

## ABSTRACT

PARK, JEONGSOO. Determinants of Views of Aging and Its Effects on Well-Being and Preparations for Old Age: Moderating Effects of Culture, Age, and Context (Under the direction of Dr. Thomas M. Hess).

This dissertation reports the results of three different manuscripts that investigated what personal attributes (i.e., personality, perceived control) influence subjective views of aging – aging attitudes toward older adults and perception of oneself as an older adult (i.e., future-self views), and the mechanisms underlying the relationship between subjective views of aging and related outcomes. In addition, interactions with different contexts such as domains of functioning and cultures were of further interest. The research questions were inspired by stereotype embodiment theory (Levy, 2009), which suggests that aging stereotypes are internalized from the individual's culture at a young age and become self-stereotypes as one gets older, and a lifespan contextualism (e.g., Bales, 1987; Bronfenbrenner, 1994), which suggests that individual development is an ongoing process within and across contexts. I expected that personal attributes, along with domains of functioning and cultures, shape different subjective views of aging and associated outcomes. For these research questions, I examined survey responses from Ageing as Future Study. In the first manuscript, I investigated whether personality traits contribute to individual differences in aging attitudes toward older adults and well-being in adults aged from 30-89 in the United States. Aging attitudes mediated the relationship between personality and well-being, along with the strongest effects of neuroticism, conscientiousness, and agreeableness. The strength of effects varied across domains of functioning (family, friends, leisure activities, life management, finances, work, and health), within and across personality traits. In the second manuscript, I investigated whether perceived control and future-self views influence preparations for old age, and whether this influence varies across ages (35-85), four

domains of functioning (friends, finances, work, and health), and three cultures (the United States, Hong Kong, and Germany). Future-self views partially mediated the relationship between perceived control and preparations for old age, along with the strength of effects varying across context. The strength of associations between perceived control and preparations increased with advancing age. In the third manuscript, I investigated a longitudinal study across a five-year period to examine whether positive current-self views predict greater perceived control, which in turn relates to greater preparations for old age, and these greater preparations predict subsequent positive self-views, along with variations of the strength across ages (30-85), four domains (friends, finances, work, and health), and three cultures (the United States, Hong Kong, and Germany). The positive associations with these variables in a cross-lagged SEM suggest that positive self-views serve as a resource for promoting adaptive behaviors such as preparations for old age, with accumulated effects over time. The strength of effects also varied by age and context. In general discussion, I illustrated an overview of a life-span framework involving results from three studies, along with limitations, future directions, and conclusion.

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Determinants of Views of Aging and Its Effects on Well-Being and Preparations for Old Age:  
Moderating Effects of Culture, Age, and Context

by  
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A dissertation submitted to the Graduate Faculty of  
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## **BIOGRAPHY**

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## Introduction

In response to prolonged life expectancy and the increasing population of older adults, research on aging has increasingly investigated what factors influence people's adaptation in later life. Among them, subjective views of aging – aging attitudes toward older adults and perception of oneself as an older adult (i.e., future-self views) – have been shown to be related to people's adaptation to challenges with advancing age. For example, relative to those with more negative attitudes, individuals with more positive views of old age exhibit enhanced cognitive function (Mazerolle, Régner, Rigalleau, & Huguet, 2015; Wurm, Tesch-Römer, & Tomasik, 2007) and show lower levels of depression and anxiety along with higher life satisfaction in later life (Bryant et al., 2012; Kornadt & Rothermund, 2011; Mock & Eibach, 2011). Longitudinal studies have also demonstrated that older adults with more positive self-perception of aging live an average age of 7.5 years longer than those with less positive aging attitudes (Levy, Slade, Kunkel, & Kasl, 2002).

Levy's stereotype embodiment theory (2009) describes the possible mechanisms of how aging attitudes become a part of one's conception of themselves as an older adult, and then influence related outcome variables, suggesting that aging stereotypes are internalized from the individual's culture at a young age and become self-stereotypes at some point as one gets older. That is, cultural stereotypes of aging may influence perception of oneself as an older adult. Indeed, Kornadt and Rothermund (2011) demonstrated that aging attitudes are associated with one's perception of current level of functioning (i.e., current-self views), with the effect stronger for older adults. Although this finding highlights how aging attitudes become incorporated into personalized views of people as older adults, which in turn may influence outcomes such as well-being, our understanding regarding the determinants of individual differences in aging attitudes

is rather limited. For example, even within a culture where negative aging stereotypes are pervasive, some individuals may be less likely to exhibit negative aging attitudes than others. Given the demonstrated impact of these views on adaptive processes, it is important to identify factors that contribute to individual differences in subjective views of aging.

