16 years of data from the Berlin Aging Study was able to expand upon these findings. Using individuals in the same age range as the previous study (*M*=85 years old; *SD*=8.66), it was found that self-perceptions of aging became less positive in relation to chronological age and distance to death (Kotter-Grühn et al., 2009). Not only were initial self-perceptions of aging related to mortality risk and relative risk (i.e., differences in mortality risk between those with varying levels of self-perceptions of aging) across four years, but changes in

self-perceptions of aging affected these outcomes as well. Positive changes in self-perceptions of aging led to reduced risk of death, even when controlling for initial self-perceptions of aging levels. Again, for most older individuals, self-perceptions of aging were less positive over time. However, this study showed that worsening of self-perceptions of aging across 16 years was twice as steep when time was measured as distance to death instead of chronological age (Kotter-Grühn et al., 2009). This finding lends support to the idea that worse self-perceptions of aging are not inherently due to aging, but more so to physical decline associated with mortality. Interestingly, this study noted that there were not significant differences in self-perceptions of aging decline between individuals. Clinical diagnosis of depression, self-reported neuroticism, and optimism at the first measurement occasion were related to worsening self-perceptions of aging by the second measurement occasion. Additionally, being a man with fewer medically diagnosed illnesses was associated with better self-perceptions of aging. Similar to the previous study, multilevel analysis revealed 52% of the total variation in self-perceptions of aging over time was due to between-person differences (Kotter-Grühn et al., 2009).

Results indicating that self-perceptions of aging are more dependent on distance to death than chronological age were supported by a study that used 16 years of data from the Australian Longitudinal Study of Aging. This study focused on elucidating the within- and between- person factors that contribute to the observed changes in self-perceptions of aging. Using a slightly younger sample (*M*=78.14 years old, *SD*= 6.68), this study found that 49% of the total variation in self-perceptions of aging across time, as measured by distance to death, was due to between-person variance (Sargent-Cox et al., 2012). An improvement in physical functioning (e.g., the number of daily activities that can be done independently) was associated with more positive self-perceptions of aging at the within-person level. However, number of medical conditions was

not found to have a significant effect on self-perceptions of aging at the within-person level. Results also showed that decreases in perceived control were significantly related to worse self-perceptions of aging at the within-person level across time. In comparison, increases in self-esteem were associated with positive within-person changes in self-perceptions of aging (Sargent-Cox et al., 2012). In regard to between-person factors, a higher number of medical conditions was associated with poorer self-perceptions of aging, while having a partner and higher self-esteem were significantly related to more positive self-perceptions of aging. Interestingly, no significant association was found for between-person differences in physical functioning and self-perceptions of aging (Sargent-Cox et al., 2012). These findings show the nuances in the aging experiences that contribute to self-perceptions of aging development; number of medical conditions, but not physical functioning, were related to between-person differences in self-perceptions of aging, while the reverse was found for within-person differences. These findings further corroborate the idea that self-perceptions of aging development, even in late life, is subject to a range of developmental factors that affect the aging process.

Additionally, a recent study assessing the development of self-perceptions of aging elucidated the differences between the effects of initial self-perceptions of aging and changes in self-perceptions of aging on mortality. Also using Australian Longitudinal Study of Aging data across 16 years, this study found that both the initial level of self-perceptions of aging and changes over time predicted mortality (Sargent-Cox et al., 2014). However, this study found that initial self-perceptions of aging were a stronger predictor of mortality than changes in self-perceptions of aging, when demographic variables were introduced into the model. These results contradict Kotter-Grühn and colleagues' (2009) findings that the main driver of mortality risk

was the worsening of self-perceptions of aging across time. The authors attribute the differences to the time span of data, suggesting that short-term change in self-perceptions of aging (across four years for the mortality analysis; Kotter-Grühn et al., 2009) may be more representative of a change in mortality risk than long-term change (across 16 years; Sargent-Cox et al., 2014). The authors posit that due to accounting for the within-person variability in self-perceptions of aging trajectories across more than five measurement occasions they were able to capture the ongoing adaptation to the aging-related health changes that occurred in this late-life sample for a period of 16 years. Such adaptions to age-related decline would be more difficult to capture when using only two time points over four years.

While the majority of studies have investigated the development of general self-perceptions of aging amongst the oldest-old, two studies counter this norm. First, Miche and colleagues (2014a) made use of 12 years of data from the Interdisciplinary Longitudinal Study of Adult Development to investigate how neuroticism, extraversion, physical health status, subjective health, depressive symptoms, gender, and education differentially affect the development of self-perceptions of aging for middle-aged and young-old adults. Although both groups experienced less positive self-perceptions of aging across time, the decline was significantly steeper for the young-old group. Only the young-old group revealed significant inter-individual variation in the average slope (Miche et al., 2014a); thus, differences in the influence of predictors on the slope of self-perceptions of aging between age groups were not calculated. In terms of initial self-perceptions of aging, neuroticism was only related to worse self-perceptions of aging for the middle-aged group, while physical health status was only related to poorer self-perceptions of aging for the young-old group. Subjective health, depressive symptoms, and gender were significant or trending towards significance for both groups, with

being male and in better physical and mental health being related to better self-perceptions of aging. Unlike the previously discussed studies, the non-significant inter-individual variation in the slope is unique to this study and suggests that views on aging are stable in middle adulthood. More research with diverse age groups is needed to corroborate this potential "latency period" of development.

Using a sample with a large age range, a more recent investigation also found minimal changes in views on aging over time. Examining 15 years of data from the German Aging Survey, Jung and colleagues (2019) found that the aging-related cognition scales, which represent positive and negative views on aging independently, were invariant across middle-aged and older adults. Although the researchers did not report group differences in self-perception of aging trajectories, they investigated how positive and negative views on aging change over time. In general, negative views on aging were found to increase slightly over time while positive views declined (Jung et al., 2019). Similar to Miche and colleagues (2014a), predictors were only regressed onto the intercepts of each view on aging. Due to the conflicting evidence for changes in views on aging over time across studies, research needs to investigate the extent to which self-perceptions of aging develop and whether changes mostly occur for the oldest-old. Beyond age-group differences, more research is needed to determine whether there are systematic differences in the factors that influence the intercept and development of positive and negative self-perceptions of aging.

Several key findings appear across the studies assessing the development of self-perceptions of aging in older adulthood. First, each study evidences the wide variability in both initial levels and change in self-perceptions of aging. Second, although the general trend is for self-perceptions of aging to worsen across time, not all individuals follow such a trajectory.

Third, both one's initial ratings and subsequent changes in self-perceptions of aging are related to health, well-being, and mortality across time. Lastly, the development of self-perceptions of aging is associated with both within- and between- person variance that is affected by different personal characteristics and health-related factors. Although these findings provide support for a more active internalization of self-perceptions of aging that is characterized by a constant negotiation with the aging process, the vast majority of participants were over 70 years of age, with most in their 80's. Research with more diverse age ranges revealed far less changes in self-perceptions of aging across time and lower inter-individual variability in change. Thus, more research is needed to understand the extent to which self-perceptions of aging changes across the three ages of adulthood and the factors that underlie such development. Moreover, the majority of these studies used a domain-general measure of self-perceptions of aging, meaning factors that change domain-specific positive and negative views on aging remain insufficiently investigated. With research finding that positive views on aging and negative views on aging are independent perceptions of aging (Boeder & Tse, 2020), understanding differences in the development of the two constructs is important for elucidating how self-perceptions of aging develop and creating more targeted interventions.

Factors that Impact Aging and the Development of Self-Perceptions of Aging

Across the longitudinal studies exploring changes in self-perceptions of aging, several factors emerged as important contributors to positive and negative self-perceptions of aging development. Personal characteristics such as personality traits, gender, age, educational attainment, and marital status (Sargent-Cox et al., 2014) explain much of the between-person variance in self-perceptions of aging development. Next, constructs representing physical health and psychological well-being were found to explain both between- and within- person variance

in self-perceptions of aging (Kleinspehn-Ammerlahn et al., 2008; Kotter-Grühn et al., 2009; Sargent-Cox et al., 2012). Lastly, relationships were found to affect self-perceptions of aging development through intergenerational transmission of cognitions (Filmer, 1989) and by providing a sense of social connectedness (Kleinspehn-Ammerlahn et al., 2008; Sargent-Cox et al., 2012). Exploring the reasons why personal characteristics, health-related factors, and social resources impact the initial level of self-perceptions of aging and subsequent changes is essential for furthering stereotype embodiment theory's developmental framework. Understanding the mechanisms responsible for self-perceptions of aging development sheds light on how individuals in ageist cultures can maintain a positive view on aging, and in turn, age positively.

Personal Characteristics. Personal characteristics explain much of the between-person variance in self-perceptions of aging because they provide the context in which one ages and they shape our views of age-related changes. For instance, personality traits represent a set of personal characteristics that frame one's daily experiences. Although there is some variability in personality traits across the lifespan, they are viewed as relatively stable, with more pronounced changes occurring before the age of 30 (Costa & McCrae, 1994; Wortman et al., 2012). It should be noted that some researchers object to the trait framework as personality attributes can change throughout the lifespan (Mroczek & Spiro, 2003). Viewed as stable or not, personality traits are found to largely shape one's outlook and the meaning of both daily and major life events (McAdams & Pals, 2006). Amongst the Big-Five personality traits (openness, conscientiousness, extroversion, agreeableness, and neuroticism), neuroticism, which is defined as a heightened response to stress and a tendency to interpret minor frustrations as difficult (Thompson, 2008), is positively associated with negative self-perceptions of aging (Jang et al., 2004; Moor et al., 2006). It is likely that individuals high in neuroticism dwell on the negative aspects of aging,

instead of holding a more balanced view of the gains and losses. Moreover, those who are less open to new experiences (i.e., rigid) tend have more negative views on aging because they are not as likely to update negative aging stereotypes internalized in youth (Levy, 2008). In contrast, optimism, defined as the tendency to have a positive outlook on future events, is found to moderate the relationship between negative views on aging and physical and mental health decline (Wurm & Benyamini, 2014). This collection of findings indicates that one's personality can greatly influence how positive and negative aspects of aging are weighted, with neurotics more likely to dwell on negative aspects that match their negative expectations compared to optimists who will more likely attend to positive changes.

A host of other personal characteristics have been directly associated with self-perceptions of aging levels across age groups or are found to affect aging processes that are associated with self-perceptions of aging. The impact of personal characteristics on aging expectations and the likelihood of aging well are important to elucidate as they add a more contextual understanding of self-perceptions of aging development beyond what is described by stereotype embodiment theory. Socioeconomic status (SES) has been connected to self-perceptions of aging, with more economically disadvantaged adults experiencing worse self-perceptions of aging (Jang et al., 2004; Moser et al., 2011). Low SES is believed to limit the probability of aging successfully (McLaughlin et al., 2010) and lead to worse self-perceptions of aging through multiple processes, such as reduced access to adequate healthcare, increased exposure to environmental hazards, more chronic and acute stress, and more unhealthy relationships that can adversely affect one's sense of self-efficacy and agency (House et al., 1994; Williams, 1990). Often tied to SES, educational attainment is also found to significantly impact the aging process, and, in turn, self-perceptions of aging, with those reaching higher

educational levels experiencing better health (Cutler & Lleras-Muney, 2006). In general, those with lower educational attainment tend to have worse views on aging (Han & Richardson, 2014; Jang et al., 2004). Education is evidenced to affect health beyond increasing SES, as it provides individuals with different ways of thinking and decision-making, above and beyond the economic return (Cutler & Lleras-Muney, 2006). Research indicates that those with higher educational attainment spend a higher proportion of their income on health and engage in less risky behaviors (Murphy & Topel, 2005). Such investments and risk avoidant behavior may allow more educated individuals to slow age-related losses in health and maintain positive views on aging. Essentially, higher SES provides the funds to access better health and education, which in turn promotes the use of available resources, allowing for a more positive aging experience and better self-perceptions of aging.

The number of positive and negative cultural aging stereotypes are not evenly distributed across all people, as gender and race greatly impact aging expectations (e.g., Andreoletti et al., 2015; Menkin et al., 2017). The "double-standard of aging" describes the general idea that women have a more difficult time aging than men (Sontag, 1972). The difficulties largely stem from women being judged on attractiveness, which individuals rate lower as a function of age, compared to men who are judged on traits that get higher ratings with age—power, intellect, and economic standing (Dowd & Bengtson, 1978; Sontag, 1972). Analyses of primetime television reveal that older women are more often represented with negative traits compared to men (Vernon et al., 1990). Although women tend to live longer than men, women on average would rather live shorter lives in perfect health when presented the hypothetical option (Ayalon & King-Kallimanis, 2010). Additionally, women are less likely to accept life-prolonging medical interventions in hypothetical situations compared to men (Carmel, 2001). Understandably,

women are found to have lower levels of aging satisfaction (Kim & Moen, 2002; Kleinspehn et al., 2008) and worse self-perceptions of aging (Klusmann et al., 2019; Wurm & Benyamini, 2014).

The effect of gender on the aging process and self-perceptions of aging development can be exacerbated by one's race. Known as "double-jeopardy," different minority group statuses like age and race compound and interact with one another, often intensifying prejudicial experiences associated with both individually (Dowd & Bengtson, 1978; Palmore, 1999). It should be noted that minority in this sense is related to lower social standing and not solely to the proportion of individuals in a society (Palmore, 1999). Older women of color are considered to be in "triple-jeopardy," as they are subjected to the combination of prejudices of three minorities (Palmore, 1999). Research shows that people of color, like women, have more anxiety regarding aging (Cummings et al., 2000; Lynch, 2000) and poorer images of aging (Foos et al., 2006), suggesting that they too will have systematically lower self-perceptions of aging. Personal characteristics such as gender and race represent factors that change the number of positive and negative stereotypes an individual is exposed to in their life. The personal characteristics one is born with alter one's aging expectations, the trajectory of their development, and ultimately, their self-perceptions of aging.

Marital status is another demographic variable that is consistently tied to self-perceptions of aging, either as a significant covariate in self-perceptions of aging–health models (Sargent-Cox et al., 2012; Wurm et al., 2007, 2008, 2010) or a direct contributor to self-perceptions of aging change (Sargent-Cox et al., 2014). Although age, gender, and race represent the most commonly stereotyped groups, many prejudices exist around those who remain single longer than is socially normative (DePaulo & Morris, 2006). Thus, the stigma of being single not only

gets worse with age, but the physiological stress associated with discrimination can be compounded by age stereotypes. The connection to self-perceptions of aging development is clear: singles may be more susceptible to the idea that healthy behaviors are futile with age, because they do not have someone reassuring them that physical loss stereotypes are untrue (Levy, 2009). In a similar vein, the lack of support for one's self-efficacy may directly undermine self-perceptions of aging's behavioral pathway, in which negative views on aging adversely affect health through decreasing one's perceived control over their health. This is evidenced, in part, by findings that suggest marriage leads to better health behaviors through supporting each other's self-efficacy (Padula & Sullivan, 2006; Schone & Weineck, 1998). Lastly, partners satisfy needs for personal connection (House et al.,1988), which may alter expectations of social loss in later life. Married individuals tend to have larger social networks across the lifespan (Wong & Waite, 2015), providing them with the necessary social support to alter expectations of age-related social loss (Steverink et al., 2001). Taken together, marriage can provide both direct and indirect support to engage in healthy practices throughout the lifespan, all of which allow healthier aging expectations that can buffer decrements in self-perceptions of aging.

Physical Health and Psychological Well-being. Across self-perceptions of aging development studies, health status was found to be an important predictor of both within- and between- person variation in the initial level and development of self-perceptions of aging (Kleinspehn-Ammerlahn et al., 2008; Kotter-Grühn et al., 2009; Sargent-Cox et al., 2012). Whereas personal characteristics provide context to the aging process and a lens to view age-related changes, one's physical health and psychological well-being are believed to represent a constant feedback mechanism that allows one to judge one's own aging experience in relation to

cultural expectations. Both of these processes are essential components of self-perceptions of aging development that warrant further investigation and could bolster stereotype embodiment theory if explicitly incorporated. The impact of lived experiences on self-perceptions of aging is exemplified by the externalization hypothesis (Rothermund & Brandtstädter, 2003), which states that adults have accommodative flexibility that allows them to adapt to experiences that may be counter to their expectations. Combining the externalization hypothesis with Rowe and Kahn's (1997) model of successful aging (minimizing risk and disability, maximizing physical and mental abilities, and engaging with life) provides a framework for understanding how an individual can maintain positive views on aging across adulthood. Although two studies have found that self-perceptions of aging impact health more so than the reverse across a four-year period (Han & Richardson, 2015; Wurm et al., 2007), other research indicates that the combination of mental and physical health serves as a primary feedback mechanism that will change the *long-term* development of self-perceptions of aging.

Amongst the few studies that have analyzed the impact of physical health and psychological well-being on self-perceptions of aging, it is clear that mental and physical health contribute to levels of self-perceptions of aging. In a sample of Swiss older adults between 65 and 70 years old, the number of chronic conditions, depressive symptoms, hospitalizations, falls, and issues with activities in daily life all significantly contributed to worse self-perceptions of aging ratings at a single measurement occasion (Moser et al., 2011). Different operationalizations of health with a Korean sample of older adults lead to similar conclusions: older adults with more chronic conditions, greater disability, poorer vision, and a greater number of sick days had worse self-perceptions of aging (Jang et al., 2004). One experimental study supports a causal relationship between physical health and self-perceptions of aging. Women

between the ages of 70 and 93 who were placed in an experimental exercise group had significantly more positive self-perceptions of aging compared to two control groups (Klusmann et al., 2012). With negative aging stereotypes centered around mental and physical health decline (e.g., Hummert, 1999; Kite et al., 2005; Kornadt & Rothermund, 2011), those who are able to maintain good health garner the necessary feedback to combat expectations of loss and preserve positive views on aging.

Social Resources. Social resources are found to impact the development of self-perceptions of aging through two processes. First, social resources can provide a sense of social connectedness that curbs loneliness and its associated negative externalities Second, familial relationships shape our self-perceptions of aging through intergenerational contact and by providing aging role models. One's engagement with life and, in particular, perceived loneliness, has been found to impact self-perceptions of aging trajectory during the later stages of adulthood (Kleinspehn-Ammerlahn et al., 2008). Similar findings were produced when assessing various contributors to self-perceptions of aging at a single measurement period, as those having more contact with friends and family experienced better self-perceptions of aging (Kim et al., 2012; Wang et al., 2019). Another study found that satisfaction with social support was more related to positive views on aging than frequency of social support, suggesting that it is the feeling of being connected to others that supports self-perceptions of aging and not necessarily physical proximity (Lamont et al., 2017). The importance of satisfaction with social support for positive views on aging was replicated with respondents living within assisted living communities (Park et al., 2015). Like physical and mental health, perceived social support is believed to counter the expectation that aging is associated with social loss (e.g., Steverink et al., 2001). It may be the case that feeling connected to others throughout adulthood alleviates the stress and anxiety that

comes from negative aging stereotypes that create expectations of loneliness. Like other aspects of health, perceptions of social connectedness and social needs change with age, leading to a continuously evolving understanding of one's own aging in relation to cultural stereotypes.

Besides providing individuals social support, relationships are believed to impact the development of self-perceptions of aging through intergenerational processes. Like many other aspects of cognition that are impacted by intergenerational processes (e.g., attitudes and values; Min et al., 2012), the aging stereotypes that become self-perceptions of aging are transmitted through our relationships beginning at a young age. As stated earlier, age stereotypes are internalized early on in childhood through adopting parental views on aging and general cultural attitudes (Gilbert & Rickets, 2008). However, the impact of parents and grandparents on aging expectations continues into adulthood as most individuals use family members as role models of aging. Those with positive family role models (e.g., older family members that maintain good health and connections with others) have significantly better self-perceptions of aging than those without a role model (Jopp et al., 2017). Moreover, adult children's views on aging are connected to the quality of their relationship with their parents, as well as the health of their parent. Specifically, individuals have better self-perceptions of aging if they are close to their parents and perceive them as aging well (Jung & Jopp, 2018). Individuals who have unhealthy parents avoid decrements in self-perceptions of aging if they are not close to their parents. Regardless of parental health, having an ambivalent relationship with one's parents is associated with worse self-perceptions of aging (Jung & Jopp, 2018). Taken together, relationships are an essential aspect of self-perceptions of aging development as they help shape one's aging expectations through socialization processes, and by providing one a glimpse into their future through seeing the aging process of relatives who share genetic and personal qualities.

Maintaining healthy relationships along with other aspects of aging well have a clear connection to self-perceptions of aging development throughout the lifespan. These developmental factors provide a more active and individualized understanding of self-perceptions of aging development that is not currently detailed in stereotype embodiment theory.

Age Identity and Perceived Discrimination. Although not tested in studies of self-perceptions of aging development, age identity and perceived discrimination represent possible developmental factors that can contribute to changes in self-perceptions of aging across adulthood (see Figure 2). Age identification plays a central role in stereotype embodiment theory, as age stereotypes are found to gain salience from self-relevance (Levy, 2009). In other words, the impact of age stereotypes increases the more an individual identifies as old. As discussed, evidence for this notion comes from old age primes primarily working for older adults and not for younger individuals (Hausdroff et al., 1999; Levy, 1996, 2000; Levy et al., 2000). However, age identification is not synonymous with chronological age, as individuals tend to feel and perceive themselves as younger than their actual age (Heckhausen, 1997; Kaufman & Elder, 2002; Montepare & Lachman, 1989). In fact, the difference between actual and subjective age is most pronounced later in life (Montepare, 1996). Accordingly, if self-perceptions of aging affect an individual through old age stereotypes becoming self-relevant, many older adults may never truly feel such stereotypes are applicable. Some of the aforementioned personal characteristics and health-related factors are found to play a role in age identity also. For instance, healthier individuals who are married tend to view themselves as younger compared to their less healthy and single counterparts (Logan et al., 1992). Younger age identification is also tied to ego defense mechanisms, such that older adults keep a younger age identity to maintain their self-esteem (Teuscher, 2009). Moreover, a direct link between age identity and cultural

stereotypes is established through the information-processing approach to subjective age. This approach suggests that individuals tend to feel younger than their age because their generation is healthier than previous ones that had harder lives, which resulted in the perpetuation of negative aging beliefs (Teuscher, 2009). Age identity is a fluid product of other aspects of development, and like the other factors, it can alter one's self-perceptions of aging for better or worse.

Closely aligned with age identity is perceived age discrimination. Age identity represents aspects of one's subjective age, while age discrimination is based on how others view one's age and the behaviors that result from their aging beliefs. Age discrimination is considered direct when someone is treated less favorably because of their age. In contrast, indirect age discrimination encapsulates group or organizational customs, policies and practices that disadvantage someone based on their age (Swift et al., 2017). Stereotype embodiment theory suggests ageism affects self-perceptions of aging very early on in development, as ageist views are internalized in youth and take effect once one enters the older adult social category (Levy, 2009). Although this may be true, being a direct recipient of ageism may strongly affect self-perceptions of aging in adulthood. While perceived ageism is found to increase with subjective age (Stephan et al., 2015), one can be on the receiving end of ageism regardless of one's age identity, as ageism is a product of how others view and treat an individual.

Ageism is the most prevalent prejudice today, outpacing sexism and racism (Ayalon, 2014). Age discrimination can be found in everyday cultural memes such as birthday cards and jokes (Palmore, 1999), while more hostile behaviors are most commonly found in the workplace (e.g., firing someone due to their age) and health professions (e.g., older adults receiving fewer diagnoses and treatments for mental and physical illnesses compared to younger adults, even when experiencing the same symptoms; Nelson, 2005). Although these acts of discrimination

stem from negative aging stereotypes, they represent a direct assault on older individuals that is distinct from the age stereotypes that become self-relevant with age. An individual's positive self-perceptions of aging may be adversely affected by perceived age discrimination, as such experiences would be counter to their expectations and personal beliefs. In contrast, someone who has developed negative self-perceptions of aging over time may find themselves having a more positive aging experience than expected if they are treated with dignity and respect in later life, which could ultimately lead to more positive self-perceptions of aging.

Some studies have found a connection between self-perceptions of aging and perceived ageism. Studies examining different cohorts have identified several trends in perceived discrimination across the lifespan. Experiences with discrimination are lower in early adulthood and peak around the fifth decade of life, due to workplace discrimination, before leveling off again (Gee et al., 2007). Perceiving more ageism is found to worsen one's self-perceptions of aging and results in more depressive symptoms (Han & Richardson, 2015) and less preventative health behaviors (Hooker et al., 2019). There is also evidence for the opposite direction of effects, such that positive self-perceptions of aging predict less perceived age discrimination over time (Giasson et al., 2017). However, one study using a 3-year cross-lagged design found that self-perceptions of aging predicts perceived age discrimination more strongly than the reverse, with the effect of perceived discrimination on self-perceptions of aging being only marginally significant (Voss et al., 2017). This finding would suggest that perceived ageism would not be a central factor in the development of self-perceptions of aging, however, the statistical method used may muddle the findings. Cross-lagged designs are beneficial for understanding the direction and magnitude of relationships over time, but they rely on means for the entire sample,

instead of within-person change. Ultimately, more research is needed to understand the long-term and within-person effects of perceived discrimination on self-perceptions of aging.

Summary and Research Directions

The growing body of self-perceptions of aging research has greatly deepened our understanding of the aging process. Most importantly, it has established that the way we view our own aging contributes to our health and well-being trajectories. Such views appear to be malleable, allowing for interventions to facilitate positive aging. However, our theoretical and empirical understanding of the development of our self-perceptions of aging is limited and does not sufficiently explain how individuals in the same culture differentially internalize aging stereotypes, or what factors are associated with changes in positive and negative self-perceptions of aging across adulthood. Elucidating both aspects of self-perceptions of aging development can enable more pointed policies and interventions to help the growing older population age successfully.

In general, the internalization of self-perceptions of aging, according to stereotype embodiment theory, is a rather passive process where aging stereotypes become self-stereotypes once one identifies as an older adult. With many of us around the world living in ageist societies (Boduroglu et al., 2006; Nelson, 2009), it is unknown how most individuals develop predominately positive self-perceptions of aging or even maintain a balance of positive and negative self-perceptions. Stereotype embodiment theory suggests that the primary factor influencing the internalization of aging stereotypes is cultural immersion, hence individuals who watch more television tend to have worse attitudes towards older adults (Donlon et al., 2005). However, more active processes may be taking place, allowing one to not internalize negative aging stereotypes. As previously mentioned, stereotype embodiment theory suggests that an

individual will have less negative self-stereotypes if they do not identify as an older adult because the stereotype does not apply. However, for some, it may be the case that they identify as an older adult but maintain positive in-group affect. Such a positive identification may lessen the extent to which negative stereotypes are internalized. Additionally, the negative aging stereotypes that individuals hold may prompt a fear of aging that would lead to compensatory actions in the form of preventative health behaviors. Lastly, having positive aging experiences may allow negative aging stereotypes to be perceived as true for others, but not applicable to one's own life. Study 1 aims to test the validity of these three processes that may reduce the internalization of negative aging stereotypes, thereby limiting the formation of negative self-perceptions of aging.

Research shows that our views on aging change throughout adulthood. Factors that have been most commonly found to influence changes in self-perceptions of aging are personal characteristics (e.g., age, gender, marital status), physical health (e.g., functional health), and psychological well-being (e.g., depression). Although past studies have begun conducted to illuminate the factors associated with the development of self-perceptions of aging, most of this research has been conducted with individuals around 80 years of age at baseline. Thus, these findings help explain changes in views on aging in later life, but more research is needed to determine which factors are most strongly associated with changes in self-perceptions of aging at different stages of life. Such research would aid the creation of targeted interventions for individuals at different stages of life.

Additionally, research exploring changes in self-perceptions of aging have primarily used global measures that do not differentiate between positive and negative views on aging. With evidence supporting the independence of the two views on aging, it would be worthwhile for

future studies to explore whether certain factors are more predictive of changes in positive or negative self-perceptions of aging. Moreover, elucidating the relationship between positive and negative views on aging across time will help provide a fuller understanding of the development of self-perceptions of aging. Although research has found positive and negative self-perceptions of aging to be mostly independent within the self-system (Steverink et al., 2001; Boeder & Tse, 2020), the development of the two may be related. Lastly, it is still unknown how baseline perceptions of aging are related to subsequent changes in these perceptions across time. Illuminating the relationship between self-perceptions of aging and changes within each view on aging would further our ability to predict the trajectory of self-perceptions of aging and the associated health trajectories for individuals. Thus, the first aim of Study 2 is to investigate the longitudinal trajectory of both positive and negative self-perceptions of aging for adults, on average, and specific to the middle, third, and fourth age of adulthood.

Beyond personal characteristics, physical health, and psychological well-being, more research is needed to understand how older age identification is associated with the development self-perceptions of aging across adulthood. As previously mentioned, stereotype embodiment theory suggests that individuals who more strongly identify as an older adult will be more strongly affected by their self-perceptions of aging. Although tied to physical health and psychological well-being, one's perceived age conceptually represents the distance between aging expectations and perceived quality of one's own aging. This postulate is supported by experimental research finding that priming negative aging stereotypes only affect behaviors for older adults and not younger adults. However, identifying as an older adult is optional as many adults do not view themselves as older even when they reach societal thresholds that indicate old age (i.e., retirement). A direct connection between identifying as an older adulthood and more

negative self-perceptions of aging has not been tested. While Study 1 tests the influence of older age identification on the association between negative aging- and negative self- stereotypes, Study 2 investigates the association between older age identification and the development of positive and negative self-perceptions of aging.

Lastly, the association between perceived discrimination and the development of self-perceptions of aging warrants further investigation. Stereotype embodiment theory mostly connects self-perceptions of aging to one's age identity, with those identifying as older expected to have shifted their general aging stereotypes to self-stereotypes. Although this may be an important part of self-perceptions of aging development, it neglects one's treatment by others. How one is treated based on outward appearances can largely differ from one's own age identity, as one can feel young but still be treated by others as old. The discrimination associated with others perceiving an individual as being a part of the low-status old-age group is likely to be associated with worse self-perceptions of aging over time. With aging being, in part, a social process, Study 2 explicates the relationship between older age discrimination and the development of positive and negative self-perceptions of aging.

Anxiety towards aging created from negative aging stereotypes is a heavy burden to carry. With more research on the development of self-perceptions of aging, the weight of negative aging stereotypes on the mind and body may be lightened, allowing individuals to age more gracefully. Extensive research has been carried out on the pathways by which self-perceptions of aging affects health; now, a more in-depth understanding is needed of how such views of aging are initially developed and change over adulthood. A more thorough investigation of the process by which negative aging stereotypes are internalized, and the factors associated

with the development of positive and negative self-perceptions of aging can empower policymakers to engage in practices that will enhance our collective ability to age positively.

Chapter II: Study 1 Aims

The objective of Study 1 is to investigate possible mechanisms that alter the internalization of negative aging stereotypes. Stereotype embodiment theory suggests that negative aging stereotypes are internalized across the lifespan and become self-stereotypes once we join the older adult social category. Eventually, those stereotypes develop into our self-perceptions of aging. With older adult stereotypes being mostly negative, it is largely unknown how individuals can prevent the internalization of negative stereotypes into their self-concept and maintain a positive self-perception of aging. For that reason and because positive stereotypes presumably are beneficial, Study 1 investigates factors that can potentially moderate or mediate the relationship between the negative aging stereotypes individuals hold and their negative self-stereotypes. Specifically, Study 1 uses cross-sectional data from adults 60 years of age and older to test three previously hypothesized pathways that may allow individuals to avoid the internalization of negative stereotypes: (a) not identifying as an older adult or having a positive identification, (b) actively taking compensatory actions (e.g., engaging in preventative health behaviors) to not fall victim to negative stereotypes, and (c) using positive aging experiences to maintain positive self-stereotypes (Hummert, 2003; Zebrowitz, 2003). Taken together, Study 1 explores whether aspects of one's older adult identification, preventative health behaviors, fear of aging, and positive aging experiences alter the relationship between the negative aging stereotypes one holds for older adults, in general, and those endorsed for one's own aging.

Research Questions and Hypotheses

RQ1. Does identification with the older adult social category partially explain the relationship between negative aging stereotypes and negative self-stereotypes, and is the extent to which identification explains this relationship affected by positive affect towards being an older adult?

Hypothesis 1: The extent to which one identifies as an older adult will significantly mediate the relationship between negative stereotypes endorsed by older adults in general, and negative aging stereotypes endorsed for oneself. However, the indirect effect will be weaker for those with higher positive in-group affect.

RQ2. Do fear of aging and preventative health behaviors partially explain the relationship between negative aging stereotypes and negative self-stereotypes?

Hypothesis 2: Fear of aging and preventative health behaviors will serially mediate the relationship between negative stereotypes endorsed by older adults, in general, and negative aging stereotypes endorsed for oneself.

RQ3. Do more positive aging experiences affect the extent to which negative aging stereotypes become negative self-stereotypes?

Hypothesis 3: Positive aging experiences will moderate the relationship between negative stereotypes endorsed for older adults, in general, and negative stereotypes endorsed for oneself.

Chapter III: Study 1 Method

Participants

Participants were recruited via Cloud Research's Prime Panels, which recruits participants from several online crowdsourcing platforms like Amazon's Mechanical Turk (Mturk). The advantage of a Prime Panel is that it allows researchers to collect large samples

with specific demographics through its participant pool of 50 million workers who have pre-registered their demographic information (Chandler et al., 2019). Such crowdsourcing platforms are a promising recruitment method, often providing more representative samples than other convenience sampling methods (Berinsky et al., 2012). Studies have found experimental results and the reliabilities of psychological constructs from internet samples provide findings similar to more traditional samples (for a review, see Shank, 2016). Based on the many studies that have been conducted on the validity of crowdsourcing for behavioral science studies (see Litman & Robinson, 2020 for a review), specific protocols can be implemented to ensure the quality of data collected with this sampling method. The current study made use of the recommendations from these empirical articles; during the recruitment process, participants with low worker ratings (i.e., ratings provided by previous researchers that indicate unreliable responses from the participant) were blocked from participation, duplicate IP addresses were blocked, and attention checks, as well as captchas, were used.

Individuals from the crowdsourcing websites that were registered as being 60 years of age or older, English speaking, and residing in the United States were presented the opportunity to participate in a 15-minute survey assessing their aging experiences. Those who were interested were directed to the informed consent page. Individuals who provided consent were included in the study. Data were collected from 666 participants; however, 37 (6%) failed at least one of the attention checks and were removed from the study. As will be discussed, an additional 17 participants (3%) were removed for either having incomplete data or being a multivariate outlier, leaving 612 participants for all analyses. On average, participants were in their mid-sixties (M=68.58, SD=5.63), and roughly half were female (56.2%), and married (53.6%). Full participant characteristics can be found in Table 1.

Measures

Negative Aging Stereotypes

The Image of Aging Scale was used to assess the extent to which participants endorse positive and negative stereotypes of aging (Levy et al., 2004). The scale consists of 18 adjectives with two subscales (9 negative items and 9 positive items) that cover nine domains of aging: activity (walks slowly, active), appearance (wrinkled, well-groomed), cognition (senile, wise), death (dying, full of life), dependence (helpless, capable), personality (grumpy, positive outlook), physical health (sick, healthy), relationships (family-oriented, lonely), and will to live (given up, will to live). Participants were prompted with "We are interested in knowing, when you think of older adults, in general (not including yourself), how much the following words match the images or pictures that you have in your mind. There are no right or wrong answers." Each item was assessed on a 7-point Likert scale ranging from 1 (*furthest from what I think)* to 7 (*closest to what I think)*. Higher scores indicate a more stereotyped view of aging. The scale has been shown to be valid and reliable across samples and time (Levy et al., 2004; Positive Adjectives, α= .84; Negative Adjectives, α= .82). Although participants responded to all items, only the negative items were used in the current study. The negative items were found to be internally reliable in the current study (α= .86).

Negative Self-Stereotypes

To assess self-stereotypes of aging, the same image of aging scale was used with a modified prompt, reading: "We would like to know the image that you have of yourself. Please indicate how much each word or phrase coincides with your own image of yourself. There are no right or wrong answers." This method of altering the prompt to measure self-stereotypes has

been previously used by Fernández-Ballesteros and colleagues (2017). Similar to aging stereotypes, only the negative self-stereotypes were used in the current study (α= .76).

Table 1.

Descriptive Statistics and Correlations at Baseline (N=612)

	Mean	Standard Deviation	Percentage	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	68.58	5.63		1													
2. Gender (female)			56.20%	-.09*	1												
3. Marital Status (married)			53.60%	.03	-.19**	1											
4. Lower Class			49.30%	.01	.16**	-.37**	1										
5. Middle Class			45.10%	.00	-.13**	.29**	-.90**	1									
6. Educational Attainment (Bachelor's Degree or Higher)			58.30%	-.05	-.11**	.08	-.27**	.19**	1								
7. Race (Caucasian)			90.80%	.04	-.01	.02	.01	-.02	-.04	1							
8. Self-Rated Health	2.70	0.81		-.02	-.04	-.12**	.20**	-.15**	-.08	-.06	1						
9. Positive Aging Experiences	5.50	0.84		.07	.21**	.05	-.08*	.07	.00	-.09*	-.34**	1					
10. Fear of Aging	4.06	1.34		-.06	.09*	-.11**	.13**	-.12**	-.09*	.14**	.29**	-.12**	1				
11. Older Age Identification	3.48	1.20		-.02	-.03	-.04	.04	-.06	-.04	.02	.23**	-.12**	.37**	1			
12. Ingroup Positivity	5.00	1.22		.04	.02	.12**	-.09*	.07	.01	-.14**	-.30**	.38**	-.51**	-.47**	1		

	Mean	Standard Deviation	Percentage	1	2	3	4	5	6	7	8	9	10	11	12	13	14
13. Negative Aging Stereotypes	3.33	1.02		-.03	-.09*	-.06	.05	-.03	.00	.02	.10*	-.16**	.35**	.23**	-.32**	1	
14. Negative Self-Stereotypes	2.34	0.89		.04	-.04	-.15**	.18**	-.14**	-.09*	-.02	.45**	-.31**	.45**	.38**	-.46**	.50**	1

Note. *p<.05; **p<.01. Sample of 612 participants reflects those respondents who remained after data cleaning procedures.

Older Age Identification and Positive In-group Affect

Identification with the older adult social category and the extent to which individuals view their association with this social category as positive was assessed with the Three-Dimensional Strength of Group Identification Scale (Cameron, 2004). The 12-item scale contains three subscales assessing group centrality (e.g., the cognitive prominence of a given group membership; "I often think about being an [ingroup member]"), in-group affect (e.g., the emotional evaluation of one's group membership; "In general I'm glad to be an [ingroup member]"), and in-group ties (e.g., the perception of similarity and bonds with other group members; "I have a lot in common with other [ingroup members]"). The scale allows for different social groups to be inserted within each question, which in the case of the current study was "older adults." Each item was presented on a Likert scale ranging from 1 (*strongly disagree)* to 7 (*strongly agree*). The scale and subscales have been shown to be valid and reliable across several studies (Cameron, 2004; Obst & White, 2005, α= .83-.91).

To test Hypothesis 1, the in-group centrality and in-group affect subscales were used to represent older adult identification and positive in-group affect, respectively. While there have been many ways to parse the components of social group identification, most can be aggregated into cognitive (here, centrality) and affective (here, in-group affect) components (Cameron, 2004). These categories align with the definition of social identification set forth by social identity theory (Tajfel, 1978). The internal reliability for the centrality subscale was not acceptable (α= .44). Based on a factor analysis, the question "Being an older adult is an important part of my self-image" was inversely associated with the other items and was removed. Although the remaining three items still had a relatively low Cronbach's alpha (α= .59), a confirmatory factor analysis revealed that all items significantly loaded onto a single

factor. Additionally, the data adequately fit the model (confirmatory fit index=1.00), providing support for the use of the measure. The items were composited such that higher scores equated to stronger older adult identification. The positive in-group subscale has good internal reliability in the current study (α= .83). The items were composited such that higher scores represent more positive affect towards an individual's older adult identity.

Fear of Aging

The Fear of Losses subscale from the Anxiety About Aging Scale (Lasher & Faulkender, 1993) was used to assess the degree to which individuals fear getting older. The subscale consists of 5 items that were assessed on a 7-point Likert scale ranging from 1 (*strongly disagree)* to 7 (*strongly agree*). Sample items include: "I fear that when I am old all my friends will be gone" and "the older I become, the more I worry about my health." The subscale has been found to be valid and reliable (Lasher & Faulkender, 1993; α= .69), as was the case in the current study (α= .82).

Preventative Health Behaviors

The Good Health Practices Scale, a revised version of the Health Behavior Checklist, was used to assess preventative health behaviors (Hampson et al., 2017). The scale contains 16 items that assess various aspects of preventative health that are positively associated with physiological indicators of cardiovascular and metabolic health. Sample items include: "I exercise to stay healthy," "I eat a balanced diet," and "I don't smoke." For the purposes of this study, participants were asked to rate each item on a scale of 1 (*very untrue of me*) to 7 (*very true of me*). Previous research supports the validity and internally reliability of the scale (Hampson et al., 2017; α= .83). Internal reliability for the scale was also found in the current study (α= .83).

Positive Aging Experiences

The Perceived Age-Related Gains subscale from the Awareness of Age-Related Changes Scale was used to operationalize positive aging experiences (Brothers et al., 2019). This measure assesses the degree to which individuals experience positive changes in their life due to aging. The subscale consists of 25 items that measure five behavioral domains: health and physical functioning ("with my increasing age, I realize…I pay more attention to my health"), cognitive functioning ("…I have more foresight"), interpersonal relations ("…others are treating me more respectfully"), social-emotional functioning ("…I recognize my own needs better"), and lifestyle and engagement ("…I enjoy life more consciously"). Each item was assessed on a Likert scale ranging from 1 (*not at all*) to 7 (*very much*). The subscale has been shown to be valid and reliable (Brothers et al., 2019; α= .83), which was also found in the current study s

Covariates

Age, gender, race, marital status, educational attainment, social class, and self-rated health were used as covariates. Participants were asked to rate their health on a 5-point Likert scale, ranging from 1 (*terrible*) to 5 (*excellent*). For analytic purposes, race, marital status, and educational attainment were dichotomized. Race was split to represent those who identified as Caucasian (race=1) and those who identified as any other race (race=0). Marriage was dichotomized to represent those who were currently married (marital status=1) and those who were divorced, separated, never married, or widowed (marital status=0). Educational attainment was transformed to categorize individuals based on whether they obtained at least a bachelor's degree (educational attainment=1) and those with less education (educational attainment=0). Lastly, social class was represented by bands of total household income following practices from Pew Research Center (www.pewresearch.org), such that those with a total household income below 50,000 USD were classified as lower class, those earning between 50,000 and less than

150,000 USD were deemed middle class, and those earning above 150,000 USD a year were categorized as upper class. Social class was dummy coded in each analysis so the effects of being low and middle class are compared to upper class.

Data Screening

The presence of missing data was minimal, with a total of 7 respondents providing incomplete data on key study variables. Next, there was no multicollinearity as all bivariate correlations were less than .70, with the highest being -.51 (excluding the relationship between dummy coded variables; see Table 1). All variables were distributed with a skew and kurtosis less than 2. While there were some univariate outliers based on z-scores, all values were retained as no scores were out of the bounds of possible nor expected values. Lastly, the data was screened for multivariate outliers by calculating Mahalanobis, Cook's distance, and leverage scores for all continuous variables. Ten participants whose scores were past the cut-off on two of the three indicators were excluded from further analyses. After excluding those with missing data or multivariate outliers, a total of 612 participants were included in all subsequent analyses.

Data Analysis

Each hypothesis was tested through the PROCESS macro (v3.5, Hayes, 2017) in IBM SPSS version 26. All continuous predictors and covariates were grand mean centered before being entered into the models. Additionally, each model parameter was bootstrapped with 5,000 bias corrected samples. Robust standard errors were calculated in the estimation process. Based on a power analysis of the most complex model (i.e., serial mediation containing 11 total predictors), the sample of 612 participants would reliably allow for the identification of small effect sizes (f^2=.03) with a power of .80 and alpha of .05. The following moderation and mediation analyses are considered atemporal such that the direction of effects is not assumed to

strictly occur in the order that is being tested (Winer et al., 2016). Thus, each of the analyses assesses whether a variable can partially explain the relationship or influence *in the statistical sense* the strength of the relationship between negative aging stereotypes and negative self-stereotypes without inferring causality

Chapter IV: Study 1 Results

Hypothesis 1: The extent to which one identifies as an older adult will significantly mediate the relationship between negative stereotypes endorsed by older adults in general, and negative aging stereotypes endorsed for oneself. However, the strength of the indirect effect will be lower for those with higher positive in-group affect.

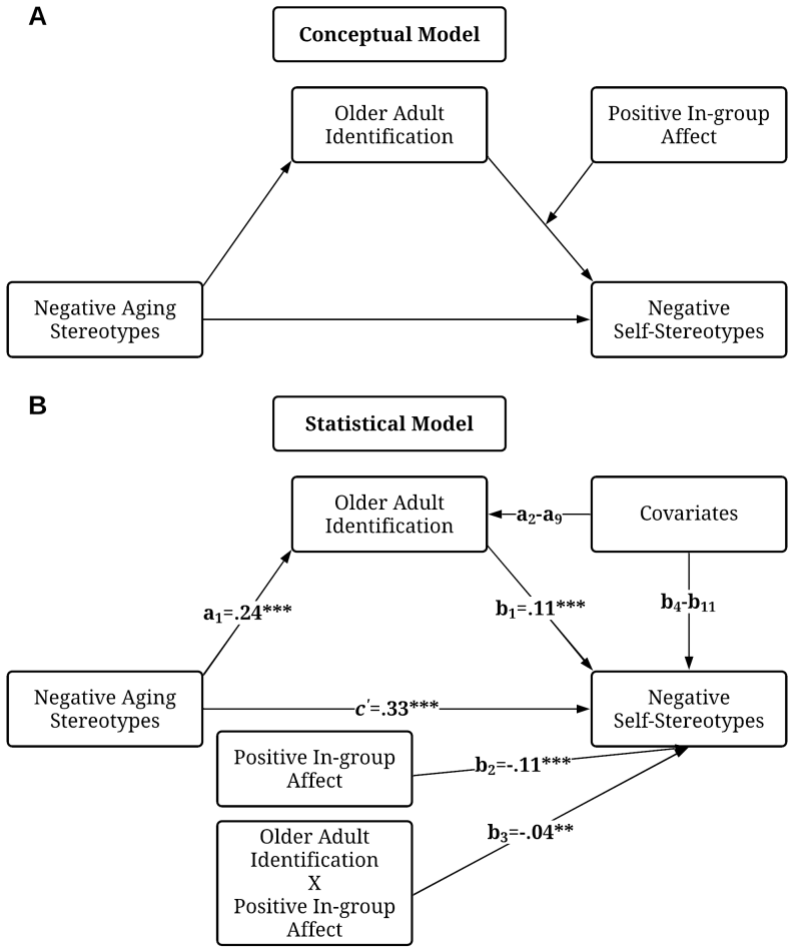
Hypothesis 1 was assessed with a moderated mediation analysis conducted via PROCESS Model 14 (see Figure 3). For this model, PROCESS creates a bootstrapped link function, known as the index of moderated mediation, that tests whether the mediation pathway significantly changes across different values of the moderator (i.e., positive in-group affect; Hayes, 2015). Specifically, if any two conditional indirect effects are significantly different at varying levels of the moderator, moderated mediation is deemed present.

All of the following estimates are unstandardized coefficients; instead of presenting each estimate of effect as a b-weight for this analysis, they will be presented by their pathway label as designated in Figure 3 to ease the interpretation of results. First, analyzing the relationship between the predictors and the mediator, older age identification, revealed a significant association between negative aging stereotypes and older age identification (a_1= .24, p<.001). Specifically, one point above the average negative aging stereotypes score was related to a .24 increase in older age identification. Next, assessing how the predictors were related to negative self-stereotypes, a direct effect between aging stereotypes and self-stereotypes was found (*c'*=

0.33, p<.001), indicating that those with more negative stereotyped views of older adults tend to have more negative self-stereotypes.