### **Personality**

One factor that may be linked to individual differences in the process of attitude internalization is personality. Personality refers to the set of characteristic patterns of cognition, emotion, and behavior in people (Cloninger, 2009). Given the presumed general influence of personality on functioning in a variety of contexts, it seems reasonable to assume that personality will also exert some influence on attitudes toward socially significant objects. Indeed, personality traits have been shown to be predictive of attitudes in contexts such as immigration (Dinesen, Kelmmensen, & Nørgaard, 2016), politics (e.g., Johnston & Wronski, 2015), social values (Sibley & Duckitt, 2008), and work (Wille, Hofmans, Freys, & De Fruyt, 2014). Although research on the relationships between personality, aging attitudes, and related outcomes is rather limited, two studies provided evidence relevant to those relationships. Moor, Zimprich, Schmitt, and Kliegel (2006) found that neuroticism was negatively associated with aging attitudes, which in turn influenced perceptions of health. Similarly, Shenkin et al. (2014) found that perceptions of one's own aging were related to health and well-being (i.e., anxiety, depression), with personality being the strongest predictor of these perceptions. These findings suggest that personality may influence the types of attitudes that people may construct about aging, influencing outcomes such as well-being and health.

### **Views of Self, Control, and Preparations for Old Age**

With respect to views of aging and related outcomes, though research has shown that

positive views of aging relate to well-being in later life (e.g., Bryant et al., 2012; Kornadt & Rothermund, 2011; Mock & Eibach, 2011), it is unclear what specific mechanisms or behaviors account for this relationship. Given that our prolonged life expectancy highlights the necessity of making preparations to deal with aging-related changes, preparations for old age may be an important component of promoting well-being. As might be expected, research has demonstrated that preparations for age-related changes are associated with many benefits in later life. For example, individuals who engage in planning for their retirement life in advance show better physical health (Topa, Moriano, Depolo, Alcover, & Moreles, 2009; Yeung, 2013, 2017) and psychological benefits (Noone, Stephen, & Alpass, 2009; Sörensen, Mak, Chapman, Duberstein, & Lyness, 2012). That is, such preparations may foster a sense of security or safety, which in turn is positively related to overall adaptation in later life (Prenda & Lachman, 2001).

Despite the importance of preparations, our understanding of the determinants of such preparation is also rather limited. Although research has shown that situational factors such as approaching retirement (i.e., getting older) may comprise one set of factors that influences preparations (Lee & Law, 2004; Noone, O'Loughlin, & Kendig, 2013), such research does not really inform us about the success of those preparations. Perhaps more consequential are characteristics of the individual. One potentially important personal characteristic may be control beliefs regarding one's capacity to bring about a given outcome (Krause, 2007). That is, people with high control beliefs may tend to engage in preparations for the future. Some researchers found a positive relationship between control beliefs and future-oriented planning (Prenda & Lachman, 2001). Individuals with high versus low control may differ in their beliefs of the capability to execute relevant activities (e.g., low control beliefs may undermine the conviction that one can successfully maintain physical activities or save money for the future).

One potential mechanism through which control may influence preparations is through its impact on how individuals perceive themselves in old age (i.e., future-self views). Given that perceived control and self-efficacy are aspects of self-perception (Bandura, 1990), a sense of control may relate to future-self views. That is, individuals with a high sense of control may have a more positive perspective toward one's own future because they expect that they can shape their lives in accordance with their goals, and they are confident that they can overcome challenges that might occur in later life.

Beyond future-self views, it is also of importance to explore how feelings in the present influence our behaviors in that having a positive self-view may encourage our behaviors in ways that enable us to seek a more fulfilling life. Though research has regarded perceptions of one's current functioning as outcome variables (e.g., Bryant et al., 2012; Kornadt & Rothermund, 2011; Mock & Eibach, 2014), those perceptions may also serve as determinants of subsequent behaviors. Given bidirectional effects between self-views and behaviors (Swann, Chang-Schneider, & McClarty, 2007), more positive current-self views may lead to more preparation, and at the same time, more preparation may lead to more positive self-views.

In addition to the hypothetical relationships between current-self views and preparations for old age, the mechanism underlying those relationships may also be partially explained by control beliefs. For example, better initial appraisal in the domain of health and social support has been shown to be associated with subsequent increases in perceived control (Gerstorf, Röcke, & Lachman, 2011), and that control belief is related to future planning (Prenda & Lachman, 2001). Feeling good about one's current situation may lead to a heightened sense of control, which in turn may motivate individuals to engage in preparations for old age.

### **Contextual Factors: Culture and Domains of Functioning**

The strength of impact of the above factors may be moderated by context. Given that an individual's experience varies across domains of functioning (e.g., social network, finances, work status, or health) and is affected by changes in systems over time (Bronfenbrenner, 1994), it is also important to consider multidimensional contextual effects in longitudinal studies that reflect changes and causal relationships across the lifespan.