Figure 3

Conceptual and Statistical Models of Moderated Mediation

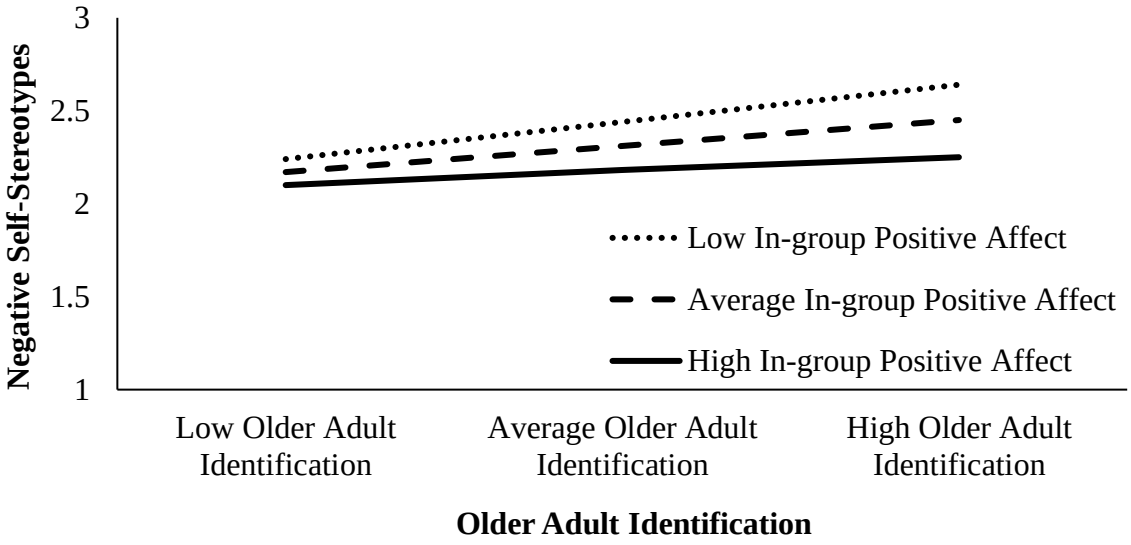


Note. Panel A represents the conceptual model of moderated mediation and Panel B represents the statistical model. *C'* signifies the effect of negative aging stereotypes on negative self-stereotypes when accounting for the indirect effect through older adult identification. The significant moderator is specific to the effect on negative self-stereotypes. The moderating effect of positive in-group affect on the entire indirect effect is not depicted in this illustration but is discussed in the results. **p<.01; ***p<.001.

The interaction between older adult identification and positive in-group affect was significant (b_3= -0.04, p<.001), meaning positive in-group affect moderated the relationship between older adult identification and negative self-stereotypes. Based on the simple slopes analysis, higher positive in-group affect was related to a smaller association between older adult identification and negative self-stereotypes (see Figure 4).

Figure 4

The Moderating Effect of Positive In-Group Affect on the Relationship Between Older Adult Identification and Negative Self-Stereotypes



Note. For both negative aging stereotypes and positive in-group affect, high means one standard deviation above the mean for the variable, and low means one standard deviation below the mean for the variable. Each simple slope was significant at p<.001.

Of central importance, the index of moderated mediation was significant (Index= -0.01, 95% CI [-0.02, -0.003], indicating that positive in-group affect moderated the indirect effect of negative aging stereotypes on negative self-stereotypes through older adult identification. The conditional effects of the moderator revealed that higher positive in-group affect was related to a

reduced indirect effect, supporting Hypothesis 1. A one standard deviation increase in positive in-group affect was related to a .01 unit decrease in the conditional indirect effect linking negative aging stereotypes and negative self-stereotypes. According to a Johnson-Neyman analysis, this moderating effect was significant for all positive in-group affect scores under 6.57 (scale ranges from 1-7)—no differences in the indirect effect were found between positive in-group affect scores higher than 6.57. In other words, the moderated mediation was significant for 86.27% of the sample (see Table 2).

Table 2

Unstandardized Regression Coefficients from Moderated Mediation Analysis

	Older Adult Identification (*M*)			Negative Self-Stereotypes (*Y*)		
		Coefficient (SE)	95% CI		Coefficient (SE)	95% CI
Negative Aging Stereotypes (*X*)	a_1 →	0.24***(0.05)	[0.15, 0.34]	c^1 →	0.33***(0.03)	[0.27, 0.39]
Older Adult Identification (*M*)				b_1 →	0.11***(0.02)	[0.06, 0.16]
Positive In-Group Affect (*W*)				b_2 →	-0.11***(0.03)	[-0.17, -0.06]
M x *W*				b_3 →	-0.04** (0.01)	[-0.07, -0.01]
Age	a_2 →	-0.00 (0.01)	[-0.02, 0.01]	b_4 →	0.01** (0.00)	[0.00, 0.02]
Self-Rated Health	a_3 →	0.32***(0.06)	[0.21, 0.44]	b_5 →	0.33***(0.04)	[0.26, 0.40]
Gender (female)	a_4 →	0.00 (0.10)	[-0.19, 0.19]	b_6 →	-0.02 (0.05)	[-0.13, 0.09]
Marital Status (married)	a_5 →	-0.04 (0.10)	[-0.25, 0.16]	b_7 →	-0.07 (0.06)	[-0.19, 0.04]
Educational Attainment (Bachelor's degree or higher)	a_6 →	-0.08 (0.10)	[-0.28, 0.11]	b_8 →	-0.06 (0.06)	[-0.17, 0.06]
Race (Caucasian)	a_7 →	0.12 (0.16)	[-0.20, 0.44]	b_9 →	-0.13 (0.08)	[-0.29, 0.04]
Lower Class	a_8 →	-0.47* (0.20)	[-0.86, -0.08]	b_{10} →	0.18 (0.11)	[-0.04, 0.40]
Middle Class	a_9 →	-0.43* (0.19)	[-0.80, -0.07]	b_{11} →	0.09 (0.11)	[-0.12, 0.30]
Constant	i_M →	0.39 (0.27)	[-0.14, 0.91]	i_y →	2.38***(0.14)	[2.10, 2.66]
		$R^2 = 0.10$			$R^2 = 0.49$	
		$F(9, 602) = 7.50$, $p<.001$			$F(12, 599) = 49.02$, $p<.001$	

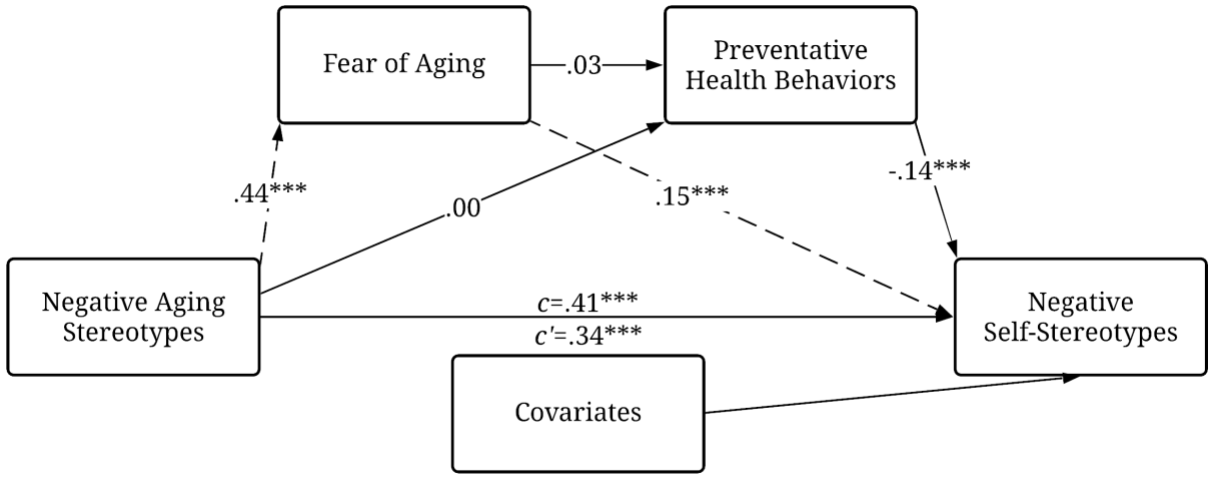
Note. SE=Standard Error. All continuous predictor variables were grand mean centered. Pathways labels correspond with Figure 4. $*p<.05$, $**p<.01$, $***p<.001$.

Hypothesis 2: Fear of aging and preventative health behaviors will serially mediate the relationship between negative stereotypes endorsed by older adults in general, and negative aging stereotypes endorsed for oneself.

Next, Hypothesis 2 was examined through a serial mediation analysis conducted via PROCESS Model 6. A more negative stereotyped view of older adults was significantly related to stronger fears of aging (b=0.44, p<.001; see Figure 5). Neither negative aging stereotypes nor fear of aging was associated with preventative health behaviors. However, enacting more preventative health behaviors was significantly related to having less negative self-stereotypes. In contrast, a more negative stereotyped view of older adults (b=0.34, p<.001) and stronger fears of aging (b=0.15, p<.001) were related to holding more negative self-stereotypes. The indirect effect of negative aging stereotypes on negative self-stereotypes through preventative health behaviors was not significant (indirect=-0.00, 95% CI [-0.01, 0.01]). Relatedly, Hypothesis 2 was not supported as the indirect effect of negative aging stereotypes on negative self-stereotypes through fear of aging and preventative health behaviors was not significant (indirect=-0.00, 95% CI [-0.01, 0.00]). However, the indirect effect of negative aging stereotypes on negative self-stereotypes through fear of aging was significant (indirect=0.06, 95% CI [0.04, 0.09]), providing evidence for partial mediation (see Table 3).

Figure 5

Indirect Effect of Negative Aging Stereotypes on Negative Self Stereotypes Through Fear of Aging and Preventative health behaviors



Note. The dotted lines represent the significant indirect effect of negative aging stereotypes on negative self-stereotypes through fear of aging. *C'* represents the effect of negative aging stereotypes on negative self-stereotypes when accounting for the indirect effects of fear of aging and preventative health behaviors.

***p<.001.

Table 3

Path Coefficients and Indirect Effects for Mediation Models

	Path Coefficients						Indirect Effects		
	Fear of Aging (M_1)		Preventative Health Behaviors (M_2)		Negative Self-Stereotypes (Y)		Estimates	Boot. SE	95% Confidence Interval
Antecedent	Coefficient	*SE*	Coefficient	*SE*	Coefficient	*SE*			
Negative Aging Stereotypes (X)	0.44***	0.05	0.00	0.04	0.34***	0.03			
Fear of Aging (M_1)	-	-	0.03	0.03	0.15***	0.02			
Preventative Health Behaviors (M_2)	-	-	-	-	-0.14***	0.03			
Constant	-0.57*	0.28	-0.39*	0.18	2.40***	0.14			
Age	-0.01	0.01	0.03***	0.01	0.02***	0.00			
Self-Rated Health	0.43***	0.06	-0.43***	0.04	0.30***	0.04			
Gender (female)	0.29*	0.10	0.38***	0.07	0.01	0.06			
Marital Status (married)	-0.08	0.10	0.14*	0.07	-0.07	0.06			
Educational Attainment (Bachelor's degree or higher)	-0.14	0.10	0.47***	0.07	0.02	0.06			
Race (Caucasian)	0.71***	0.17	0.04	0.12	-0.13	0.09			
Lower Class	-0.07	0.20	-0.35*	0.12	0.10	0.11			
Middle Class	-0.15	0.19	-0.08	0.11	0.06	0.10			
	R^2 = 0.24 $F(9, 602) = 20.98$, $p = < 0.001$		R^2 = 0.29 $F(10, 601) = 29.11$, $p = < 0.001$		R^2 = 0.48 $F(11, 600) = 47.08$, $p = < 0.001$				
NAS → FOA → NSS							0.06	0.01	[0.04, 0.09]
NAS → FOA → PHB → NSS							-0.00	0.00	[-0.01, 0.01]
NAS → PHB → NSS							-0.00	0.00	[-0.01, 0.00]

Note. N=612. All continuous predictor variables were grand mean centered. NAS=Negative Aging Stereotypes. FOA=Fear of Aging. PHB=Preventative Health Behaviors. NSS=Negative Self-Stereotypes.

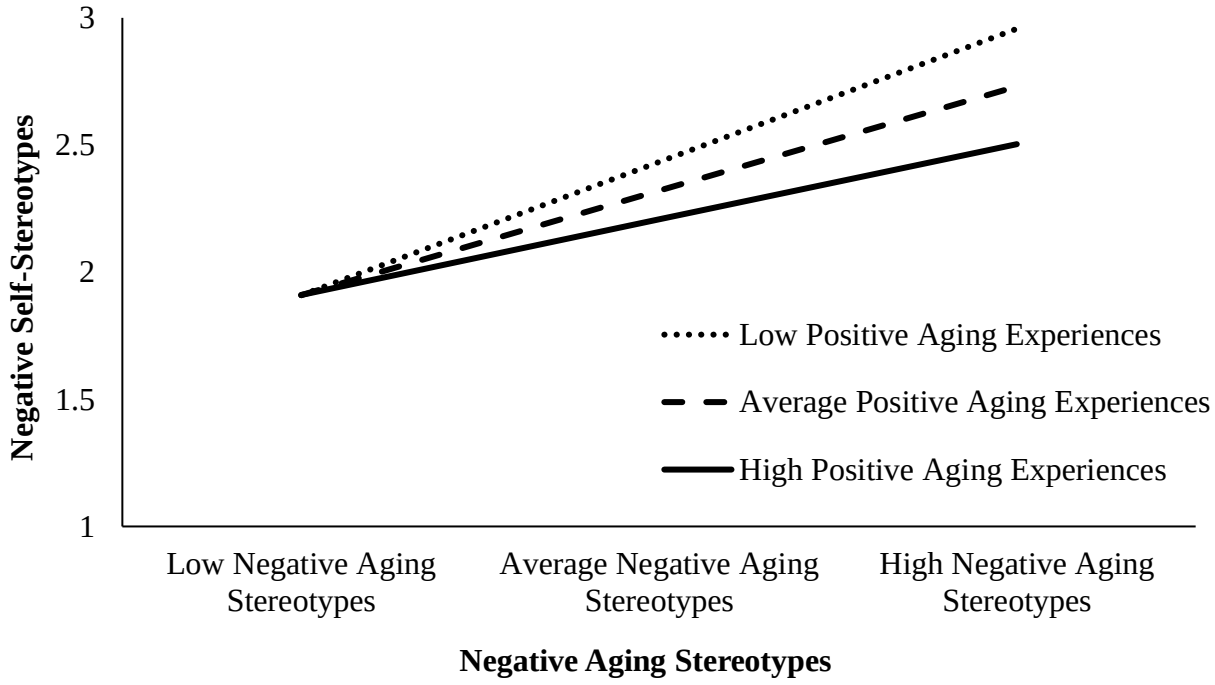
∗p<.05, ∗∗p<.01, ∗∗∗p<.001.

Hypothesis 3: Positive aging experiences will moderate the relationship between negative stereotypes endorsed for older adults in general and negative stereotypes endorsed for oneself.

Lastly, Hypothesis 3 was tested through a moderation analysis conducted via PROCESS Model 1. In support of Hypothesis 3, the interaction between negative aging stereotypes and positive aging experiences was significant (b=-0.13, p<.001). The interaction explained an additional 2% of the variation in negative self-stereotypes (ΔR^2 = .02, F(1, 600) = 19.21, p < .001), totaling 46% for the entire model. Plotting the association between negative aging stereotypes and negative self-stereotypes across low (1 standard deviation below the mean), average, and high values (1 standard deviation above the mean) of positive aging experiences revealed that more positive aging experiences lessened the association between the two forms of negative aging stereotypes (see Figure 6). The unstandardized simple slope for individuals 1 *SD* below the mean of positive aging experiences was .51 (p<.001), .40 (p<.001) for individuals with average positive aging experience scores, and .29 (p<.001) for those who had positive aging experiences 1 *SD* above the mean. Based on the Johnson-Neyman analysis, the relationship between negative aging stereotypes and negative self-stereotypes was moderated at all levels of positive aging experiences and there was no specific region of significance. Thus, the effect of positive aging experiences was in the expected direction and Hypothesis 3 was fully supported (see Table 4).

Figure 6

The Moderating Effect of Positive Aging Experiences on the Relationship Between Negative Aging Stereotypes and Negative Self-Stereotypes



Note. For both negative aging stereotypes and positive aging experiences, high means one standard deviation above the mean for the variable, and low means one standard deviation below the mean for the variable. Each simple slope was significant at $p<.001$.

Table 4

Unstandardized Coefficients from Moderation Analysis

			95 % Confidence Interval				
Variables	Coefficient	*SE*	Lower	Upper	df	t	*p*
(intercept)	2.36	0.15	2.07	2.66	11	15.86	0.001
Negative Aging Stereotypes	0.40	0.03	0.34	0.46	11	13.37	0.001
Positive Aging Experiences	-0.14	0.04	-0.21	-0.06	11	-3.60	0.001
Negative Aging Stereotypes X Positive Aging Experiences	-0.13	0.03	-0.19	-0.07	11	-4.38	0.001
Age	0.01	0.00	0.00	0.02	11	2.87	0.004
Self-Rated Health	0.38	0.04	0.31	0.46	11	10.41	0.001

Variables	Coefficient	*SE*	95 % Confidence Interval		df	t	*p*
			Lower	Upper			
Gender (female)	0.06	0.06	-0.05	0.18	11	1.10	0.273
Marital Status (married)	-0.09	0.06	-0.20	0.03	11	-1.48	0.140
Educational Attainment (Bachelor's degree or higher)	-0.07	0.06	-0.19	0.04	11	-1.24	0.215
Race (Caucasian)	-0.06	0.09	-0.23	0.11	11	-0.71	0.475
Lower Class	0.10	0.12	-0.14	0.33	11	0.81	0.417
Middle Class	0.04	0.11	-0.18	0.26	11	0.35	0.730

Notes. N=612. All continuous predictor variables were grand mean centered.

Chapter V: Study 1 Discussion

The aim of Study 1 was to examine the validity of three potential pathways that were hypothesized to alter the extent to which negative aging stereotypes are related to negative self-stereotypes. A moderated mediation analysis supported Hypothesis 1 as the association between negative aging stereotypes and negative self-stereotypes was partially explained by an individual's identity as an older adult unless they had positive feelings towards their identification. The indirect effect of negative aging stereotypes on negative self-stereotypes through older age identification was increasingly reduced the more an individual had positive affect towards their identification. First and foremost, this finding supports the notion that the negative stereotypes we hold about older adults do not necessarily become our self-beliefs. With negative self-stereotypes theoretically (Levy et al., 2009) and empirically (Rothermund, 2005) linked to negative self-perceptions of aging, the current findings suggest that those who do not strongly identify as an older adult or those who enjoy their older adult identity may be protected from internalizing all of the aging biases they hold. Consequently, these individuals may maintain more positive self-perceptions of aging. In fact, the harmful role of identifying as an older adult on the internalization of negative aging stereotypes is almost non-existent for those with very high in-group affect. Therefore, the role of older age identification on the

internalization of negative aging stereotypes cannot be fully understood without taking into account an individual's feeling towards their identification. However, it should be noted that positive in-group affect and older adult identification were inversely related in Study 1, meaning most individuals who strongly identify as an older adult do not like this part of their identity. Whereas such a finding is atypical for most social identities, as individuals tend to favor their in-groups, due to the pervasiveness of ageism, older adults are one of the few groups that have more out-group favoritism (Levy, 2003). Before interventions can be designed to boost positive in-group affect for older adults, or to decrease the internalization of negative aging stereotypes, more research is needed to determine the conditions required for individuals who identify as older adults to view their in-group positively.

Hypothesis 2 investigated whether the association between negative aging stereotypes and negative self-stereotypes would be lessened through fears of aging promoting preventative health behaviors. Although having a more negative stereotyped view of older adults was related to higher fears of aging, and increased preventative health behaviors were related to lower negative self-stereotypes, there was no association between fear of aging and preventative health behaviors. Therefore, the full hypothesized pathway was not supported. However, it was found that fears of aging partially explain the internalization of ageist stereotypes. It may be the case that individuals who fear aging view growing old as inevitable, and as a result, they lack the motivational resources to counteract it. This possibility aligns with empirical findings regarding the behavioral pathway of self-perceptions of aging, such that those with negative views on aging tend to have an insufficient self-efficacy and self-esteem to engage in preventative health behaviors (e.g., Levy et al., 2000; Levy & Myers, 2004).

Inducing fear has been a cornerstone of public health messaging aimed at increasing preventative health behaviors (e.g., commercials showing long-time smokers using an electrolarynx as they convey tobacco risks). The immense amount of research on the value of fear as a motivational mechanism has found that strong fear appeals combined with high self-efficacy messages produce the most positive health behavior change. In contrast, strong fear appeals with low self-efficacy messages are the least effective (Witte & Allen, 2000). With many negative aging stereotypes being implicitly transmitted through various forms of media (Boeder et al., 2020; Donlon et al., 2005) and cultural memes (e.g., ageist jokes, Palmore, 2001), fear of aging is being spread without information on the controllability of negative aspects of aging. Therefore, ageist views and the related fear of aging may take their toll on motivational resources even before self-perceptions of aging are developed.

Lastly, those who had more positive aging experiences had a weaker correlation between their negative aging stereotypes and their negative self-stereotypes, supporting Hypothesis 3. Aligning with the externalization hypothesis (i.e., individuals balance aging stereotypes with their own experiences, Bennett & Gains, 2010), this finding evidences a more active conceptualization of the internalization of negative aging stereotypes—Individuals who can focus on the positive aspects of aging, and relatedly, cultivate positive aging experiences are potentially less likely to internalize negative aging stereotypes, ultimately protecting their self-perceptions of aging. Put differently, individuals do not passively incorporate all of the negative aging stereotypes they hold into their self-concept. Instead, they actively negotiate their preconceived notions with their lived experiences. However, being subjected to negative aging stereotypes throughout life is sure to influence individuals' ability to be open-minded to positive aging experiences and possibly exacerbates the effects of age-related loss on their views of

aging. For instance, when negative aging stereotypes are activated experimentally, older adults report lower levels of subjective health and higher feelings of loneliness, as well as more frequent help-seeking behavior (Coudin & Alexopoulos, 2010). Relatedly, numerous studies have found that priming older adults with negative stereotypes can temporarily worsen their performance across both mental and physical tasks (e.g., Hausdorff et al., 1999; Hess et al., 2004; Levy, 1996). Taken together, an important task for future research is to identify ways in which adults can maintain an openness to positive aging experiences despite their negative aging stereotypes.

Study 1 Limitations and Future Directions

While Study 1 had many strengths, there are notable limitations that warrant discussion. First, the sample consisted of older adults who partake in crowdsourced survey work. Although studies using such populations have replicated findings from studies relying on more typical samples (Shank, 2016), and empirically substantiated protocols (Litman & Robinson, 2020) were taken to ensure quality responses, selection bias is still a concern. Particularly, older adults who are more likely to use computers than the average older adult comprised the study sample. More extensive computer usage may be related to increased exposure to ageist content, especially for those who access social media through the internet (Meisner, 2020). Thus, the participants in the current study may hold more negative aging stereotypes than older adults who are less comfortable using the computer. In line with previous findings on older adults with relatively high computer usage (see Hargittai et al., 2019 for a review), a higher proportion of the current sample was Caucasian (90.9% vs. 77%) and highly educated (57.4% vs. 30% had obtained a bachelor's degree or higher) than the national average for older adults (U.S. Department of Health and Human Services, 2018). In contrast to past findings, a higher proportion of the

sample was lower class than national average for older adults (49.3% vs. 41%). This contrast to previous research is most likely due to the current sample's internet usage being partially tied to their income. Such differences in media exposure and demographic characteristics may limit external validity. Further research with a more nationally representative sample is needed to determine the generalizability of the current study's results.

Second, the reliability of the centrality subscale from the larger Three-Dimensional Strength of Group Identification Scale (Cameron, 2004) that was used to operationalize older adult identification had a relatively low Cronbach's alpha. With the deletion of one item, a confirmatory factors analysis revealed the remaining items significantly loaded onto a single factor. Yet, the findings from Hypothesis 1 that used the subscale should be interpreted with caution, and future research is needed to replicate and validate the findings. Beyond replication, it would be beneficial for future studies to test other aspects of identity in relation to the internalization of negative aging stereotypes. For instance, in-group ties which was measured but unused in the current study represents another facet of identity that may influence the extent to which negative aging stereotypes are internalized. Studies have found a positive association between in-group ties and mental health, as those with strong bonds tend to use in-group members as resources to actively cope with stressors (Ysseldyk et al., 2018), including those related to identity issues like discrimination (Branscombe et al., 1999). Whether support from other in-group members prevents the formulation of negative self-stereotypes is unknown but could be an important avenue for future research with practical implications centered around the design of aging support groups.

Last, the current study used a cross-sectional design to test the three hypotheses. While moderation and mediation can be used to test causal pathways, temporal precedence is needed to

make such claims. The current study's analyses relied on atemporal versions of moderation and mediation (Winer et al., 2016) that allowed for examining possible alternate pathways. With this approach the direction of effects cannot be considered causal. Thus, a longitudinal approach where the measurement of negative aging stereotypes precedes the measurement of the predictors, followed by the measurement of negative self-stereotypes, is needed to verify if the findings hold over time and if causal claims can be made. The current findings provide an essential step in elucidating potential factors that can alter the internalization of negative aging stereotypes. The significant pathways identified in the current study should be primary candidates to be tested in future longitudinal research.

Chapter VI: Study 2 Aims

While Study 1 examined moderators and mediators of the stereotype internalization process, Study 2 explored whether and how our already formed self-perceptions of aging change during adulthood. Although previous studies have found that demographics, health, well-being, and, in part, social resources are related to the development of self-perceptions of aging, the samples have been primarily restricted to individuals who were on average in the fourth age of adulthood (i.e., 80 years of age or older). Moreover, self-perceptions of aging have been mostly measured in a general form, instead of being separated by valence. To build a fuller understanding of the development of self-perceptions of aging, Study 2 first examined whether positive and negative self-perceptions of aging significantly change across a decade and identifies the shape of these trajectories. Next, Study 2 identifies the association between personal characteristics, physical and cognitive health, well-being, age identity, age discrimination, and changes in positive and negative self-perceptions of aging for a sample of adults between the ages of 40 and 85. To further extend our understanding of how self-

perceptions of aging develop, Study 2 investigates the relationship between baseline self-perceptions of aging and changes in both positive and negative views of aging. Beyond using a sample of adults with a diverse age range, differences in the development of both perceptions of aging will be explored among middle-aged, third-aged, and fourth-aged adults.

Hypotheses and Research Questions

RQ1. Do positive self-perceptions of aging change across a decade, and if so, what is the shape of the trajectory?

Hypothesis 1: The average individual growth trajectory of positive self-perceptions of aging will be characterized by a significant linear decline across four measurement occasions, totaling 10 years.

RQ2. How are the initial values and changes in positive self-perceptions of aging associated with personal characteristics, health, well-being, social resources, older adult age identification, and perceived age discrimination?

Hypothesis 2.1: Personal characteristics (i.e., age, gender, marital status, educational attainment, and social class) will be significantly related to baseline positive self-perceptions of aging and changes over time.

2.1a: Older individuals will have lower baseline positive self-perceptions and a steeper decline over time.

2.1b. Individuals who report having higher educational attainment and social class will have higher baseline positive self-perceptions of aging and a shallower decline over time.

2.1c: Males and individuals who are married will have higher baseline positive self-perceptions of aging and a shallower decline over time compared to females and individuals who are not married or not living with their spouse.

Hypothesis 2.2: Health factors (i.e., comorbidities and cognitive health) will be significantly related to baseline positive self-perceptions of aging and changes over time.

2.2a: Individuals who report having more comorbidities will have lower baseline positive self-perceptions of aging and a steeper decline over time.

2.2b: Individuals with better cognitive health will have higher baseline positive self-perceptions and a shallower decline over time.

Hypothesis 2.3: Well-being factors (i.e., satisfaction with life and depression) will be significantly related to baseline positive self-perceptions of aging and changes over time.

2.3a: Individuals who report having higher satisfaction with life will have higher baseline positive self-perceptions of aging and a shallower decline over time.

2.3b: Individuals who report having more depressive symptoms will have lower baseline positive self-perceptions of aging and a steeper decline over time.

Hypothesis 2.4: Social resources (i.e., loneliness, quality of relationships with friends/acquaintances and family, and network size) will be significantly related to baseline positive self-perceptions of aging and changes over time.

2.4a: Individuals who experience more loneliness will report lower baseline positive self-perceptions of aging and a steeper decline over time.

2.4b: Individuals who report having higher quality relationships with friends/acquaintances and family, as well as larger network sizes, will have higher baseline positive self-perceptions of aging and a shallower decline over time.

Hypothesis 2.5: Individuals who identify as old compared to those who do not will have significantly lower baseline positive self-perceptions and experience a steeper decline over time.

Hypothesis 2.6: Individual who report experiencing more perceived age discrimination will have lower baseline positive self-perceptions of aging and a steeper decline over time.

RQ3. Do negative self-perceptions of aging change across a decade, and if so, what is the shape of the trajectory?

Hypothesis 3: The average individual growth trajectory of negative self-perceptions of aging will be characterized by a significant linear increase across four measurement occasions, totaling 10 years.

RQ4. How are the initial values and changes in negative self-perceptions of aging associated with personal characteristics, health, well-being, social resources, older adult age identification, and perceived age discrimination?

Hypothesis 4.1: Personal characteristics will be significantly related to baseline negative self-perceptions of aging and changes over time.

4.1a: Older individuals will have higher baseline negative self-perceptions of aging and a steeper increase over time.

4.1b: Individuals who report having higher educational attainment and social class will have lower baseline negative self-perceptions of aging and a shallower increase over time.

4.1c**:** Males and individuals who are married will have lower baseline negative self-perceptions of aging and a shallower increase over time compared to females and individuals who are not married.

Hypothesis 4.2: Health factors (i.e., comorbidities and cognitive health) will be significantly related to baseline negative self-perceptions and changes over time.

4.2a: Individuals who report having more comorbidities will have higher baseline negative self-perceptions and a steeper increase over time.

4.2b: Individuals with better cognitive health will have lower baseline negative self-perceptions of aging and a shallower increase over time.

Hypothesis 4.3: Well-being factors (i.e., satisfaction with life and depression) will be significantly related to baseline negative self-perceptions and changes over time.

4.3a: Individuals who report having higher satisfaction with life will have lower baseline negative self-perceptions of aging and a shallower increase over time.

4.3b: Individuals who report having more depressive symptoms will have higher baseline negative self-perceptions and a steeper increase over time.

Hypothesis 4.4: Social resources (i.e., loneliness, quality of relationships with friends/acquaintances and family, and network size) will be significantly related to baseline negative self-perceptions and changes over time.

4.4a: Individuals who experience more loneliness will have higher baseline negative self-perceptions and a steeper increase over time.

4.4b: Individuals who report having higher quality relationships with friends/acquaintances and family, as well as larger network sizes, will have lower baseline negative self-perceptions of aging and a shallower increase over time.

Hypothesis 4.5: Individuals who identify as being old compared to those who do not will have higher baseline negative self-perceptions and a steeper increase over time.

Hypothesis 4.6: Individuals who report experiencing more perceived age discrimination will have higher baseline negative self-perceptions and a steeper increase over time.

RQ5. What is the relationship between the development of an individual's positive and negative self-perceptions of aging across 10 years?

Hypothesis 5: The initial values and longitudinal trajectories of positive and negative self-perceptions of aging will be inversely related.

RQ6. Do the growth trajectories of positive and negative self-perceptions of aging differ between age groups?

RQ7. Does the relationship between the growth factors related to positive and negative self-perceptions of aging differ between age groups?

RQ8. Are there differences between age groups in terms of what factors are associated with their positive and negative SPA development?

Chapter VII: Study 2 Method

Participants

Data for this study come from the German Aging Survey (DEAS), an ongoing nationally representative cohort-sequential survey of the German population aged 40 and up (Klaus et al., 2017). The first round of DEAS survey data were collected in 1996, and subsequent waves were collected in 2002, 2008, 2011, 2014, and 2017. Every six years, new cross-sectional samples are drawn, and panel respondents are re-interviewed every three years. Thus, data collected in 2002, 2008 (N=8,196), and 2014 (N=10,324) include cross-sectional samples as well as a panel sample of study participants. In 2011 (N=4,854) and 2017 (N=6,626), only panel participants were re-

interviewed. The current study includes data from individuals who completed the 2008 survey and at least two additional surveys between 2011 and 2017 (*N*= 2,969). Individuals who did not provide information on their self-perceptions of aging on at least three measurement occasions were removed from the study, resulting in a total of 2,463 participants. Roughly 91% of the remaining respondents participated in 4 waves of data collection. Systematic sample analyses conducted by the German Aging Survey indicate that individuals who participate in multiple waves tend to be younger, healthier, more educated, and have higher incomes and more extensive informal networks than respondents who drop out (Klaus et al., 2017). See Table 5 for sample characteristics.

Measures

Personal Characteristics

Age, sex, education, marital status, and social class were used to assess the personal characteristics of the participant. Marital status was dichotomized (0=not married, 1=married). Educational attainment was assessed with the International Standard Classification of Education which distinguishes between low (incomplete vocational training), medium (complete vocational training and/or high school degree) and higher education (completion of any higher education; UNESCO, 1997). The educational attainment variable was dummy coded such that low (0=not low educational attainment, 1=low educational attainment) and medium educational (0=not medium educational attainment, 1=medium educational attainment) attainment were compared to higher educational attainment in the statistical analyses.

Social class was measured by the combined social class of an individual and their spouse, if applicable. The measure contains five categories, including lower class, lower middle class, middle class, upper middle class, and upper class. The DEAS constructed the social class

variable by assigning each occupational code to an economic class based on the average income associated with that occupation. The highest economic class between an individual and their spouse, if alive, was assigned to the participant. Upon creating a social class variable that collapses the social classes in a manner similar to Study 1, several issues occurred. First, Germany has an extremely large middle class, which if condensed into a single category would contain 76.1% of the participants. Second, Germany's lower class is extremely small, with only 51 individuals in the sample falling into the lower-class category. This small subsample could lead to unreliable statistical results, especially when testing for age group differences. Lastly, due to the relatively low number of occupations actually representing upper class occupations in the DEAS, caution is given for separating the upper middle-class and upper-class categories (Mayer & Wagner, 1999 as cited by Engstler et al., 2019). Accordingly, the middle-class sub-categories were distributed into the other economic classes to create three distinct middle-class categories. The lower class and lower-middle-class categories were combined to make a lower-middle-class category. The upper-middle-class and upper-class categories were combined to create a upper-middle-class category. These classes were then dummy coded in each analysis so the effects of being lower-middle class (0=not lower-middle class, 1=lower-middle class) and middle class (0=not middle class, 1=middle class) were compared to upper-middle class.

Lastly, for age group analyses, participants were placed in categories representing the middle (40-59 years of age), third (60-74 years of age), and fourth age (75 years of age or older) of adulthood. Although the fourth of age of adulthood is most commonly defined as 80 years of age and older, the current study used a cut-off of 75 to ensure a reasonable sample size for statistical analyses.

Self-Perceptions of Aging

The self-perceptions of aging variables were transformed using the percentage of maximum possible (POMP) method, such that the lowest and highest scores on the scale were transformed to 0 and 100, respectively (Moeller, 2015). This transformation allowed for more interpretable fixed-effect coefficients as small changes in the intercept and slope due to the inclusion of a predictor variable may be significant but not detectable when rounded to the tenths place. This method does not change the relationship between variables, only the size of the unstandardized parameters. Transforming self-perceptions of aging measures to increase the size of the unstandardized parameters through the POMP method or similar means (i.e., *T* metric standardization) is becoming increasingly common for longitudinal studies in general, and for self-perceptions of aging specifically (Boeder et al., 2020; Kotter-Grühn, et al., 2009).

Positive Self-Perceptions of Aging. Positive self-perceptions of aging were assessed with the Ongoing Development scale from the larger set of Aging-Related Cognitions scales (Dittman-Kohli et al., 1997; Steverink et al., 2001). The scale consists of four items which were assessed on a 4-point Likert scale, ranging from 1 (*definitely false*) to 4 (*definitely true*). The four items that make up the scale include: "Aging means to me that I continue to make plans", "my capabilities are increasing", "I can still learn new things", and "I can still put my ideas into practice". The scale was internally reliable in previous research (Steverink et al., 2001; α=.78) and across measurement occasions in the current study (α_{2008}=.68; α_{2011}=.67; α_{2014}=.79; α_{2017}=.81). Similar to previous work using respondents who participated in multiple waves, the Cronbach's alpha varied across waves and at times was lower than those found in the original validation study (Wurm et al., 2010). Research has also found the scale to be longitudinally invariant across age and genders (Jung et al., 2019).

Table 5

Baseline Sample Characteristics Overall and by Age Group for Study 2

	Full Sample		Middle Age		Third Age		Fourth Age	
	Mean/Percentage	SD	Mean/Percentage	SD	Mean/Percentage	SD	Mean/Percentage	SD
1. Age	60.47	10.16	53.92	6.45	69.26	2.70	78.38	2.59
2. Gender (female)	51.60%		55.80%		46.90%		36.00%	
3. Marital Status (married)	84.10%		85.50%		83.70%		73.90%	
4. Low Educational Attainment	5.40%		3.70%		6.40%		14.80%	
5. Medium Educational Attainment	49.20%		49.40%		49.90%		45.00%	
7. Lower Class	19.00%		17.60%		14.50%		11.40%	
5. Middle Class	26.80%		26.70%		25.60%		33.30%	
6. Comorbidities	2.13	1.64	1.80	1.49	2.56	1.68	2.99	1.88
7. Cognitive Health	45.72	12.73	49.21	12.23	40.55	11.29	37.12	11.08
8. Satisfaction with Life	3.83	0.69	3.75	0.71	3.95	0.64	4.01	0.61
9. Depressive Symptoms	5.65	5.46	5.92	5.82	5.20	4.86	5.25	4.53
10. Loneliness	1.74	0.52	1.78	0.53	1.70	0.51	1.65	0.49
11. Friendship Quality	4.16	0.60	4.18	0.61	4.12	0.59	4.14	0.56
12. Family Quality	4.09	0.76	4.06	0.77	4.09	0.73	4.25	0.70
13. Network Size	4.91	2.78	5.06	2.77	4.75	2.81	4.38	2.60
14. Older Age Identification	13.30%		2.60%		22.80%		63.50%	
15. Age Discrimination	0.15	0.55	0.17	0.56	0.13	0.55	0.13	0.47
16. Positive SPA	64.66	16.44	65.17	15.84	63.98	17.36	63.41	17.27
17. Negative SPA	57.75	17.91	56.84	17.80	58.67	17.88	61.19	18.36

Note. N=2,463. $n_{Middle\ Age}$= 1,523, $n_{Third\ Age}$= 751, $n_{Fourth\ Age}$= 189. SPA=self-perceptions of aging. All variables were measured at the 2008 baseline measurement occasion.
Age discrimination scores were cube-rooted. SPA scores were POMP transformed.

Negative Self-Perceptions of Aging. The Physical Loss scale from the Aging-Related Cognitions scales was used to measure negative self-perceptions of aging (Steverink et al., 2001). Participants were asked to rate their negative views of aging with a 4-point Likert scale, ranging from 1 (*definitely false*) to 4 (*definitely true*). The subscale consists of four items, including "Aging means to me being less energetic and fit," "my health declines," "I have less physical endurance," and "I'm less able to handle physical declines." The underlying factor structure and internal reliability has been established (Steverink et al., 2001; α=.79). In the current study, the scale was found to be internally reliable across measurement occasions (α_{2008}=.77; α_{2011}=.79; α_{2014}=.78; α_{2017}=.81). Additionally, research using the DEAS has found the scale to be invariant to age and gender (Jung et al., 2019).

Health

Comorbidity. Comorbidity was assessed by the total number of health conditions individuals indicated they had from a list of 11 common chronic conditions (e.g., cardiovascular diseases, circulatory issues, arthritis). The items were summed, meaning scores range from 0 to 11(for the entire list of chronic health issues, see Klaus et al., 2017).

Cognitive health. The Digit Symbol Substitution Test (Wechsler, 1955) from the Wechsler Adult Intelligence Scale was used to assess cognitive health. During this test, the interviewee is shown a table with codes of hieroglyphic figures that correspond to geometric signs. After reviewing the table, the interviewee is given 90 seconds to fill out a table with four rows of figures with the corresponding geometric sign. The total number of correct matches was used as a measure of cognitive health. While the test does not have a maximum score, meta-analyses indicate that the average older adult receives a score of 48.6 (Hoyer et al., 2004). The

test has been widely used since its inception and has shown to be a valid and reliable indicator of perceptual processing speeds (Hoyer et al., 2004).

Well-Being

Satisfaction with life. The Satisfaction with Life Scale (Diener et al., 1985) was used to measure the cognitive component of subjective well-being. The measure consists of 5 items, rated on a Likert scale with responses ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A sample item includes: "In most ways my life is close to ideal." The items were averaged such that higher scores represent higher satisfaction with life. Previous studies have found the scale to be valid in both U.S. (Diener et al., 1985; α=.87) and German samples (Glaesmer et al., 2011; α=.92). The scale was found to be internally reliable in the current study (α=.85).

Depression. The German version of the Center for Epidemiological Studies Depression Scale (CES-D) was used to assess depressive symptoms (Hautzinger, 1988). Participants rated the extent to which they experienced 15 depressive symptoms during the past week on a Likert scale ranging from 1 (*rarely or none of the time – less than one day long*) to 4 (*most or all of the time – five to seven days long*). Sample items include: "I felt lonely" and "I thought my life had been a failure." The composite variable is a sum score that has been transformed to a range of 0 to 45, with higher values indicating more frequent depressive symptoms. The scale has been found to be reliable in previous research (Radloff, 1977; α=.85) and in the current study (α=.74).

Social Resources

Social resources were measured by a combination of subjective perceptions of the quality of one's relationships and the total size of one's developmental network.

Loneliness. A six-item version of the De Jong Gierveld Loneliness Scale was used to assess overall, social, and emotional loneliness (De Jong Gierveld & Van Tilburg, 2006). The six

items were presented on a Likert scale ranging from 1 (*strongly agree)* to 4 (*strongly disagree*). Sample items include "I miss having people around" and "There are plenty of people that I can depend on if I'm in trouble." The positively worded items were reverse coded before all items were averaged, resulting in higher scores equating to more loneliness. The short version of the scale has been found to be valid and reliable in past research (De Jong Gierveld & Van Tilburg, 2006; α=.70-.76) and in the current study (α=.94).

Relationship quality of friends and acquaintances. The quality of one's relationship with friends and acquaintances was measured with a single item developed by the DEAS: "How would you rate your present relationship with your friends and acquaintances?" Participants responded to the single item on a Likert scale ranging from 1 (*very good*) to 5 (*very bad*). Responses were reverse coded so higher scores indicate better relationship quality. This measure of relationship quality has been used in previous work assessing health in later life (Hajek et al., 2017).

Relationship quality of family. The quality of one's relationship with family was measured with a single item: "How would you rate your relationship with your family overall at the moment?" Participants responded to the single item on a Likert scale ranging from 1 (*very good*) to 5 (*very bad*). Responses were reverse coded so higher scores indicate better relationship quality.

Network size. The size of one's network was represented by the total number of important people participants reported having regular contact with. The maximum number that an individual was able to report was nine, thus the scale ranged from 0 to 9.

Older Age Identification

Identification with the older adult social category was created from the difference between participants' chronological age and their response to the question "At what age would you describe someone as old?" For the purposes of this study, individuals whose chronological age was equal to or greater than the older age classification they provided were categorized as having an older adult age identification. Thus, individuals were either coded as identifying as an older adult (older age identification=1) or not (young age identification=0). Past research has measured age identity by subtracting an individual's chronological age from the age they feel most of the time (for a review of age identity and subjective age, see Diehl et al., 2014). Negative values reflect a younger subjective age, whereas positive values signify an older subjective age. While this method of constructing age identity recognizes the subjective nature of an individual's age, whether an individual perceives themselves as old or not captured. By substituting an individual's perceived age for the age at which they perceive people as old, it becomes possible to classify whether they identify with the older adult social category or not. The outcome is equivalent to research that has individuals place themselves in a discrete age category (e.g., young, middle, or older adult; for a review, see Barak, 2009) as a means of classifying their age group identification.

Perceived Age Discrimination

Perceived age discrimination was assessed by the total number of domains in which participants reported having felt discriminated against due to their age. The domains included work (i.e., at work or while looking for work), in dealing with government agencies, medical care, everyday life, money matters, and any other area they wished to specify. If no additional area was specified, a missing response was coded as "no" response. Through summing all "yes" responses, the scale ranged from 0 to 6 with higher scores indicating more perceived age

discrimination. Lastly, to handle convergence issues caused by the skewness of this variable all scores were cube rooted.

Data Screening

Data screening procedures for growth modeling followed those outlined by Grimm et al. (2016). All variables were first inspected for errors (e.g., scores outside the possible scale bounds), normality, and multicollinearity (e.g., bivariate correlations above .70). According to descriptive statistics and bivariate correlations between the measures at baseline, all variables were normally distributed, and multicollinearity was not present (see Tables 5 and 6).

Next, the data were converted to long format to create visualizations of the growth processes for both self-perceptions of aging. Longitudinal plots with a random subsample of roughly one third of the participants (n=754) were analyzed using the ggplot2 package (Wickham, 2016) within the open-source statistical software R (version 4.0.3). The figures were created with one third of the participants to maximize the readability of the figure while also providing enough data to visualize trends that should hold for the full sample. For each plot, the measurement occasion was used as the time metric for the x-axis. Based on a visual inspection of the plots, it appeared that individuals, on average, experienced small decreases and increases in positive and negative self-perceptions of aging, respectively (see Figures 7 and 8). However, there was a large degree of variability around these averages.

Table 6

Correlations Between Variables at Baseline for Study 2

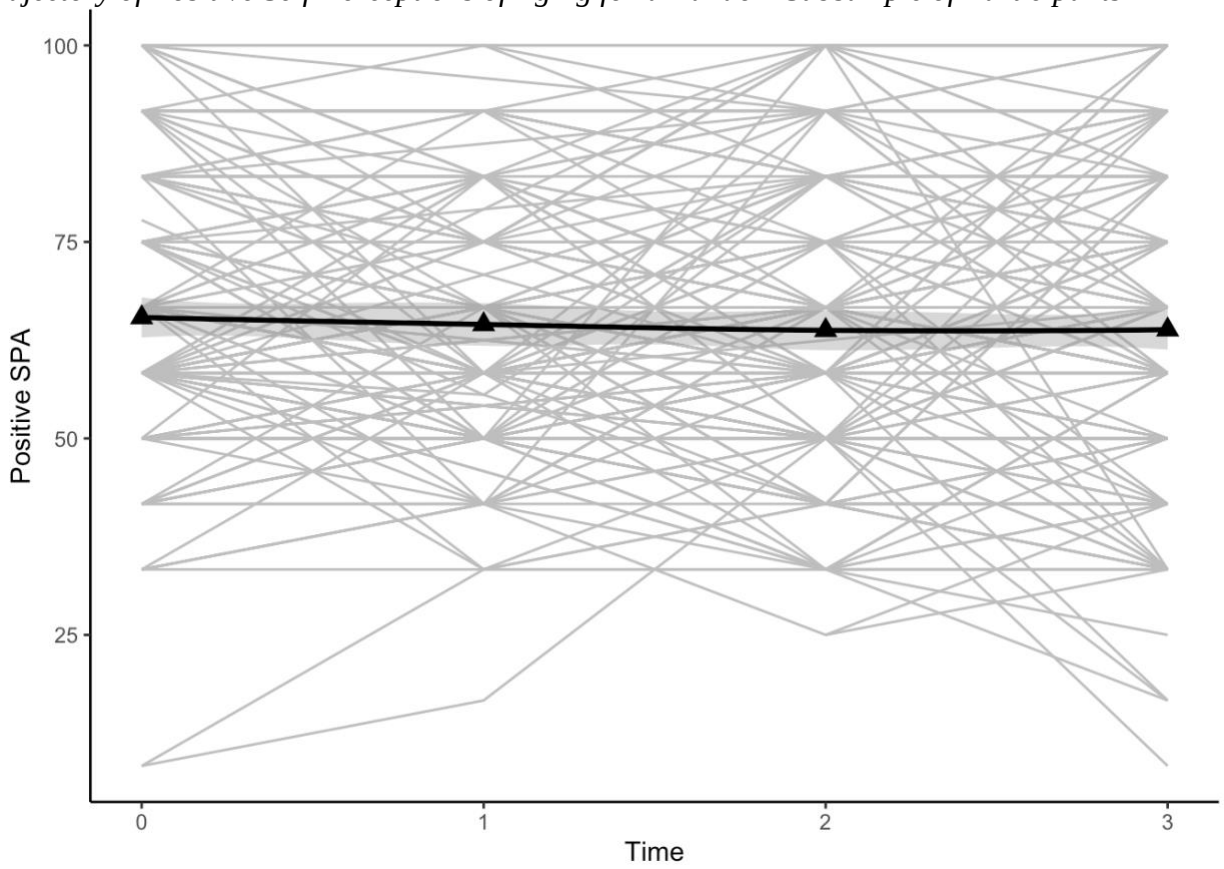
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Age	1																		
2. Gender (female)	-.11**	1																	
3. Marital Status (married)	-.07**	-.17**	1																
4. Low Educational Attainment	.12**	.17**	-.09**	1															
5. Medium Educational Attainment	-.02	.11**	-.05*	-.23**	1														
6. Lower Class	-.07**	.03	-.10**	.22**	.20**	1													
7. Middle Class	.03	.04	-.05*	-.02	.21**	-.27**	1												
8. Comorbidities	.29**	-.01	-.04	.09**	.02	.03	.03	1											
9. Cognitive Health	-.40**	.19**	.07**	-.11**	-.08**	-.16**	-.05	-.20**	1										
10. Satisfaction with Life	.15**	.03	.16**	-.02	-.07**	-.12**	-.05*	-.16**	.03	1									
11. Depressive Symptoms	-.07**	.10**	-.13**	.02	.05*	.06**	-.02	.25**	-.05*	-.34**	1								
12. Loneliness	-.12**	-.09**	-.09**	.00	.05*	.05*	.00	.11**	-.01	-.45**	.25**	1							
13. Friendship Quality	-.04	.12**	-.05*	-.00	-.03	-.01	.01	-.05*	.07**	.11**	-.08**	-.28**	1						
14. Family Quality	.05*	.07**	-.01	-.01	.01	-.01	.02	-.04	.05*	.17**	-.12**	-.26**	.24**	1					
15. Network Size	-.10**	.06**	.09**	.00	-.02	-.04	-.02	.01	.12**	.03	-.04*	-.07**	.07**	.08**	1				
16. Older Age Identification	.46**	-.13**	-.07**	.08**	-.01	-.02	.03	.17**	-.24**	.03	.02	.01	-.05*	.02	-.08**	1			

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
17. Age Discrimination	-.01	.01	-.08**	.02	.01	.02	.05	.12**	-.05*	-.21**	.13**	.12**	-.00	-.06**	-.00	-.01	1		
18. Positive SPA	-.03	.01	.03	-.03	-.05*	-.07**	.00	-.15**	.08**	.37**	-.21**	-.24**	.09**	.09**	-.01	-.09**	-.02	1	
19. Negative SPA	.06**	-.05*	-.04	.03	.00	.09**	.00	.30**	-.09**	-.27**	.27**	.13**	-.06**	-.05*	-.02	.13**	.13**	-.33**	1

Note. SPA= Self-perceptions of aging. All variables were measured at the 2008 baseline measurement occasion.
*p<.05; **p<.001; ***p<.001.

Figure 7

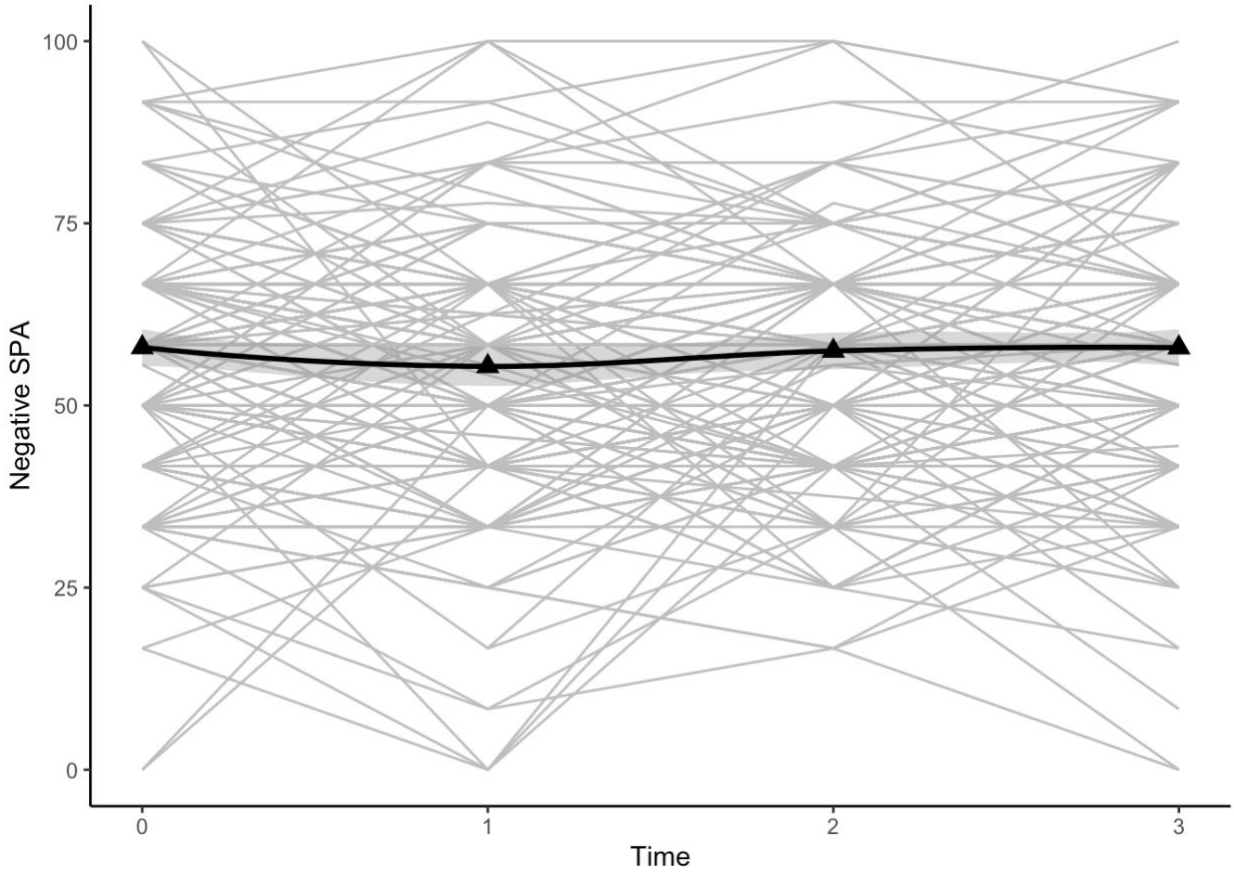
Trajectory of Positive Self-Perceptions of Aging for a Random Subsample of Participants



Note. *n*= 745. SPA= Self-perceptions of aging. Data for the plot comes from randomly sampling about one-third of the full sample. Each line represents a single individual's trajectory, while the solid black line represents the average trajectory. Time is represented by measurement occasion with the baseline wave occurring in 2008, T1 in 2011, T2 in 2014, and T3 in 2017.

Figure 8

Trajectory of Negative Self-Perceptions of Aging for Subsample of Participants



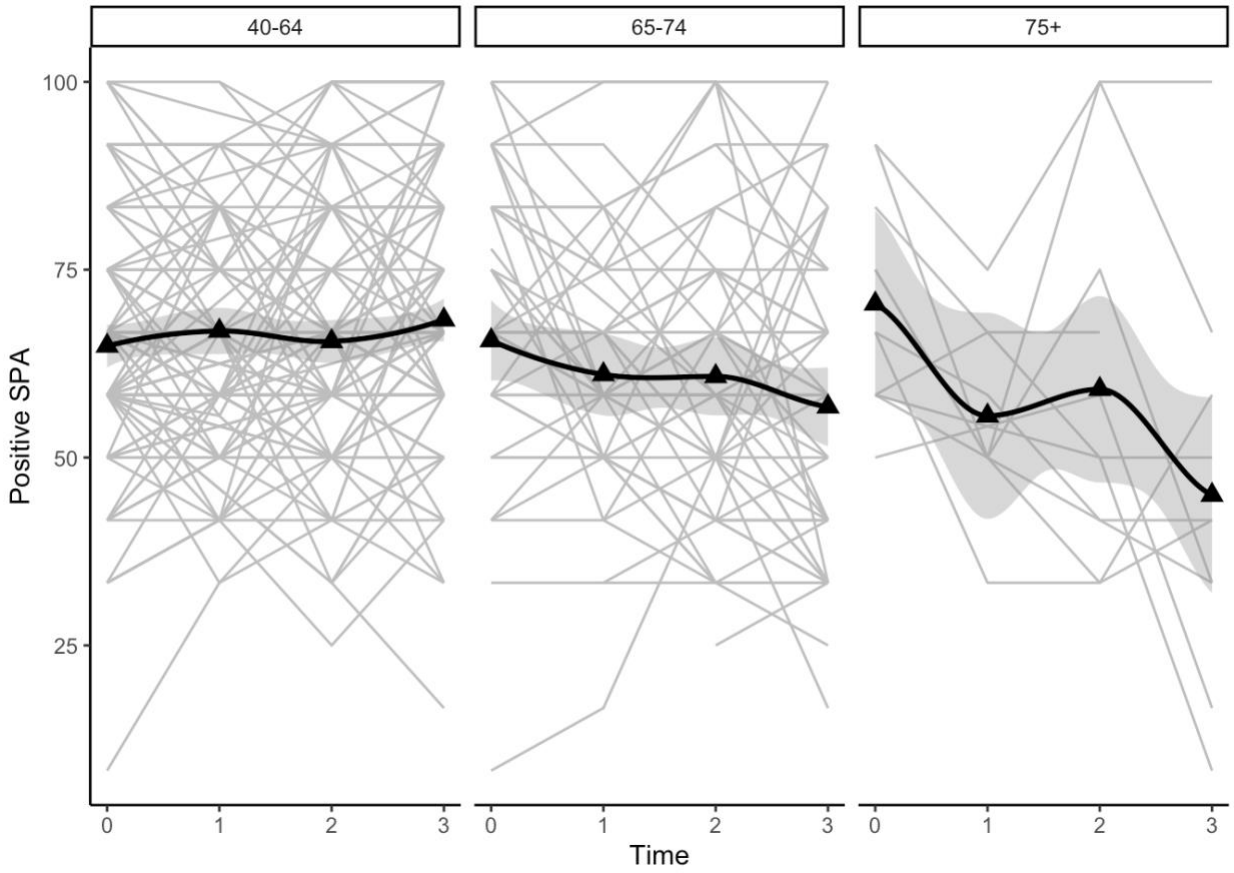
Note. *n*= 745. SPA= Self-perceptions of aging. Data for the plot comes from randomly sampling about one third of the full sample. Each line represents a single individual's trajectory, while the solid black line represents the average trajectory. Time is represented by measurement occasion with the baseline wave occurring in 2008, T1 in 2011, T2 in 2014, and T3 in 2017.

Subsequently, longitudinal plots were created for each age group to inspect whether the growth trajectories were different across middle-aged (*n*= 495), third-aged (*n*= 217), and fourth-aged adults (*n*= 42) (see Figures 9 and 10). Again, the plots were created from a random sample of roughly a third of the participants in each age group to optimize readability and interpretability of the longitudinal trajectories. Based on a visual inspection of plots, middle-aged

adults experienced more positive and less negative self-perceptions of aging across measurement periods. In contrast, self-perceptions of aging became worse over time for the older age groups, with declines in positive and increases in negative self-perceptions of aging much steeper for those in the fourth age of adulthood compared to those in the third age. Again, within each age group there appeared to be quite a bit of variability around the mean. Next, using the entire sample and a wide-formatted dataset, between-person means and standard deviations for the self-perceptions of aging were investigated across measurement occasions to give further context to the visual plots. In general, the descriptive statistics using between-person averages supported the inferences made from the visual plots that rely on within-person data for both the entire sample and for each age group (see Table 7).

Figure 9

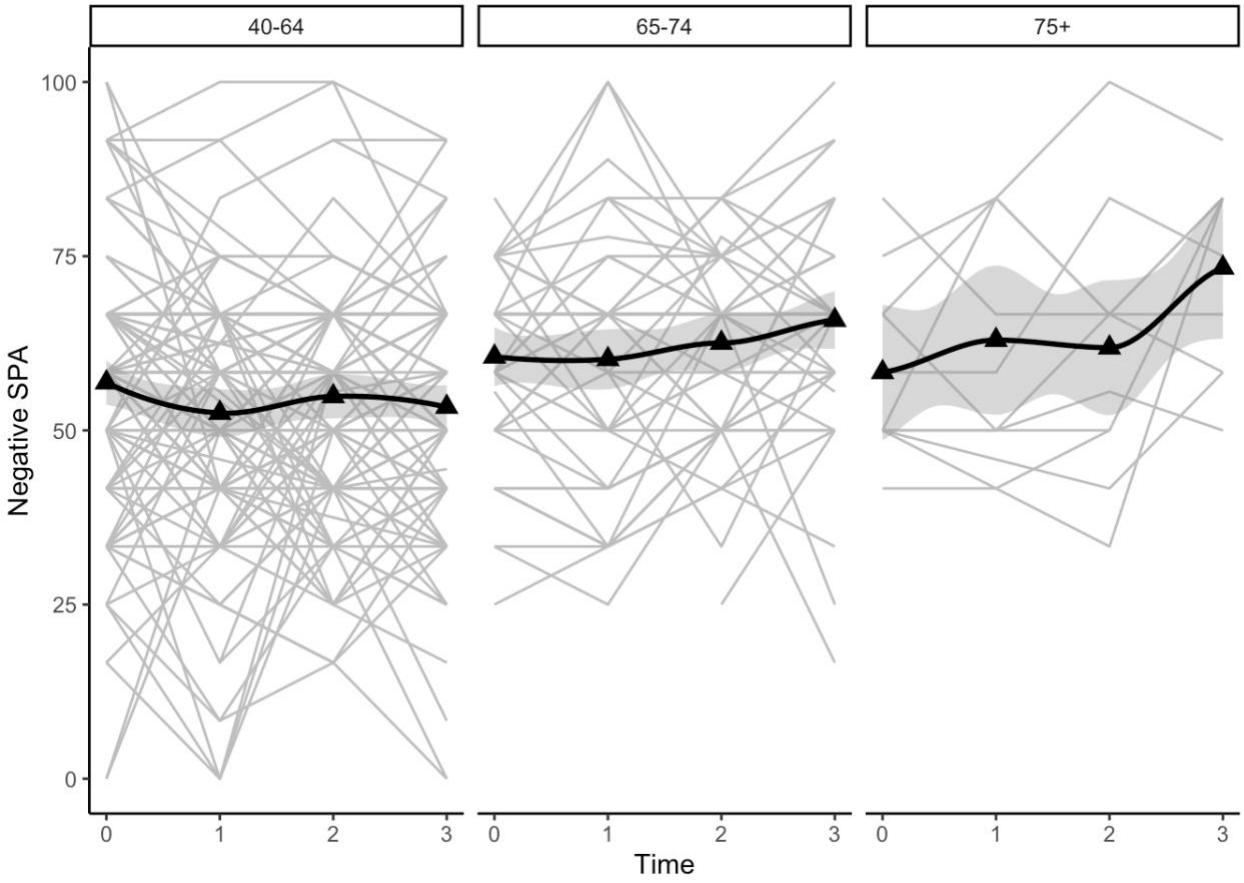
Trajectory of Positive Self-Perceptions of Aging by Age Group



Note. $n_{Middle\ Age}$= 495, $n_{Third\ Age}$= 217, $n_{Fourth\ Age}$= 42. SPA= Self-perceptions of aging. Data for these plots come from randomly sampling about one third of the participants in each age group. Each line represents a single individual's trajectory, while the solid black line represents the average trajectory. Time is represented by measurement occasion with the baseline wave occurring in 2008, T1 in 2011, T2 in 2014, and T3 in 2017.

Figure 10

Trajectory of Negative Self-Perceptions of Aging by Age Group



Note. $n_{Middle\ Age}$= 495, $n_{Third\ Age}$= 217, $n_{Fourth\ Age}$= 42. SPA= Self-perceptions of aging. Data for these plots come from randomly sampling about one-third of the participants in each age group. Each line represents a single individual's trajectory, while the solid black line represents the average trajectory. Time is represented by measurement occasion with the baseline wave occurring in 2008, T1 in 2011, T2 in 2014, and T3 in 2017.

Table 7

Means and Standard Deviations of Positive and Negative Self-Perceptions of Aging Across Time

	2008		2011		2014		2017	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Entire Sample								
Positive SPA	64.66	16.44	63.78	16.96	63.96	18.06	63.13	19.21
Negative SPA	57.75	17.91	58.26	18.52	57.91	17.74	58.73	18.04
Middle Age								
Positive SPA	65.17	15.84	64.83	16.54	66.96	17.11	67.09	17.98
Negative SPA	56.84	17.80	56.7	18.57	55.74	17.45	55.91	17.98
Third Age								
Positive SPA	63.98	17.36	62.41	17.46	60.06	18.57	57.93	18.98
Negative SPA	58.67	17.88	60.10	18.44	60.77	17.70	62.66	16.90
Fourth Age								
Positive SPA	63.41	17.27	60.99	17.5	55.66	17.81	50.62	19.99
Negative SPA	61.19	18.36	63.31	16.88	63.64	17.33	66.63	17.96

Note. N=2,463. $n_{Middle\ Age}$= 1,523, $n_{Third\ Age}$= 751, $n_{Fourth\ Age}$= 189.

Data Analysis

To investigate the current study's research questions and hypotheses, a series of growth models were conducted using Mplus (version 8.4). As in previous longitudinal studies on self-perceptions of aging, missing data was handled by using a full information maximum likelihood estimator (FIML; Jung et al., 2019; Sargent-Cox et al., 2014). FIML uses all of the sample data in the model to estimate the most likely population parameters. Studies have shown that similar results are obtained when using FIML compared to multiple imputation (Collins et al., 2001). The overall adequacy of each model's fit was assessed through traditional structural equation model criteria: comparative fit index (CFI) > .90, root mean square error of approximation (RMSEA) < .05, and standardized root mean square residual (SRMR) < .08 (e.g., Hu & Bentler, 1999; MacCallum et al., 1996).

Unconditional growth models were created for positive and negative self-perceptions of aging independently to test Hypotheses 1 and 3. With three or four time points per participant, each model was tested for linear and quadratic time effects. Next, the optimal models of time for both self-perceptions of aging were combined into an unconditional parallel process growth curve model to test Hypothesis 5. While it is possible to regress the intercepts of the self-perceptions of aging variables onto the slopes, this practice is best used when the intercept is a meaningful time point in the developmental process (e.g., the onset of retirement; Grimm et al., 2016). With no meaningful developmental process associated with the chosen baseline wave of the current study, the relationships between the growth factors were modeled as correlations instead of regressions. Therefore, causal claims regarding the relationship between the intercepts and slopes of the self-perceptions of aging trajectories cannot be made. Hypotheses within RQ2 and RQ4 were tested by adding predictors to the model, creating conditional parallel process growth models. The model building steps were repeated for each age group to test RQs 6, 7, and 8.

For the conditional models, each predictor was modeled as a time-invariant covariate. When modeling covariates as time-invariant, all values of the predictor variables are measured at baseline, and their longitudinal changes are not incorporated into the model. The covariates were modeled as time-invariant because they necessitate many fewer degrees of freedom and allow for inferences to be made about how a one-unit change in the covariate is associated with changes in the intercept and slope of the dependent variable. Essentially, when time-invariant covariates are included in a growth model, they directly predict the growth factors (e.g., intercept, slope). In contrast, the effects of the time-varying predictors are directly regressed onto the repeated measures instead of the growth factors. Thus, the inclusion of time-varying predictors heavily

taxes growth models and would not allow for the number of covariates specified in the hypotheses to be tested, nor would they allow for the necessary interpretations to answer the underlying research questions driving Study 2.

Chapter VIII: Study 2 Results

In lieu of presenting the results in sequential order by hypothesis, they will be presented in the order of the model building steps described in the previous section. First, results from the unconditional growth curve models for positive and negative self-perceptions of aging using the full sample will be presented, followed by the unconditional growth models specific to each age group. Next, the optimal growth models for the two self-perceptions of aging will be combined into an unconditional parallel process model growth. Results for the full sample, followed by those for each age group, will be presented. Lastly, covariates will be added to the unconditional models, creating conditional parallel process growth models. Again, the results of these models will first be presented for the full sample and then for each age group.

Unstandardized parameter estimates are reported in the results section (*b*). Both unstandardized and standardized (β) parameter estimates are reported in the tables presenting the results for the conditional models. Standardized parameter estimates allow independent variables to be compared in terms of how strongly they are related to self-perceptions of aging.

Unconditional Growth Curve Models: Full Sample

Hypothesis 1: The average individual growth trajectory of positive self-perceptions of aging will be characterized by a linear decline across measurement occasions.

Unconditional growth curve models for positive self-perceptions of aging using the full sample were analyzed to test Hypothesis 1. The first model assessed the adequacy of modeling the development of positive self-perceptions of aging linearly. Adequate model fit was observed:

CFI= 1.00, RMSEA= .03, 90% CI [.01, .04], and SRMR= .01. Both the intercept (*b*= 64.66, *p*<.001) and the slope were significant (*b*= -0.48, *p*<.001), suggesting that positive self-perceptions of aging decline linearly across measurement occasions (see Table 8). Additionally, the variance components of the growth factors were significant, indicating significant between-person differences in the starting value and changes in positive self-perceptions of aging over time. Significant variance also suggests that predictor variables can be introduced to explain the variability within the average intercept and slope. Next, the development of positive self-perceptions of aging was modeled quadratically: CFI= 1.00, RMSEA= .04, 90% CI [.01, .08], and SRMR= .01. While adequate model fit was found, the quadratic growth factor was not significant (*b*=-0.08, *p*=.505); therefore, the growth of positive self-perceptions of aging was measured linearly in subsequent analyses.

Hypothesis 3: The average individual growth trajectory of negative self-perceptions of aging will be characterized by a linear increase across measurement occasions.

Linear and quadratic growth models for negative self-perceptions of aging using the full sample were created to test Hypothesis 3. The linear model adequately fit the data: CFI= 1.00, RMSEA= .04, 90% CI [.03, .06], and SRMR= .03. The intercept (*b*=57.74, *p*<.001) and slope (*b*=0.27, *p*=.030) were significant, revealing that negative self-perceptions of age increase linearly across measurement occasions for the entire sample (see Table 8).

Table 8

Model Fit and Estimates of Linear Growth Models

	Positive SPA					Negative SPA				
	CFI	RMSEA	SRMR	*b*	SE	CFI	RMSEA	SRMR	*b*	SE
Full Sample	1.00	0.03	0.01			0.99	0.04	0.03		
Means										
Intercept				64.66***	0.32				57.74***	0.35
Slope				-0.48***	0.13				0.27*	0.12
Intercept<->Slope				-0.17***	0.04				-0.27***	0.05
Variance										
Intercept				162.99***	8.07				206.53***	9.56
Slope				20.77***	1.55				10.87***	1.53
Middle Age	1.00	0.04	0.02			0.99	0.05	0.04		
Means										
Intercept				64.99***	0.39				56.83***	0.45
Slope				0.72***	0.16				-0.37*	0.15
Intercept<->Slope				-0.17**	.05				-0.27***	0.06
Variance										
Intercept				148.75***	9.59				203.96***	12.04
Slope				17.63***	1.80				10.18***	1.92
Third Age	1.00	0.00	0.01			1.00	0.02	0.04		
Means										
Intercept				64.12***	0.61				58.76***	0.64
Slope				-2.02***	0.23				1.19***	0.21
Intercept<->Slope				-0.21**	0.07				-0.39***	0.07
Variance										
Intercept				190.79***	15.81				214.89***	17.83
Slope				18.46***	2.77				11.77***	2.67
Fourth Age	1.00	0.00	0.07			1.00	0.02	0.07		
Means										
Intercept				64.08***	1.19				60.96***	1.25
Slope				-4.15***	0.53				1.74***	0.46

	Positive SPA					Negative SPA				
	CFI	RMSEA	SRMR	*b*	SE	CFI	RMSEA	SRMR	*b*	SE
Intercept<->Slope				-0.30	0.18					
Variance										
Intercept				155.76***	34.05				171.44***	33.89
Slope				18.14*	7.15				4.23	6.11

Note. SPA= self-perceptions of aging. CFI= comparative fit index. RMSEA= root mean square error of approximation. SRMR= standardized root mean square residual. The means and variances of the slopes are represented by unstandardized estimates. However, the covariances between the intercept and slope were standardized and can be interpreted as the correlation between the growth factors. *p<.05; **p<.01; ***p<.001.

Again, the variance of the intercept and slope were significant, indicating that there are between-person differences in the starting value and change in negative self-perceptions of aging that can be explained with the inclusion of the predictors in the subsequent models. Next, a quadratic representation of growth was tested, and adequate model fit was found: CFI= 1.00, RMSEA= .05, 90% CI [.02, .09], and SRMR= .01. Although the data fit this model, the quadratic growth factor was not significant (b=0.15, p=.202); therefore, the development of negative self-perceptions of aging was modeled linearly in subsequent growth models.

Unconditional Growth Curve Models: Age Groups

RQ6. Do the growth trajectories of positive and negative self-perceptions of aging differ between age groups?

The same process of testing the development of positive and negative self-perceptions of aging linearly and then quadratically was carried out for each age group. These analyses were conducted to determine whether the linear growth trajectories observed for both perceptions of aging using the full sample apply to each age group. The same pattern of findings was observed for each age group—both the linear and quadratic models fit the data, yet only the intercept and slope were significant for the linear model (see Table 8). Additionally, the variance of the intercept and slope were significant in the linear models for each age group allowing for the inclusion of predictor variables in the parallel process growth models. Of particular interest, middle-aged adults, on average, experienced increases in positive self-perceptions of aging, while third and fourth-aged adults experienced declines. Similar findings were observed for negative self-perceptions of aging as middle-aged adults experienced slight decreases in these perceptions across measurement occasions. In contrast, third and fourth agers experienced increases over time.

Unconditional Parallel Process Model: Full Sample

Hypothesis 5: The initial values and longitudinal trajectories of positive and negative self-perceptions of aging will be inversely related.

After the growth curves were modeled independently, Hypothesis 5 was tested through an unconditional parallel process model such that the growth of both self-perceptions of aging was modeled simultaneously along with the covariances between the intercepts and slopes. The first unconditional parallel process model included the full sample and was found to adequately fit the data: CFI= .98, RMSEA= .05, 90% CI [.04, .06], and SRMR= .03. As expected, the intercept and slope for both positive and negative self-perceptions of aging remained identical to the independent models. The intercept and slope of positive self-perceptions of aging had a weak, inverse correlation (r = -.17, p<.001) such that higher initial positive self-perceptions of aging were related to a steeper decline across measurement occasions (see Table 9). For negative self-perceptions of aging, higher baseline ratings were related to a shallower increase over time (r = -.28, p<.001). The intercepts of the growth factors had a strong negative correlation (r = -.54, p<.001), suggesting that higher starting values on either positive or negative self-perceptions of aging were related to lower baseline values on the opposite self-perception of aging. A similar correlation was found between the slopes of the growth factors (r = -.59, p<.001), indicating that steeper increases in negative self-perceptions of aging were associated with steeper decreases in positive self-perceptions of aging. Negative self-perceptions at baseline were not correlated with the rate of change in positive self-perceptions of aging (r = -.01, p=.741). In contrast, more positive self-perceptions of aging at baseline were associated with steeper increases in negative self-perceptions of aging across measurement occasions (r = .19, p<.001).

Table 9

Relationship Between Growth Factors from Unconditional Parallel Process Models

	CFI	RMSEA	SRMR	*R*	SE
Full Sample	.98	.05	.03		
$I_{positive}$ <-> $S_{positive}$				-.17***	.04
$I_{negative}$ <-> $S_{negative}$				-.28***	.05
$I_{positive}$ <-> $I_{negative}$				-.54***	.03
$I_{positive}$ <-> $S_{negative}$				.19***	.05
$I_{negative}$ <-> $S_{positive}$				-.01	.04
$S_{positive}$ <-> $S_{negative}$				-.59***	.06
Middle Age	.98	.05	.03		
$I_{positive}$ <-> $S_{positive}$				-.17**	.05
$I_{negative}$ <-> $S_{negative}$				-.27***	.06
$I_{positive}$ <-> $I_{negative}$				-.58***	.03
$I_{positive}$ <-> $S_{negative}$				.20**	.06
$I_{negative}$ <-> $S_{positive}$				.06	.05
$S_{positive}$ <-> $S_{negative}$				-.61***	.08
Third Age	.99	.05	.03		
$I_{positive}$ <-> $S_{positive}$				-.20**	.07
$I_{negative}$ <-> $S_{negative}$				-.39***	.07
$I_{positive}$ <-> $I_{negative}$				-.49***	.05
$I_{positive}$ <-> $S_{negative}$				.20*	.08
$I_{negative}$ <-> $S_{positive}$				-.08	.07
$S_{positive}$ <-> $S_{negative}$				-.35***	.10
Fourth Age	1.00	.00	.06		
$I_{positive}$ <-> $S_{positive}$				-.29	.21
$I_{negative}$ <-> $S_{negative}$				-.24	.29
$I_{positive}$ <-> $I_{negative}$				-.31*	.13
$I_{positive}$ <-> $S_{negative}$				-.21	.42
$I_{negative}$ <-> $S_{positive}$				-.20	.21
$S_{positive}$ <-> $S_{negative}$				-.31	.50

Note. I=Intercept. S=slope. The "positive" and "negative" subscripts indicate whether the growth factors relate to positive or negative self-perceptions of aging, respectively.
***p<.001; **p<.001; *p<.05.

Unconditional Parallel Process Model: Age Groups

RQ7. Does the relationship between the growth factors related to positive and negative self-perceptions of aging differ between age groups?

Next, RQ7 was investigated by assessing whether the relationship between the growth factors of positive and negative self-perceptions of aging differed across age groups. The data adequately fit the unconditional parallel process model for each age group (see Table 9). The correlations between the growth factors that reached statistical significance were in the same direction for each age group. The fourth-aged group was unique as only the correlation between the intercepts of positive and negative self-perceptions of aging was significant, such that higher baseline values on one self-perception of aging were related to lower baseline ratings on the other.

Findings from the models for the middle-age and third-age groups resembled those from the full sample. All the correlations between the slopes and intercepts were significant besides the relationship between the intercept of negative views on aging and the slope of positive views on aging. However, due to middle-aged adults uniquely experiencing increases and decreases in positive and negative self-perceptions of aging, respectively, the interpretation of their results that include slopes is different. For middle-aged adults, higher positive self-perceptions of aging at baseline were associated with less steep increases in these perceptions across measurement occasions (r = -.17, p<.001). Higher negative self-perceptions of aging at baseline were associated with steeper decreases in these perceptions across measurement occasions (r = -.27, p<.001). Baseline positive and negative self-perceptions of aging were inversely correlated (r = -.58, p<.001), such that higher initial ratings in one perception was related to lower ratings in the other perception. The slopes of the growth factors were inversely correlated (r = -.61, p<.001)—

steeper increases in positive self-perceptions of aging were related to steeper decreases in negative self-perceptions of aging. As mentioned, there was no relationship between baseline negative self-perceptions of aging and changes in positive self-perceptions of aging (r = .06, p=.165). Lastly, higher positive self-perceptions of aging at baseline were correlated with less steep decreases in negative self-perceptions of aging across time (r = .20, p=.001).

Conditional Parallel Process Models: Full Sample

RQ2/4. How are changes in positive/negative self-perceptions of aging associated with personal characteristics, health, well-being, social resources, older adult age identification, and perceived age discrimination?

The hypotheses within RQ2 and RQ4 were tested by adding predictor variables to the unconditional parallel process model. The resulting conditional, parallel process model utilizing the full sample adequately fit the data: CFI= .99, RMSEA= .03, 90% CI [.02, .03], and SRMR= .01. Individuals who reported experiencing more age discrimination (b= 1.74, p=.002) and life satisfaction (b= 7.18, p<.001) had higher positive self-perceptions of aging at baseline (see Table 10). In contrast, those who identified as an older adult (b= -2.80, p=.006), not married (b= -1.80, p=.032), and reported more comorbidities (b= -6.27, p=.002), depressive symptoms (b= -2.19, p<.001), and loneliness (b= -2.61, p<.001) had lower baseline positive self-perceptions of aging. This model explained a significant amount of variance in baseline positive self-perceptions of aging (28.4%, p<.001).

Only life satisfaction was related to lower baseline negative self-perceptions of aging (b= -4.89, p<.001). However, individuals who identified as an older adult (b= 4.75, p<.001), experienced more age discrimination (b= 1.55, p=.012), more physical illnesses (b= 2.42, p=.002), depressive symptoms (b= 0.52, p<.001), and were in the lower-middle social class

category (*b*= 4.11, *p*<.001) reported higher negative self-perceptions at baseline. This model explained a significant amount of variance in baseline negative self-perceptions of aging (26.5%, *p*<.001).

In terms of factors associated with the rate of change of positive self-perceptions of aging, only individuals with larger social networks (*b*= 0.13, *p*=.004) experienced a shallower decline across measurement occasions. In contrast, individuals who reported having more life satisfaction (*b*= -0.53, *p*=.017), were older (*b*= -0.15, *p*<.001), and in the lower-middle social class category (*b*= -0.99, *p*=.029) experienced steeper declines in positive self-perceptions of aging over time. The model explained a significant amount of variance in the slope of positive self-perceptions of aging (9.3%, *p*<.001).

Regarding changes in negative self-perceptions of aging, only individuals who reported experiencing more depressive symptoms had a shallower increase across measurement occasions (*b*= -0.06, *p*<.001). Those who reported having more loneliness (*b*= .67, *p*=.018), higher life satisfaction ratings (*b*= .62, *p*=.004), and were older (*b*= .07, *p*<.001) experienced steeper increases in negative self-perceptions of aging over time. The model explained a significant amount of the variance in the slope of negative self-perceptions of aging (17.2%, *p*<.001).

Table 10

Conditional Parallel Process Model Results for the Full Sample

	Positive SPA Intercept		Negative SPA Intercept		Positive SPA Slope		Negative SPA Slope	
Variable	*b* (SE)	β	*b* (SE)	β	*b* (SE)	β	*b* (SE)	β
Age	-0.07 (0.04)	-0.06	-0.00 (0.04)	-0.00	-0.15 (.02)***	-0.34	0.07 (0.02)***	-0.34
Gender (female)	-0.79 (0.64)	-0.03	-1.28 (0.70)	-0.04	-0.07 (0.27)	-0.01	0.23 (0.26)	-0.01
Marital Status (married)	-1.80 (0.84)*	-0.05	0.84 (0.92)	0.02	-0.06 (0.36)	-0.01	-0.20 (0.35)	-0.01
Low Educational Attainment	-0.07 (1.48)	-0.00	-2.32 (1.62)	-0.04	-0.88 (0.64)	-0.04	-0.06 (0.61)	-0.04
Medium Educational Attainment	-0.55 (0.67)	-0.02	-1.4 (0.74)	-0.05	-0.18 (0.29)	-0.02	-0.27 (0.28)	-0.02
Lower Class	-1.38 (1.04)	-0.04	4.11 (1.13)***	0.11	-0.99 (0.45)*	-0.08	-0.35 (0.43)	-0.08
Middle Class	-0.05 (0.81)	-0.00	0.09 (0.89)	0.00	-0.44 (0.35)	-0.04	0.53 (0.34)	-0.04
Comorbidities	-0.63 (0.20)**	-0.08	2.42 (0.22)***	0.27	-0.01 (0.09)	-0.00	-0.01 (0.08)	-0.00
Cognitive Health	0.02 (0.03)	0.02	0.01 (0.03)	0.01	0.00 (0.01)	0.01	-0.01 (0.01)	0.01
Satisfaction with Life	7.18 (0.52)***	0.39	-4.89 (0.57)***	-0.23	-0.53 (0.22)*	-0.08	0.62 (0.21)**	-0.08
Depressive Symptoms	-0.22 (0.06)***	-0.09	0.52 (0.07)***	0.20	-0.02 (0.03)	-0.02	-0.06 (0.03)*	-0.02
Loneliness	-2.61 (0.68)***	-0.11	-0.97 (0.75)	-0.04	0.11 (0.29)	0.01	0.67 (.28)*	0.01
Friendship Quality	0.71 (0.53)	0.03	-0.47 (0.57)	-0.02	0.09 (0.23)	0.01	-0.00 (0.22)	0.01
Family Quality	0.15 (0.41)	0.01	0.33 (0.45)	0.02	-0.10 (0.18)	-0.02	0.08 (0.17)	-0.02
Network Size	-0.19 (0.11)	-0.04	-0.06 (0.12)	-0.01	0.13 (0.05)**	0.08	-0.02 (0.04)	0.08
Older Age Identification	-2.80 (1.02)**	-0.07	4.76 (1.11)***	0.11	-0.60 (0.44)	-0.05	-0.31 (0.42)	-0.05
Age Discrimination	1.74 (0.56)**	0.08	1.55 (0.62)*	0.06	-0.29 (0.24)	-0.04	0.06 (0.23)	-0.04

Note. *N*=2,463. SPA= self-perceptions of aging.
*p<.05; **p<.001; ***p<.001.

Conditional Parallel Process Models: Age Groups

RQ8. Are there differences between age groups in terms of what factors are associated with their positive and negative SPA development?

Middle-Aged Adults

Conditional parallel process models were created separately for each age group to test RQ8. As was done in previous work exploring age group differences in the development of self-perceptions of aging (Miche et al., 2014), chronological age was removed as a predictor variable. The model containing only middle-aged participants adequately fit the data: CFI= .99, RMSEA= .03, 90% CI [.02, .03], and SRMR= .01. For this age group, individuals who experienced more age discrimination (b= 1.44, p=.034) and life satisfaction (b= 6.49, p<.001) were had higher positive self-perceptions of aging at baseline (see Table 11). In contrast, those who identified as an older adult (b= -8.02, p=.001), reported more comorbidities (b= -0.62, p=.017), depressive symptoms (b= -0.20, p=.004), and feelings of loneliness (b= -2.00, p=.014) had lower baseline positive self-perceptions of aging.

Only individuals who reporting having higher life satisfaction had lower negative self-perceptions of aging at baseline (b= -5.36, p<.001; see Table 12). Individuals who identified as an older adult (b= 6.24, p=.020), lower-middle class social category (b= 3.98, p=.005), female (b= -2.04, p=.019), and experienced more comorbidities (b= 2.06, p<.001) and depressive symptoms (b= 0.50, p<.001) had higher baseline negative self-perceptions of aging.

Table 11

Conditional Effects on Positive SPA Intercept by Age Group

	Middle Age		Third Age		Fourth Age	
Variable	*b* (SE)	β	*b* (SE)	β	*b* (SE)	β
Positive SPA Intercept						
Gender (female)	-0.97 (0.76)	-0.04	-0.10 (1.28)	-0.00		
Marital Status (married)	-1.40 (1.07)	-0.04	-1.87 (1.57)	-0.05		
Low Educational Attainment	-5.99 (2.07)**	-0.09	3.48 (2.66)	0.06	2.87 (4.59)	0.08
Medium Educational Attainment	-0.44 (0.83)	-0.02	-0.37 (1.27)	-0.01	-2.55 (2.60)	-0.10
Lower Class	-1.88 (1.22)	-0.06	-1.86 (2.05)	-0.05	5.65 (5.54)	0.14
Middle Class	-0.60 (0.98)	-0.02	0.20 (1.57)	0.01	1.99 (3.30)	0.08
Comorbidities	-0.62 (0.26)*	-0.08	-0.70 (0.36)	-0.08	-1.02 (0.62)	-0.15
Cognitive Health	0.00 (0.03)	-0.01	0.04 (0.06)	0.03		
Satisfaction with Life	6.49 (0.63)***	0.38	8.89 (1.01)***	0.41	7.42 (1.98)***	0.36
Depressive Symptoms	-0.20 (0.07)**	-0.10	-0.30 (0.13)*	-0.10	-0.27 (0.28)	-0.10
Loneliness	-2.00 (0.82)*	-0.09	-3.63 (1.13)**	-0.13		
Friendship Quality	0.94 (0.63)	0.05	0.01 (1.02)	0.00		
Family Quality	0.29 (0.49)	0.02	-0.53 (0.80)	-0.03	2.97 (1.81)	0.17
Network Size	-0.20 (0.13)	-0.05	-0.18 (0.20)	-0.04		
Older Age Identification	-8.02 (2.36)**	-0.10	-2.10 (1.42)	-0.06		
Age Discrimination	1.44 (0.68)*	0.07	2.23 (1.06)*	0.09		

Note. $n_{Middle\ Age}$= 1,523, $n_{Third\ Age}$= 751, $n_{Fourth\ Age}$= 189. SPA=Self-perceptions of aging.
*p<.05; **p<.001; ***p<.001

Table 12

Conditional Effects on Negative SPA Intercept by Age Group

	Middle-Age		Third Age		Fourth Age	
Variable	*b* (SE)	β	*b* (SE)	β	*b* (SE)	β
Negative SPA Intercept						
Gender (female)	-2.04 (0.87)*	-0.07	0.95 (1.33)	0.02		
Marital Status (married)	0.93 (1.23)	0.02	2.06 (1.63)	0.05		
Low Educational Attainment	-0.95 (0.72)	-0.01	-3.69 (2.75)	-0.06	-1.75 (4.77)	-0.05
Medium Educational Attainment	-0.86 (0.95)	-0.03	-3.15 (1.31)*	-0.11	1.08 (2.71)	0.04
Lower Class	3.98 (1.40)**	0.11	5.05 (2.07)*	0.12	-3.16 (5.81)	-0.08
Middle Class	0.33 (1.13)	0.01	0.17 (1.58)	0.01	-1.80 (3.45)	-0.06
Comorbidities	2.06 (0.30)	0.21	2.58 (0.37)***	0.29	3.03 (0.64)***	0.43
Cognitive Health	0.02 (0.04)	0.01	0.01 (0.06)	0.01		
Satisfaction with Life	-5.36 (0.73)***	-0.27	-5.31 (1.05)***	-0.23	-2.12 (2.05)	-0.10
Depressive Symptoms	0.50 (0.08)***	0.20	0.59 (0.13)***	0.19	0.66 (0.29)*	0.22
Loneliness	-1.29 (0.94)	-0.05	-0.89 (1.36)	-0.03		
Friendship Quality	-0.96 (0.72)	-0.04	1.15 (1.04)	0.05		
Family Quality	0.57 (0.56)	0.03	-0.66 (0.83)	-0.03	0.41 (1.82)	0.02
Network Size	-0.10 (0.15)	-0.00	-0.10 (0.21)	-0.02		
Older Age Identification	6.23 (2.69)*	0.07	4.79 (1.48)**	0.14		
Age Discrimination	1.13 (0.78)	0.04	1.99 (1.10)	0.08		

Note. $n_{Middle\ Age}$= 1,523, $n_{Third\ Age}$= 751, $n_{Fourth\ Age}$= 189. SPA=Self-perceptions of aging.
*p<.05; **p<.001; ***p<.001

As previously mentioned, the middle-aged group is distinct as their positive and negative self-perceptions increased and decreased, respectively. These growth patterns alter how positive and negative estimates from the predictors are related to the slopes. Only individuals with larger social network sizes experienced a steeper increase in positive self-perceptions of aging (b= 0.13, p=.028; see Table 13). In contrast, life satisfaction was the only variable associated with shallower increases in positive self-perceptions of aging across time (b= -0.58, p=.038). Individuals who experienced more loneliness and (b= 0.85, p=.015) and higher life satisfaction ratings (b= 0.53, p=.050) had a shallower decrease in negative self-perceptions of aging (see Table 14). However, those who reported more depressive symptoms experienced steeper decreases in negative self-perceptions of aging across measurement occasions (b= -0.06, p=.046).

Table 13

Conditional Effects on Positive SPA Slope by Age Group

	Middle-Age		Third Age		Fourth Age	
Variable	*b* (SE)	β	*b* (SE)	β	*b* (SE)	β
Positive SPA Slope						
Gender (female)	-0.16 (0.33)	-0.02	-0.29 (0.53)	-0.03		
Marital Status (married)	0.17 (0.46)	0.01	-0.05 (0.66)	-0.00		
Low Educational Attainment	-0.38 (0.89)	-0.02	-1.70 (1.12)	-0.10	-0.64 (2.13)	-0.06
Medium Educational Attainment	-0.19 (0.36)	-0.02	-0.11 (0.53)	-0.01	0.25 (1.19)	0.03
Lower Class	-0.93 (0.53)	-0.8	0.11 (0.86)	0.01	0.25 (1.19)	-0.29
Middle Class	-0.29 (0.43)	-0.03	-0.51 (0.66)	-0.05	-0.91 (1.55)	-0.11
Comorbidities	-0.10 (0.11)	-0.04	0.01 (0.15)	0.00	0.01 (0.29)	0.00
Cognitive Health	0.02 (0.02)	0.05	0.01 (0.03)	0.03		
Satisfaction with Life	-0.58 (0.28)*	-0.10	-0.59 (0.42)	-0.09	-0.41 (0.91)	-0.06
Depressive Symptoms	-0.02 (0.03)	-0.03	-0.03 (0.05)	-0.03	0.18 (0.13)	0.20
Loneliness	-0.16 (0.36)	-0.02	1.19 (0.55)*	0.14		
Friendship Quality	0.36 (0.27)	0.05	-0.20 (0.42)	-0.03		
Family Quality	0.05 (0.21)	0.01	-0.02 (0.34)	-0.00	-1.77 (0.80)*	-0.30
Network Size	0.13 (0.06)*	0.08	0.20 (0.08)*	0.13		
Older Age Identification	-0.79 (1.03)	-0.03	-0.54 (0.60)	-0.05		
Age Discrimination	-0.34 (0.30)	-0.05	-0.37 (0.44)	-0.05		

Note. $n_{Middle\ Age}$= 1,523, $n_{Third\ Age}$= 751, $n_{Fourth\ Age}$= 189. SPA=Self-perceptions of aging.
*p<.05; **p<.001; ***p<.001.

Table 14

Conditional Effects on Negative SPA Slope by Age Group

	Middle Age		Third Age		Fourth Age	
Variable	*b* (SE)	β	*b* (SE)	β	*b* (SE)	β
Negative SPA Slope						
Gender (female)	0.07 (0.33)	0.01	0.66 (0.50)	0.10		
Marital Status (married)	0.04 (0.46)	0.00	-0.75 (0.61)	-0.08		
Low Educational Attainment	0.20 (0.89)	0.01	-0.41 (1.04)	-0.03	-1.99 (1.83)	-0.32
Medium Educational Attainment	-0.32 (0.36)	-0.05	0.07 (0.49)	0.01	-2.68 (1.06)*	-0.60
Lower Class	-0.55 (0.53)	-0.06	-0.27 (0.78)	-0.03	2.17 (2.24)	0.31
Middle Class	0.35 (0.43)	0.05	0.34 (0.59)	0.04	2.73 (1.28)*	0.58
Comorbidities	0.10 (0.11)	0.04	-0.10 (0.14)	-0.05	-0.04 (0.26)	-0.03
Cognitive Health	-0.01 (0.02)	-0.05	-0.02 (0.02)	-0.07		
Satisfaction with Life	0.53 (0.27)*	0.12	1.16 (0.39)**	0.21	-0.66 (0.81)	-0.18
Depressive Symptoms	-0.06 (0.03)*	-0.10	-0.07 (0.05)	-0.10	-0.12 (0.11)	-0.24
Loneliness	0.85 (0.35)*	0.12	0.44 (0.51)	0.06		
Friendship Quality	0.08 (0.27)	0.02	-0.32 (0.39)	-0.05		
Family Quality	0.07 (0.21)	0.02	0.13 (0.31)	0.03	-0.17 (0.72)	-0.05
Network Size	-0.05 (0.06)	-0.05	0.00 (0.08)	0.00		
Older Age Identification	0.52 (1.02)	0.03	-0.46 (0.55)	-0.06		
Age Discrimination	0.08 (0.30)	0.01	0.05 (0.41)	0.01		

Note. $n_{Middle\ Age}$= 1,523, $n_{Third\ Age}$= 751, $n_{Fourth\ Age}$= 189. SPA=Self-perceptions of aging.
*p<.05; **p<.001; ***p<.001.

Third-Aged Adults

Next, the conditional parallel process model containing only participants in the third age of adulthood adequately fit the data: CFI= .98, RMSEA= .03, 90% CI [.02, .04], and SRMR= .02. Individuals who reported experiencing more age discrimination (b= 2.23, p=.035) and satisfaction with life (b= 8.90, p<.001; see Table 11) had higher baseline positive self-perceptions of aging. In contrast, those who reported more comorbidities (b= -0.70, p=.051), depressive symptoms (b= -0.30, p=.021), and loneliness (b= -3.63, p=.006) had lower initial positive self-perceptions of aging. Individuals who identified as an older adult (b= 4.79, p=.001), in the lower-middle social class category (b= 5.05, p=.015), as well as reported more comorbidities (b= 2.58, p<.001) and depressive symptoms (b= 0.59, p<.001; see Table 12) had higher baseline positive self-perceptions of aging. In comparison, those with medium educational attainment (b= 3.98, p=.005) and higher life satisfaction scores (b= -3.15, p=.017) reported lower baseline negative self-perceptions of aging.

While no factors were associated with a steeper decline in positive self-perceptions of aging, individuals who had a larger social network (b= 0.20, p=.018) and reported more feeling of loneliness (b= 1.19, p=.031) experienced a shallower decline in positive self-perceptions of aging (see Table 13). Similarly, no factors were associated with a shallower increase in negative self-perceptions of aging (see Table 14). However, those who reported higher life satisfaction experienced a steeper increase in negative self-perceptions of aging (b= 1.16, p=.003).

Fourth-Aged Adults

Due to the relatively small sample size of the fourth-aged adults in the current study, the full conditional parallel process model could not produce reliable results as the model had more parameters to estimate than individuals in the sample. The issue was alleviated by creating two separate models, one with only personal characteristics as predictors and a second containing all other predictors besides the personal characteristics. The results of a third model created by including only the significant predictors on any of the growth factors from the first two models are presented. This method is akin to "step-up," "two-step," and "forward selection" model building strategies where predictors are added to the model in steps as a means of reducing a large set of predictors variables to a subset (Glen, 2017). Starting with a null model, predictors are added in each step with only those that significantly explain variance in the dependent variable, or significantly increase model fit, included in the next step. Thus, in the current study, the unconditional parallel process model serves as the null model, and the model building took place over three steps.

The combined model adequately fit the data: CFI= 1.00, RMSEA= .00, 90% CI [.00, .04], and SRMR= .04. Only life satisfaction was related to baseline positive self-perceptions of aging for the oldest-old, with those reporting higher life satisfaction having higher baseline positive self-perceptions of aging (b= 7.48, p<.001; see Table 11). Individuals who reported having more comorbidities (b= 3.03, p<.001) and depressive symptoms (b= 0.66, p=.021) had higher baseline negative self-perceptions of aging (see Table 12).

Whereas no factors were associated with decreases in the rate of change in positive self-perceptions of aging, individuals who reported having higher family quality ratings experienced steeper declines in positive self-perceptions of aging (b= -1.77, p=.027; see Table 13). Those

who received medium educational attainment compared to high (*b*= -2.68, *p*=.012) experienced less steep increases in negative self-perceptions of aging across time while those in the middle social class category (*b*= 2.73, *p*=.033) experienced steeper increases in negative self-perceptions of aging (see Table 14).

Chapter IX: Study 2 Discussion

The aim of Study 2 was to extend the empirical understanding of how self-perceptions of aging develop by investigating the longitudinal relationship between positive and negative views on aging, the factors associated with baseline scores and changes over time, and whether the findings differed between age groups. Both hypotheses 1 and 2 were supported with unconditional growth curve models revealing that, on average, positive self-perceptions of aging decreased across measurement occasions, and negative self-perceptions of aging increased. While these findings were true for models containing the full sample, changes in self-perceptions of aging varied by age group. In particular, middle-aged adults were distinct. They developed more positive and less negative self-perceptions of aging across time. Self-perceptions of aging were found to worsen for the older age groups, with fourth-aged adults experiencing an almost twice as steep decline in positive self-perceptions of aging compared to third-aged adults. It may be the case that midlife allows for the most positive perspective on aging as this age group tends to have the largest social network (Antonucci & Akiyama, 1987), highest financial earnings (Bureau of Labor Statistics, 2020), and have yet to experience major health declines (Nakano et al., 2014). Although it has been found that the worsening of self-perceptions of aging is accelerated for older age groups (Miche et al., 2014a), the current study is the first to observe any positive changes in self-perceptions of aging across time.

Moreover, past research investigating age group differences in the development of self-perceptions of aging found that middle-aged adults had significant declines across a 12-year period in unconditional models and non-significant changes when accounting for demographics and health variables (Miche et al., 2014). Given that the Miche et al. (2014) study and the current study both utilized German samples, cohort differences may partially explain the incongruent

findings. Individuals in the current study entered midlife roughly 10 years later than those in previous research. Based on stereotype embodiment's postulate that self-perceptions of aging are largely internalized through television consumption, the reduction of ageist media content over the years (Loos & Ivan, 2018) may allow younger cohorts to develop more positive self-perceptions of aging. Another possibility is that our collective image of aging becomes more positive as it is updated by healthier generations entering older adulthood. Since aging stereotypes are initially internalized in youth, individuals are mostly adopting the perspective of aging from the generation that is considered old at that period of time. Thus, with cultural and technological advances increasing the healthspan, our collective image of aging may become more positive across time. More research is needed to determine whether self-perceptions of aging are becoming more positive with younger cohorts or if midlife is a unique period of adulthood characterized by enhanced self-perceptions of aging.

Hypothesis 5 was mostly supported as the longitudinal trajectories of positive and negative self-perceptions of aging were inversely related. Specifically, higher initial positive self-perceptions of aging were correlated with lower baseline negative perceptions of aging. Additionally, steeper increases in negative self-perceptions of aging were associated with steeper decreases in positive self-perceptions of aging. Whereas previous research has found that positive and negative self-perceptions of aging are independent constructs (Boeder & Tse, 2020; Steverink et al., 2001), the current study reveals that the development of our views on aging are strongly related.

However, upon investigating whether correlations between the growth factors differed across age groups (RQ 8), it was apparent that the development of positive and negative self-perceptions of aging were less correlated for fourth-aged adults. For this age group, only the

baseline ratings for views on aging were negatively correlated. Older adults' increased ability to simultaneously experience positive and negative affect, as well as other mixed emotions, might help explain the independence between the development of positive and negative self-perceptions of aging for the oldest old (Carstensen et al., 1999; 2000). Additionally, the developmental changes in late life, such as the increased attention towards positive stimuli (Reed & Carstensen, 2012) and the acceptance of one's life as a whole (i.e., ego integrity, Erikson, 1982), allow for the simultaneous high rates of satisfaction with life and functional decline experienced in late life (e.g., the paradox of aging; for review, see Carstensen, 2019). Such cognitive and emotional changes may allow for a fuller awareness and acceptance of the decline associated with aging, along with an appreciation of the fleetingness of life. All of this can contribute to the independent development of positive and negative self-perceptions of aging for fourth-aged adults.

Partial support was found for the hypotheses regarding the factors associated with baseline self-perceptions of aging (Hypotheses 2.1-2.6; 4.1-4.6). Supporting the current study's hypotheses and aligning with previous research, health (i.e., comorbidities and depressive symptoms) and well-being (i.e., satisfaction with life) had the strongest associations with baseline positive and negative self-perceptions of aging (e.g., Kleinspehn-Ammerlahn et al., 2008; Kotter-Grühn et al., 2009; Sargent-Cox et al., 2012). Expanding on stereotype embodiment theory's position that identifying with the older age social group enhances the salience of aging stereotypes (Levy, 2009), my results uniquely recognize age identity as a variable associated with the development of self-perceptions of aging. As expected, identifying as an older adult was associated with worse self-perceptions of aging at baseline. Exploring age group differences reveals that the negative association between self-perceptions of aging and identifying as an

older adult was specific to the middle-aged and third-aged participants. With most adults believing that old age begins in the 7th decade of life (Kaufman & Elder, 2002), identifying as an older adult before this time may indicate poor aging experiences and earlier than expected functional decline (Kaufman & Elder, 2002). Additionally, this study is the first to find an association between perceived age discrimination and the development of both self-perceptions of aging. Thus, regardless of the age group with which we identify, how others perceive and treat us can affect our self-perceptions of aging.

Counter hypotheses 2.6 and 4.6, experiencing more age discrimination was related to higher positive and negative baseline self-perceptions of aging. Among the few past studies that have examined the relationship between perceived ageism and views on aging, the findings are mixed. Some evidence suggests those with more negative self-perceptions of aging are more prone to experiencing ageism (Giasson et al., 2017; Hooker et al., 2019; Voss et al., 2017). These researchers suggest that those who hold mostly negative perceptions of aging know more negative aging stereotypes and, in turn, are more readily able to observe discriminatory behaviors. Other research suggests those with more positive self-perceptions of aging should be more likely to experience ageism (Inman, 2001), reasoning that individuals with predominately positive self-perceptions of aging would be more sensitive to age-based discrimination as it runs counter to their views on aging. Additionally, it is possible that people who highly identify as an older adult engage in positive in-group distortions when they are the subject of ageism (Gartska et al., 2004). Results from the current study complicate matters further as perceived discrimination was associated with changes in self-perceptions of aging (Han & Richardson, 2015). Taken together, the relationship between perceived discrimination and self-perceptions of aging may be bi-directional. Future experimental work is needed to disentangle the direction of

effects. Regardless of which construct is more responsible for changes in the other, evidence supporting a positive relationship between both views on aging and perceived age discrimination suggest that other factors may alter the relationship. Following conclusions made by Voss and colleagues (2018), future research needs to examine how situational features and personal characteristics can moderate the relationship between self-perceptions of aging and perceived discrimination.

Examining age-group differences revealed that the number of factors associated with baseline positive and negative self-perceptions of aging diminished across age groups. Only satisfaction with life was significantly associated with baseline positive views on aging for fourth-aged adults. Comorbidities and depressive symptoms were the only factors associated with negative self-perceptions of aging at baseline for this age group. While fewer significant associations may be a result of the smaller sample size for the fourth age group, the significant variance remaining in the intercepts of both views on aging suggests there may be a category of factors specific to this age group that was not considered in this study. For instance, more developmentally relevant factors such as ego integrity, limited time perspective, and flexible goal pursuit may be more indicative of changes in self-perceptions of aging that begin specifically in later adulthood. With research finding the worsening of self-perceptions of aging for the oldest old are twice as steep when time is measured as distance to death rather than chronological age (Kotter-Grühn et al., 2009), factors related to the regulation of loss and acceptance of the final stage of life should be tested in future studies.

Hypotheses regarding factors associated with changes in self-perceptions of aging across measurement occasions were partially supported (Hypotheses 2.1-2.6; 4.1-4.6). Confirming Hypothesis 2.4b, individuals with larger social networks experienced shallower declines in

positive self-perceptions of aging. Interestingly, neither the quality of one's friendships nor familial relationships were associated with changes in self-perceptions of aging. Therefore, the benefits of others in regard to self-perceptions of aging may be from the shared resources that come from a more extensive social network rather than intimate relationships allowing one to feel positive about their aging. For instance, unlike the quality of close relationships, social network size relates to the structure of the life course, such as being employed, married, and having children (Hawkley et al., 2008); all of which represent important resources for aging well. While high-quality relationships are generally beneficial, and purposefully maintained in later adulthood (Carstensen, 1999), being attached to someone suffering from age-related decline is linked to worse self-perceptions of aging (Jung & Jopp, 2018). In support of my hypotheses regarding changes in views on aging, lower social class standing, and higher chronological age were related to steeper declines in positive self-perceptions of aging. Additionally, lower social class standing, higher chronological age, and experiencing more loneliness were associated with steeper increases in negative self-perceptions of aging.

Contrary to my hypotheses, higher life satisfaction was associated with steeper decreases in positive self-perceptions of aging and steeper increases in negative self-perceptions of aging across time. Additionally, more depressive symptoms were related to shallower declines in negative self-perceptions of aging. These surprising findings are believed to be a byproduct of the observed inverse correlation between the intercept and slope for both self-perceptions of aging. Variables that were significantly related to both baseline self-perceptions of aging and changes in the latter across time were forced to mirror the inverse association found between the intercept and slope for both self-perceptions of aging. With baseline self-perceptions of aging being measured first, the association between the predictors and the baseline ratings were in the

expected directions, while the subsequent association with longitudinal changes were restricted to reflect the inverse association between the intercept and slope. For example, higher satisfaction with life scores were significantly related to higher positive self-perceptions of aging at baseline, as expected. However, due to satisfaction with life also being significantly associated with changes in positive self-perceptions of aging it became bound to the inverse relationship between its growth factors, forcing a harmful longitudinal association between satisfaction with life and positive self-perceptions of aging. The same effect occurred between satisfaction with life and negative self-perceptions of aging. Being significantly related to both the intercept and slope of negative self-perceptions of aging, satisfaction with life was associated with lower negative self-perceptions of aging at baseline, as expected, but unexpectedly to a steeper increase such perceptions across time. The reverse effect was also found as higher depression scores were related to higher negative self-perceptions of aging at baseline and unexpectedly associated with shallower increases across time.

In contrast, variables that were only associated with longitudinal changes were not bound to the association between the growth factors. For instance, chronological age and low social class were not associated with baseline positive self-perceptions of aging but were related to steeper decreases in positive self-perceptions of aging over time as expected. Furthermore, in line with my hypotheses, higher chronological age and more feelings of loneliness were associated with steeper increases in negative self-perceptions of aging across measurement occasions but were not significantly associated with baseline negative views on aging.

To directly test whether the statistical effect was present, I removed the associations between satisfaction with life and the intercept of positive and negative self-perceptions of aging from the model containing the full sample. The results showed that higher ratings of satisfaction

with life were significantly associated with a less steep decrease and increase in positive and negative self-perceptions of aging over time, respectively. Again, when removing the association between depressive symptoms and the intercept of negative self-perceptions of aging, the results changed and were in the expected direction—higher depressive symptoms were related to a steeper increase in negative self-perceptions of aging over time. Thus, evidence was provided for my assumption that the factors were bound to the inverse relationship between the intercept and slope of the self-perceptions of aging.

Other possible statistical effects explaining the unexpected findings can largely be ruled out. For instance, while both ceiling and floor effects are common in longitudinal data, the average positive and negative self-perceptions of aging score being 64.66 and 57.75 on a 100-point scale, respectively, suggests that there is plenty of room for individuals' self-perceptions of aging to increase or decrease across time. Alternatively, it could be possible that the findings are a regression toward the mean artifact, such that individuals who start higher or lower than average are predisposed to experiencing faster decreases or increases towards the mean across time, respectively, such an artifact is usually eliminated when covariates are added to growth models (Marsh & Hau, 2010). Although the concept of regression toward the mean has not been included in many newer textbooks regarding analyses of longitudinal change (Marsh & Hau, 2010), three conditions have been found to increase the risk of experiencing regression toward the mean in longitudinal analyses: (1) the selection criteria used to include participants is based on extreme scores, (2) baseline scores are not reliable, and (3) trait instability is high. The large sample size used in the current study largely rules out an issue with the first condition. With Cronbach's alpha being adequate across measurement occasions, it is unlikely that the scores are so unreliable that they would produce a regression toward the mean artifact. Lastly, while

changes in positive and negative self-perceptions of aging were significant across age groups, most individuals did not experience drastic changes across time, providing evidence against the possibility that the scores are unstable. Thus, there is sufficient evidence against the notion that the relationship between the intercept and slope for both self-perceptions of aging is a regression toward the mean artifact. However, Rogossa (1998) reminds us that even when we do our best to control statistical artifacts, regression towards the mean always remains a possibility when doing longitudinal research.

Age group differences were found in terms of which factors were associated with the growth trajectories of self-perceptions of aging, as well as the strength of certain associations. Identifying as an older adult was particularly harmful to self-perceptions of aging for middle-aged adults, as identification was related to lower positive, and higher negative, self-perceptions of aging for this age group. It may be the case that the transition to an older adult identity during middle age may be prompted by earlier than expected functional decline or experiencing more age-based discrimination. Similar to past studies, the middle-aged group experienced the highest rates of perceived age discrimination. Changes in positive self-perceptions of aging were associated with social network size for those in the third age of adulthood, such that larger network sizes were related to less steep decreases in positive self-perceptions over time. Similarly, baseline positive self-perceptions of aging had a particularly strong, inverse, correlation with loneliness for third-aged adults. With many of those in the third age of adulthood entering retirement, seeing their adult children leave home, and beginning to experience functional limitations, frequency of social contact is at its lowest around 70 years of age (Cornwell et al., 2008), and susceptibility to loneliness increases. In fact, loneliness levels are found to peak twice across the lifespan, first during the third decade of life, and then again

during the sixth decade of life (Luhmann & Hawkley, 2016). Therefore, the observed associations align with one of the most pertinent aging issues during that phase of life.

For those in the fourth age of adulthood, higher satisfaction with one's familial relationships was distinctively associated with worse positive self-perceptions of aging over time. As individuals age, their social network composition shifts to primarily consist of family members as functional health limitations and death of friends narrows their social circles (Wrzus et al., 2013). While friendships in the fourth age provide emotional support, familial relationships become increasingly instrumental as older adults become more reliant on assistance (Adams & Blieszner, 1995). Shifting from the caretaker role to the care receiver role can make many older adults feel like a burden to their family (Fingerman et al., 2008). The closer one is to their family, the more they may feel guilty for receiving their support, potentially leading to worse self-perceptions of aging. However, this reasoning is speculative, and it is also possible that the finding stems from the relatively small sample size of fourth-aged adults producing unreliable results. As with all of the results regarding the fourth-aged sample, replication with a larger sample size is needed. If the finding is replicated in studies, more research will be needed to test whether the association between family relationship quality and positive self-perceptions of aging is moderated by an individual's network composition and the form of support provided by family members (e.g., emotional or instrumental).

The observed age-group differences in the factors associated with the development of positive and negative self-perceptions of aging suggest that future interventions aimed at enhancing self-perceptions of aging would be maximized if tailored to the developmental phase of the participants. For instance, aiding the transition into older adulthood for middle-aged adults may ease the negative association observed between older adult identification and positive self-

perceptions of aging. Such an intervention would not be as useful for those in the fourth-aged group. Additionally, an intervention designed to increase individuals' social network size may be extremely beneficial for those in the earlier stages of adulthood but would most likely not promote more positive self-perceptions of aging for fourth-aged adults. While no factors were associated with changes in positive or negative self-perceptions of aging across age groups, life satisfaction, and depressive symptoms were related to higher and lower baseline self-perceptions of aging for each age group, respectively. Thus, self-perceptions of aging could be enhanced at the population level by implementing public policies designed to support mental health. Of course, with only a few studies assessing age group differences in factors associated with the development of self-perceptions of aging, more research is needed to elucidate the most pertinent factors associated with positive changes in views on aging for each age group and across phases of development.

Study 2 is one of three studies that have investigated the development of both positive and negative self-perceptions of aging (Miche et al., 2014; Jung et al., 2019), and only the second to report age group differences in such trajectories. Although stereotype embodiment theory postulates that positive and negative self-perceptions of aging are differentially internalized (Levy et al., 2009), and empirical research supports the independence between the two constructs (Sterverink et al., 2001), systematic investigations of their different correlates and developmental trajectories are sparse (Boeder & Tse, 2020).

With the vast majority of empirical work investigating the development of self-perceptions of aging using global measures (e.g., The Attitudes Towards Own Aging Scale), the differences in the development of positive and negative self-perceptions of aging, as well as the factors that are associated with changes in said development, have been relatively unknown.

Without this knowledge, the development of future interventions will be limited, or worse, not effective. It is not enough to know what factors are associated with more positive self-perceptions of aging over time or decreases in negative self-perceptions, as the same factor may be associated with harmful changes in the opposite view on aging. Based on the findings of Study 2, there is a bit more certainty that interventions designed to increase positive self-perceptions of aging or decrease negative perceptions of aging will not be antagonistic to the development of the other view on aging. In general, the most pertinent variables associated with healthy changes in views on aging were the same for both positive and negative self-perceptions of aging. Moreover, Study 2 revealed that although positive and negative self-perceptions of aging are independent constructs, their intercepts and slopes are inversely related.

While there were no major differences in the factors associated with changes in positive and negative self-perceptions of aging, there were differences in the most relevant factors associated with the development of self-perceptions of aging across age groups. Therefore, interventions may be best tailored to the age of the individual rather than the form of self-perceptions of aging. With many of the factors most highly associated with beneficial changes in self-perceptions of aging aligning with developmentally relevant issues, it appears that many efforts across psychology aimed at enhancing aging will lead to better self-perceptions of aging over time.

Study 2 Limitations and Future Directions

While there are many strengths to Study 2, some notable limitations need to be addressed in future research. The positive and negative self-perception of aging measures used in the current study were domain-specific as the Ongoing Development and Physical Loss scales specifically measure positive psychological and negative physiological views on aging,

respectively. Although the two scales are most commonly used to measure either positive or negative self-perceptions of aging in previous research (for a review, see Wurm et al., 2017), there are additional positive and negative scales in the larger set of Aging Related Cognitions scales. Findings may have been different if the other measures were used. Future research should include all four Aging-Related Cognitions scales to examine further whether factors are differentially associated with changes in various domains of positive and negative views on aging.

Additionally, several issues arose due to the longitudinal design of the study. For instance, the attrition of participants may have biased the sample. With research on the German Aging Study revealing that on-going participants tend to be healthier, the current study results may be more generalizable to healthier adults (c.f. Klaus et al., 2017). Relatedly, the sample was disproportionately wealthy as evidence by the few individuals who were a part of the lower social class category. Due to the small lower-class sample and the few jobs actually representing high social class in the DEAS, the social classes created in this study more accurately represent gradients of middle-class instead of the full spectrum of social classes. Thus, like most longitudinal studies, the generalizability of the current findings may be limited to healthier and wealthier adults.

Moreover, sample size became an issue when running the conditional parallel process models by age group. Specifically, a model with all the independent variables could not be run for the fourth-aged sample because more parameters were estimated than individuals in the sample. Relatedly, due to only a few individuals over 80 years of age having participated in at least three measurement occasions, the age brackets used in the current study do not directly map onto theory. Replication with a larger sample of fourth-aged adults is needed to support the

findings of the current study. With the fourth age of adulthood defined by outliving half of one's birth cohort, longitudinal studies specifically designed to answer questions about the oldest-old (e.g., The 90+ Study) may need to be utilized to replicate the current study's findings.

Furthermore, some caution needs to be taken when interpreting the study results as the relationships between the development of self-perceptions of aging and the various factors modeled in the study are bi-directional. In other words, it is just as likely that higher life satisfaction bolsters self-perceptions of aging as it is that those with more positive self-perceptions of aging are more satisfied with life. Previous research has used a cross-lag panel design to identify variables that more strongly predict self-perceptions of aging than the reverse (e.g., Wurm et al., 2007); however, these analyses are often restricted to two time points and lose the benefits associated with more intensive longitudinal designs such as the parallel process model used in the current study. Similar to the work done by Sargent-Cox and colleagues (2012), bivariate dual-change scores could be used to determine the direction of effects and isolate factors that contribute more to the development of self-perceptions of aging than the reverse pathway while maintaining a lengthier longitudinal design. Conducting such analyses with the significant factors identified in the current study will help isolate the factors driving the changes in self-perceptions of aging. Such work will be beneficial for identifying variables that may be particularly important to focus on in future interventions.

Lastly, due to restrictions in sample size and the number of predictors of interest, the current study modeled each predictor as a time-invariant covariate, instead of a time-varying covariate. This method does not allow for the assessment of how changes in factors are related to changes in self-perceptions of aging. For certain predictors where longitudinal changes are particularly associated with aging well (e.g., functional health), the association between such

changes and the development of positive and negative self-perceptions may be stronger than the relationship between baseline ratings and changes in perceptions of aging. Due to the number of degrees of freedom needed to model time-varying covariates, future research investigating the relationship between changes in predictors and the development of self-perceptions of aging should begin their investigation by analyzing the significant factors from the current study.

Chapter X: General Discussion

While it is assumed that individuals internalize the positive and negative stereotypes propagated by their culture (Levy, 2009), research shows that most individuals maturing in an ageist society can develop similar positive and negative self-perceptions of aging (e.g., Levy & Myers, 2004, 2005; Wurm et al., 2007). Thus, it appears that there are ways in which individuals can avoid internalizing negative aging stereotypes and develop positive perceptions of aging. With both experimental and longitudinal research buttressing the association between well-being and positive self-perceptions of aging, elucidating how individuals can develop pre-dominantly positive views on aging is an essential task for protecting the health of the aging population. To advance this line of research, two studies were conducted to examine how individuals can develop positive self-perceptions of aging despite living in societies with more negative than positive aging stereotypes (U.S., Study 1; Germany, Study 2). Study 1 focused on the internalization of negative aging stereotypes. It examined how aspects of identification with the older adult social category, compensatory actions, and positive aging experiences could alter the relationship between negative aging stereotypes held by older adults and their negative self-stereotypes. Study 2 analyzed the development of already formed self-perceptions of aging by illuminating the average trajectory of positive and negative self-perceptions of aging, the

relationship between said trajectories, and how a host of factors are associated with changes in the trajectories.

Study 1 concluded that not identifying as an older adult or having a positive older adult identification, may reduce the extent to which the negative stereotypes we hold about older adults are associated with our negative self-stereotypes. Although Study 1 indirectly supports stereotype embodiment theory's postulate that self-perceptions of aging gain salience with self-relevance, as older adult identification was positively associated with negative self-stereotypes, the nuances of identification must be considered. As currently framed by stereotype embodiment theory, the identity postulate only pertains to the cognitive dimension of identification and ignores the affective component. While cognitively identifying as an older adult partially explained the relationship between negative aging stereotypes and negative self-stereotypes, this indirect effect was moderated by individuals' positive affect towards their older adult identification. In other words, whereas the association between negative aging stereotypes and negative self-stereotypes was largely explained by the extent to which individuals identified as being an older adult, the association between the two forms of negative stereotypes was weaker for those who had positive feelings toward their older adult identity. However, the question that arises is: How do older adults develop positive in-group affect when identifying as older adults is linked to negative aging stereotypes?

Although less emphasized than the cognitive component of social identification, one's feelings toward group membership are strongly related to motivations and behaviors (Tajfel, 1978). According to social identity theory, if an individual is part of a low-status group, such as an older adult, the individual will be motivated to achieve a more positive identity (Tajfel & Turner, 1979). With our sense of self being partially tied to our social groups' status, self-esteem

is connected to the feelings we hold about our social groups (e.g., collective self-esteem, Luhtanen & Crocker, 1992; Tajfel & Turner, 1986). Therefore, members of low-status groups need to engage in behaviors that allow for a positive re-appraisal of their group or leave the group as a means to protect their personal and collective self-esteem. While older adults cannot leave their low-status social group like members of other groups (e.g., changing occupations), they are theoretically inclined to engage in behaviors that allow for optimal distinctiveness to protect their sense of self (Brewer, 2003; Hogg, 2003). For instance, Blacks, another low-status group in the United States (O'Brien & Major, 2005), are found to have a very low correlation between the self-esteem they derive from the public's view of their social group, public collective self-esteem, and their personal views towards their in-group, private collective self-esteem (Utsey & Constantine, 2006). Essentially, members of this group and other low-status groups can separate their thoughts on how others perceive their group and their personal feelings about their group as a defense mechanism (Crocker & Major, 1989; Whittler et al., 1991). However, this protective process may not be the default for older adults as identification, and positive in-group affect were negatively correlated in Study 1. While Blacks are a low-status group in the U.S., their culture can be a source of pride, which has not been the case for older adults. Therefore, other processes unique to older adults may better explain how they can maintain positive in-group affect while identifying with a low-status group.

For older adults, the division between public and private collective self-esteem is complex as individuals age into the social category and are subject to the internalization of negative aging stereotypes in youth (Levy, 2009). Since aging is a process directly related to a progression of social identities, with "older adult" being an ascribed identity later in the process, it is possible that individuals who focus on their personal success can develop a more positive in-

group identity. This idea aligns with social identity theory as individuals who are a part of low-status groups they cannot dissociate from (i.e., ascribed identities) can focus on their individual upward mobility by engaging in behaviors that are distinct from negative representations of older adults (e.g., engaging in fitness routines) as a means of protecting their self-esteem (Ellemers & Van Laar, 2010). In fact, those who have higher *personal* self-esteem are better able to engage in in-group favoritism and develop more positive in-group affect as a means of protecting their *collective* self-esteem (Brown et al., 1988). While focusing on individual upward mobility typically calls for dissociating from one's in-group (Ellemers & Van Laar, 2010; Kaiser & Pratt-Hyatt, 2009), which can lead to being accused of in-group disloyalty (Contrada et al., 2001), the older adult social group may be distinct from this pattern. The "older adult" social category is superordinate with varying representations of the prototypical group member. Therefore, those who focus on their personal social status through engaging in counter-stereotypical behaviors like improving their health could be viewed as the ideal member of the subordinate "golden ager" category (Boland & Schmidt, 1986; Hummert et al., 1994). Moreover, older adults may not admonish someone focusing on bettering their health as a successfully aging older adult can cultivate more positive images of older adults, which, in turn, can boost the status of the entire social group. Support for this idea comes from experimental studies finding that adults of all ages who view images of admired older adults (Dasgupta & Greenwald, 2001) or those with high occupational prestige (Robertson & Weiss, 2017) tend to have more positive attitudes towards older adults and see them as having higher status than those who viewed the opposite images. Research should directly test whether older adults who focus on their personal social status are better able to hold negative aging stereotypes and positive in-group affect. In general, our understanding of social group identification would be bolstered through more investigations into

how members of ascribed low-status groups can maintain positive in-group affect as a means of protecting their self-esteem. Such efforts could significantly reduce the effects of discrimination on low-status group members.

While support was not found for Hypothesis 2 in Study 1—fear of aging was not associated with preventative health behaviors—fear of aging partially explained the relationship between negative aging stereotypes and negative self-stereotypes. More intense fears of aging being related to more negative self-stereotypes but unrelated to preventative health behaviors suggests that negative aging stereotypes may affect our motivational resources even before our self-perceptions of aging develop. With negative aging stereotypes positively associated with fears of aging, and neither associated with preventative health behaviors, it is plausible that negative aging biases may reduce the motivational resources needed to engage in compensatory behaviors to avoid falling prey to the self-fulfilling prophecies we create around aging. In other words, this finding supports a possible extension of the behavioral pathway as described by stereotype embodiment theory to the internalization process. However, more research is needed to determine whether increases in fear of aging are directly related to decreases in self-efficacy and other motivational resources to support such an extension.

With fear being a powerful emotion for change when paired with self-efficacy (Ruiter et al., 2014), public messaging campaigns addressing the facts of aging and individuals' agency in the quality of their aging may be a promising avenue to protect the health of the rapidly growing aging population. As most individuals fare poorly when quizzed on the facts of aging, often perceiving aging as more negative than reality (Davis & Friedrich, 2010; Palmore, 1980), it is no wonder fears of aging can make us feel like the negative aspects of aging are inevitable (Levy, 2009). With perceived control being a primary factor in whether older adults engage in health

behaviors to reduce functional decline (Parish et al., 2019), education specifically addressing the controllable factors of aging can help counter the repercussions related to fears of aging. Recent interventions designed to educate older adults on the controllable factors and lifestyles associated with aging well have been promising. For instance, the 12-week AgeWISE education-based intervention increased older adults' contentment with their memory and perceived control over improving their memory as they age (O'Connor et al., 2018). A two-pronged approach is needed to improve self-perceptions of aging; beyond reducing ageism in the media, efforts are needed to disseminate the facts of aging, emphasizing the control individuals have over the aspects of aging that they fear most.

Additionally, Study 1 found lived experiences moderate the internalization of negative aging stereotypes. Individuals who had more positive aging experiences had less overlap between their negative aging views and their self-views. Although stereotype embodiment theory describes the internalization of negative aging stereotypes as a passive process, it appears that our lived experiences can affect the extent to which we allow our negative aging stereotypes to apply to ourselves. For instance, most individuals believe they are aging better than others in their age group and predict they will experience less loss and more gains in the future than the typical older adult (Heckhausen & Brim, 1997; Heckhausen & Kreuger, 1993). Moreover, even with the normalcy of negative aging biases (Davis & Friedrich, 2010), life satisfaction tends to increase with age until about the 7th decade of adulthood (Baird et al., 2010). While many processes may explain these findings, such as cognitive biases, it would also make sense that having positive aging experiences would allow individuals to separate their view on their own aging from their internalized negative expectations. Support for this claim comes from research findings that 70% of third and fourth agers believe that their aging process exceeded their

expectations (Rothermund & Brandtstädter, 2003). Although the cultural perpetuation of ageism cultivates a negative perspective of the aging process, lived experiences actively reshape the negative images of aging individuals are subjected to throughout the lifespan, allowing for the observed balance between positive and negative self-perceptions of aging observed in past research and Study 2.

Referring back to Hypothesis 1, positive aging experiences may be partially responsible for some individuals' ability to hold positive feelings towards their older adult identity, even though older adults are viewed as low status by society. Just as increasing personal self-esteem may allow for more in-group favoritism, having positive aging experiences may cultivate an affinity towards one's in-group even if they still hold general negative aging stereotypes. Put differently, positive aging experiences may create personal biases towards one's own aging that are distinct from their views of the older adult social category as a whole. While identifying with a negatively perceived group may be difficult at times, the positive experiences associated with the identity potentially may allow for positive in-group affect to develop and protect individuals from internalizing all of their negative aging stereotypes into their sense of self.

Based on the current findings and past research (Bennett & Gains, 2010), the internalization component of stereotype embodiment theory should be expanded to include the role of lived experiences in the development of self-stereotypes and, in turn, self-perceptions of aging. Additionally, the role of older age identification should also be expanded to include the affective component of social identity as positive in-group affect may reduce the harm associated with identifying as an older adult. Taken together, Study 1 identifies two factors that may limit the association between negative aging stereotypes and negative self-stereotypes. The strength and degree of positivity of an individual's older adult identification, as well as their positive

aging experiences are prime candidates for future longitudinal research exploring processes that limit the internalization of negative aging stereotypes, and allow for more positive self-perceptions of aging to develop.

Turning our attention from the internalization of aging stereotypes to self-perceptions of aging more directly, findings from Study 2 help further our understanding of the dynamic relationship between the growth trajectories of positive and negative self-perceptions of aging. As expected, baseline ratings and changes in positive and negative views on aging were inversely related. However, the difference between positive and negative views within individuals does not necessarily widen over time as those with higher baseline positive self-perceptions of aging experience sharper decreases in these perceptions across time, and those with lower negative self-perceptions of aging experience steeper increases in these perceptions across measurement occasions. Thus, those starting with "healthy" self-perceptions of aging (i.e., low negative and high positive self-perceptions) are likely to experience steeper declines in positive self-perceptions of aging and steeper increases in negative self-perceptions of aging, ultimately closely resembling those with less healthy views on aging over time.

Nevertheless, there are reasons to be optimistic and believe that worse perceptions of aging are not inevitable. The high variability found in the slopes for both positive and negative self-perceptions of aging across age groups suggests that many adults will not follow this trend. Additionally, a host of factors were related to more positive and less negative self-perceptions of aging over time. While not all these factors are controllable (e.g., being male and having high social class), many can be altered through various forms of interventions that have already have evidence for being effective. For example, evidence from a recent meta-analysis containing 68 randomized controlled studies suggests the average psychological well-being intervention

significantly increases satisfaction with life (Koydemir et al., 2020). Similarly, a review of 51 intervention studies found that positive psychology interventions can significantly reduce depressive symptoms (Sin & Lyuboirsky, 2009). Therefore, a multitude of evidence-based interventions exist that can indirectly support the most prevalent factors associated with healthier self-perceptions of aging across time.

Overall, the factors related to enhancing and diminishing self-perceptions of aging in the current study were similar to those found in previous research. Replicating past results, individuals with more comorbidities, depressive symptoms, and feelings of loneliness reported worse self-perceptions of aging, while those with larger social networks reported more positive self-perceptions of aging (e.g., Jung et al., 2019, Kleinspehn-Ammerlahn et al., 2008; Kotter-Grühn et al., 2009; Miche et al., 2014a; Sargent-Cox et al., 2012). However, whereas past studies have found cognitive health to be an important factor in the development of self-perceptions of aging, it was not significantly related to views on aging in the current study. With other indicators of health being significant, it is likely that the operationalization of cognitive health moderates its relationship to views on aging (Kleinspehn-Ammerlahn et al., 2008; Kotter-Grühn et al., 2009). Cognitive health consists of a many factors, and while the digit symbol substitution task used in the current study is a valid tool for assessing changes in cognitive functioning and cognitive impairment (Jaeger, 2018), it does not necessarily assess a diverse range of functioning. Research compositing several domains of functioning or using clinical diagnoses of impairment appears to be more likely to observe longitudinal associations between cognitive health and self-perceptions of aging (Kleinspehn-Ammerlahn et al., 2008; Kotter-Grühn et al., 2009). More research is needed to determine whether variables that are inconsistently linked to the development of views on aging are due to different operationalizations of the construct.

Beyond those factors, life satisfaction was identified in the current study as a factor that is uniquely associated with positive changes in self-perceptions of aging. In fact, standardized regression coefficients suggest that life satisfaction had a larger association with self-perceptions of aging than any of the indicators of psychological and physical health. Relatedly, another variable associated with healthier self-perceptions of aging uncovered in the current study was identifying with the older adult social category, with individuals identifying as old experiencing worse self-perceptions of aging at baseline. Perceived age discrimination was also related to baseline positive and negative self-perceptions of aging; however, the overall effects exemplify the mixed findings found in previous research investigating the association between perceived age discrimination and self-perceptions of aging as it was related to higher levels of both perceptions of aging at baseline in the current study. Regardless, these findings support the notion that an individual's age identity and the identity assigned to them by others, along with the treatment associated with that assignment, are linked to their self-perceptions of aging.

Although there were no discernible patterns in terms of the factors that were differentially associated with positive and negative self-perceptions of aging, there were notable age group differences. Of particular significance, middle-aged adults experienced increases in positive and decreases in negative self-perceptions of aging. Additionally, for middle-aged adults, higher negative self-perceptions of aging at baseline were associated with steeper decreases in these perceptions across measurement occasions. At this time, two studies have investigated the development of self-perceptions of aging during midlife with only one reporting results specific to the age group (Jung et al., 2019; Miche et al., 2014a). Contrary to the current findings, Miche and colleagues (2014a) found that middle-aged adults experienced worse self-perceptions of aging over time. One possible reason for this discrepancy could be the different

operationalization of self-perceptions of aging, as the researchers used the Attitudes Towards Own Aging subscale, a measure that collapses positive and negative self-perceptions of aging. With both studies relying on German samples, another possibility is that younger cohorts are experiencing more positive self-perceptions of aging, as participants in the current study entered middle age roughly 16 years after those in the Miche et al. study.

While more research is needed to understand how self-perceptions of aging develop in early and middle adulthood and whether views on aging are becoming more positive with younger cohorts, our findings have notable implications for developing interventions. If the current findings hold in future studies, it would be beneficial for interventions aimed at enhancing self-perceptions of aging to focus on middle-aged adults. With this age group already experiencing better self-perceptions of aging over time, creating targeted interventions for this population could maximize baseline views on aging before health declines take their toll and harm self-perceptions of aging. Relatedly, with most middle-aged adults yet to experience severe health declines, this group may be particularly receptive to interventions aimed at increasing health behaviors as a way to protect self-perceptions of aging, and health itself, as self-efficacy will still be relatively high compared to older adults.

At this time, interventions targeting self-perceptions of aging have been primarily restricted to older adults (Klusman et al., 2011; Smith & Bryant, 2018; Wolff et al., 2014); and while the results have been promising, the decrements in views on aging may have already been substantial. Based on the current study's findings specific to the middle-aged group, interventions aimed at increasing satisfaction with life and enhancing an individual's social network size may be particularly beneficial. In fact, with both mindfulness and savoring associated with satisfaction with life (e.g., Smith & Bryant, 2016; Wilson et al., 2020), the

beneficial effects of mindfulness (Turner, 2014) and savoring (Smith & Bryant, 2019) interventions on self-perceptions of aging may have been mediated by increases in life satisfaction. Strategies utilized by individuals to protect their social network size during the COVID-19 pandemic may prove to be beneficial for self-perceptions of aging after the pandemic has ended. For instance, with functional decline related to a reduced social network size (Cornwell et al., 2008), middle-aged adults currently learning how to use teleconference technologies like Zoom may be building capacities to adapt to decline in later life. Interventions to help middle-aged adults specifically use such technologies could be an important avenue for reducing unintentional social network losses in older adulthood and, in turn, protect the increases in self-perceptions of aging obtained in middle age. As the size of the older adult population increases worldwide, the development of preventative health measures is needed now more than ever. Due to the well-supported connection between self-perceptions of aging and health, and the malleability of views on aging (see Kotter-Grühn, 2015 for a review), funding self-perception of aging interventions should be a priority for public health officials.

Conclusion

The current studies advance our empirical understanding of the development of self-perceptions of aging, adding insights into both the internalization of negative aging stereotypes, as well as how theoretically influential factors are associated with changes in positive and negative self-perceptions of aging over time. While stereotype embodiment theory postulates that those who more strongly identify as older adults will suffer more from the effects of negative aging stereotypes (Levy, 2009), the current findings indicate that this may not be as true for those who have positive affect towards their identification. Not only was identifying as an older adult

related to the internalization of negative aging stereotypes in Study 1, but it was also related to worse self-perceptions of aging at baseline in Study 2.

Additionally, stereotype embodiment theory describes the internalization of negative aging stereotypes into the self as a passive process, albeit the possibility of factors that can alter the internalization process has been acknowledged (Levy, 2003b). Besides positive affect towards identifying as an older adult, positive aging experiences were also found to reduce the relationship between negative aging stereotypes and negative self-stereotypes. Based on these results, it is better to think of the internalization of negative aging stereotypes as a more active process that can, at least in part, be influenced by an individual's experiences, lifestyle, and mindset. A reconceptualization of the internalization process may encourage future studies on the topic that would be fruitful for developing interventions aimed at reducing the acceptance of negative aging stereotypes before they can become self-perceptions of aging. Similar to positive aging experiences, satisfaction with life had the most beneficial longitudinal association with self-perceptions of aging. While it is easy to say that a good life allows for positive self-perceptions of aging, the bidirectionality between the quality of one's life and one's self-perceptions of aging creates a difficult task for future research as ways in which adults can maintain an openness to positive aspects of their life despite holding negative aging stereotypes needs to be explored.

Furthermore, a more differentiated view of the development of positive and negative self-perceptions of aging was uncovered. For instance, past research that primarily used samples of adults in the fourth age of life have characterized changes in self-perceptions of aging as being negative with significant inter-individual variability (e.g., Kleinspehn-Ammerlahn et al., 2008; Kotter-Grühn et al., 2009; Sargent-Cox et al., 2012). Using a sample of adults with a wide age

range revealed that middle-aged adults develop more positive and less negative self-perceptions of aging. Additionally, factors that differentially bolster self-perceptions of age across age groups were found and may be particularly useful for creating developmentally tailored interventions.

Although having predominately negative self-perceptions of aging is related to a host of physical and mental health issues, the current studies provide evidence that there is plasticity in our views on aging as both the internalization of negative aging stereotypes and our already developed self-perceptions of aging can change in beneficial ways. To fear aging is to be afraid of life. However, with continued scientific efforts focused on understanding how the transmission of ageism can be ameliorated we can make great strides in reducing our collective fear of aging and, in turn, protect the health of our aging population.

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Appendix

Instruments for Study 1

Aging Stereotypes and Self-Stereotypes (18 items)

Scale: Images of Aging Scale

Citation:
Levy, B. R., Kasl, S. V., & Gill, T. M. (2004). Image of aging scale. *Perceptual and motor skills*, *99*(1), 208-210. https://doi.org/10.2466/pms.99.1.208-210

Aging Stereotypes Instructions: We are interested in knowing when you think of older people, in general (not including yourself), how much do the following words match the images or pictures that you have in your mind? There are no right or wrong answers.

Self-Stereotypes Instructions: We would like to know the image that you have of yourself. Please indicate how much each word or phrase coincides with your own image of yourself. There are no right or wrong answers.

Response Scale: 1=Furthest from what I think, 7=Closest to what I think

Items: (N=Negative, P=Positive)

1. Will to live (P, Will to Live)
2. Capable (P, Dependence)
3. Active (P, Activity)
4. Positive outlook (P, Personality)
5. Full of life (P, Death)
6. Groomed (P, Appearance)
7. Healthy (P, Physical Health)
8. Wise (P, Cognition)
9. Family orientated (P, Relationships)
10. Walks slowly (N, Activity)
11. Helpless (N, Dependence)
12. Lonely (N, Relationships)
13. Dying (N, Death)
14. Wrinkled (N, Appearance)
15. Grumpy (N, Personality)
16. Sick (N, Physical Health)
17. Senile (N, Cognition)
18. Given up (N, Will to Live)

Preventative Health Behaviors (16 items)

Scale: The Good Health Practices Scale

Citation:
Hampson, S. E., Edmonds, G. W., & Goldberg, L. R. (2017). The Health Behavior Checklist: Factor structure in community samples and validity of a revised good health practices scale. *Journal of Health Psychology*, *24*(8), 1103-1109. https://doi.org/10.1177/1359105316687629

Instructions: Please take some time to think about your current health and the behaviors you take to maintain your health. After you have done so, please rate the extent to which you believe each of these behaviors is true for you. Keep in mind your responses are confidential.

Response Scale: 1=Very untrue of me, 7=Very true of me

Items:

1. I exercise to stay healthy.
2. I eat a balanced diet.
3. I take vitamins.
4. I see a dentist for regular checkups.
5. I watch my weight.
6. I limit my intake of foods like coffee, sugar, and fats.
7. I gather information on things that affect my health.
8. I watch for possible signs of major health problems.
9. I take health food supplements.
10. I see a doctor for regular checkups.
11. I use dental floss regularly.
12. I discuss health with friends, neighbors, and relatives.
13. I don’t smoke.
14. I brush my teeth regularly.
15. I get shots to prevent illness.
16. I get enough sleep.

Positive Aging Experiences (25 items)

Scale: The Perceived Age-Related Gains subscale from the Awareness of Age-Related Changes Scale

Citation:

Brothers, A. F., Gabrian, M., Wahl, H.-W., & Diehl, M. (2018). A new multi-dimensional questionnaire to assess Awareness of Age-Related Change (AARC). *The Gerontologist.* https://doi.org/10.1093/geront/gny006.

Instructions: Please take a moment to think about your aging experiences. With my increasing age, I realize that …

Response Scale: 1=Not at all, 7=Very much

Items:

1. … others are treating me more respectfully.
2. …I pay more attention to my health.
3. …I appreciate relationships and people much more.
4. …I have more say in setting my daily routine.
5. …I recognize my own needs better.
6. …I have more experience and knowledge to evaluate things and people.
7. …I have a better sense of what is important to me.
8. …I enjoy life more consciously.
9. …I am more grateful for the things I have.
10. …my friendships and relationships have become stronger.
11. …I have more foresight.
12. …I try to be more myself.
13. …I pay more attention to eating healthy food.
14. …I take more time to focus on my physical shape.
15. …I have more time for the things I enjoy.
16. …I gather more information before I make decisions.
17. …I pay more. attention to regular physical exercise.
18. …I enjoy many things more intensively.
19. …I am more open toward other people.
20. …I have more freedom to live my days the way I want.
21. …I have grown in terms of my self confidence.
22. …I pay more attention to getting enough sleep.
23. …I have become wiser.
24. …I think things through more carefully.
25. …my family has become more important to me.

Fear of Aging (5 items)

Scale: The Fear of Losses subscale from the Anxiety About Aging Scale

Citation:

Lasher, K. P., & Faulkender, P. J. (1993). Measurement of aging anxiety: Development of the anxiety about aging scale. *The International Journal of Aging and Human Development*, *37*(4), 247-259. https://doi.org/10.2190/1U69-9AU2-V6LH-9Y1L

Instructions: Please rate the extent to which you agree or disagree with each statement.

Response Scale: 1=Strongly disagree, 7=Strongly Agree

Items:

1. I fear that when I am old all my friends will be gone.
2. The older I become, the more I worry about my health.
3. I get nervous when I think about someone else making decisions for me when I am old.
4. I worry that people will ignore me when I am old.
5. I am afraid that there will be no meaning in life when I am old.

Older Age Identification and Positive In-group Affect (12 items)

Scale: Three-Dimensional Strength of Group Identification Scale

Citation:
Cameron, J. E. (2004). A three-factor model of social identity. *Self and Identity*, *3*(3), 239–262. https://doi.org/10.1080/13576500444000047

Instructions: Please rate the extent to which you agree or disagree with each statement.

Response Scale: 1=Strongly disagree, 7=Strongly Agree

Items: (C=Centrality/Older Age Identification; P=Positive In-group Affect; T=In-group Ties)

1. I often think about being an older adult. (C)
2. Being an older adult has little to do with how I feel about myself in general. (C)
3. Being an older adult is an important part of my self image. (C)
4. The fact I am an older adult rarely enters my mind. (C)
5. In general, I'm glad to be an older adult. (P)
6. I often regret being an older adult. (P)
7. Generally, I feel good about myself when I think about being an older adult. (P)
8. I don't feel good about being an older adult. (P)
9. I have a lot in common with other older adults. (T)
10. I feel strong ties to other older adults. (T)
11. I find it difficult to form a bond with other older adults. (T)
12. I don't feel a strong sense of being connected to older adults. (T)

Demographics

1. How would you rate your current health?
    1. Excellent
    2. Very good
    3. Good
    4. Poor
    5. Terrible
2. What is your year of birth? Please only use numerals (e.g., 1950)
3. What is the highest level of school you have completed or the highest degree you have received?
    1. Less than high school degree
    2. High school graduate (high school diploma or equivalent including GED)
    3. Some college but no degree
    4. Associate degree in college (2-year)
    5. Bachelor's degree in college (4-year)
    6. Master's degree
    7. Doctoral degree
    8. Professional degree (JD, MD, etc.)
4. With which racial or ethnic group do you most identify?
    1. Asian
    2. Black or African American
    3. Hispanic or Latinx
    4. Native American or Alaska Native
    5. Native Hawaiian or Pacific Islander
    6. White
    7. Mixed-Race
    8. Other
5. With which gender do you identify?
    1. Male
    2. Female
    3. Other
6. What is your household's total annual income?
    1. Less than $25,000
    2. $25,000 - less than $50,000
    3. $50,000 - less than $100,000
    4. $100,000 -less than $150,000
    5. $150,000-less than $200,000
    6. Over $200,000
7. What is your current marital status?
    1. Married
    2. Widowed
    3. Divorced
    4. Separated
    5. Never Married