Research has shown that subjective views of aging vary across both domains of functioning and cultures (e.g., Löckenhoff et al., 2009; North & Fiske, 2015), and preparations for old age also vary depending on domains across cultures (e.g., Kornadt, Voss, Fung, Hess, & Rothermund, 2019). In those studies, the degree of variation was found to be related to the relevance of each domain to specific phases of adulthood or to different cultures. Perception of control within particular life domains is also likely to be affected by beliefs, knowledge, and experiences associated with that domain (e.g., Skinner, 1996).

In sum, stereotype embodiment theory (Levy, 2009) suggests how aging stereotypes are internalized from a host culture at a young age, and then become self-stereotypes with advancing age, illustrating general ideas about how belief systems might account for between-groups or cross-cultural differences in aging outcomes (e.g., Levy, Hausdorff, Hencke, & Wei, 2000; Levy, Slade, Kunkel, & Kasl, 2002). However, that theory is less clear as to how individual differences emerge in this internalization process and associated outcomes. For example, some individuals may maintain positive aging stereotypes and show positive outcomes even within the same group or culture where negative aging stereotypes are prevalent. Thus, identifying individual characteristics that may influence the internalization may provide a more complete understanding of the impact of aging stereotypes and facilitate our understanding of factors that

promote adaptation. In addition, although there is evidence regarding the adaptive consequences of aging attitudes and stereotypes, the mechanisms underlying this relationship are in need of further elaboration.

### **The Present Research**

The manuscripts that comprise this dissertation report on research that addresses these issues. First, I am interested in whether personality traits are related to views of aging and associated outcomes. As personality traits have been shown to be predictive of attitudes in diverse contexts (e.g., Dinesen et al., 2016; Johnston & Wronski, 2015; Wille et al., 2014) and well-documented relationships between personality traits and well-being (e.g., McCrae & Costa, 1986), personality traits are expected to show individual differences in aging attitudes and related outcomes such as well-being. Second, I am interested in what individual characteristics and views of aging are related to preparations for old age. Given that control beliefs relate to future-planning (Prenda & Lachman, 2001), and more positive views of one's own aging are related to increased preparations (Kornadt et al., 2019), I expect control beliefs and future-self views will reflect individual differences in preparations. Third, I am interested in how one's current circumstances influence adaptive processes. Other than views of aging, current views of self are also expected to influence preparations through a sense of control, and at the same time, preparations are expected to influence views of one's current functioning. I predict these relationships will vary across contexts over time, and thus I will examine the impact of domains of functioning and cultures in a longitudinal study.



## **Manuscript 1: The Effects of Personality and Aging Attitudes on Well-Being in Different Life Domains**

The first manuscript investigated whether personality may contribute to individual differences in subjective views of aging, especially generalized aging attitudes, which in turn may influence current well-being. Given that I expected that the strength of these relationships will vary across domains of functioning, I examined behavior in different domains of functioning (i.e., family relationships, friends and acquaintances, leisure activities, life management, financial situations, work, and health). Lastly, I hypothesized that age will moderate the relationship between aging attitudes and well-being, with its impact increasing in strength as people get older due to increasing relevance.

The sample consisted of 563 persons (aged from 30 to 89) recruited as a part of the Ageing as Future Study in Wake County, North Carolina in 2013. Both men and women were relatively evenly distributed across age range. They completed a paper-and-pencil questionnaire assessing a wide variety of constructs. For the present study, I focused on the following measures.

- (a) Big-Five Inventory -short version (Lang, John, Lüdtke, Schupp, & Wagner, 2011).

Participants responded to 15 items using seven-point scales for neuroticism, conscientiousness, agreeableness, openness, and extraversion.

- (b) Aging attitudes (Kornadt & Rothermund, 2011). Participants rated their agreement with each statement regarding general older adults unique to seven life domains. Each item addressed the domain-specific functioning of older adults using two opposing statements, with higher scores indicating more positive views and lower scores indicating more negative views.

(c) Well-being (Kornadt & Rothermund, 2012). Well-being was assessed through two measures; life satisfaction and perception of their own current level of functioning (i.e., current-self views) within each of the seven domains.

Mediation was tested using the Process macro for SPSS (Hayes, 2018), with the models including gender, education, and health as covariates. Next, I ran the moderated mediation model with age as a continuous moderator on the relationship between aging attitudes and well-being. To further explore significant age effects, I examined effects at three representative points: 1 SD below the sample mean of age, the sample mean of age, and 1SD above the sample mean of age.

Results revealed that significant negative relations between neuroticism and both aging attitudes and well-being were obtained in most of seven domains, whereas positive associations were observed between the other four personality traits and both aging attitudes and well-being in all domains, with effects weaker in strength being less consistent across domains. Mediation analyses also supported the prediction that aging attitudes mediate the relationship between personality and well-being, with the strongest effects for neuroticism, conscientiousness, and agreeableness. Whereas high neuroticism was a risk factor for negative aging attitudes and well-being, high conscientiousness and agreeableness were protective.

I also found the strength of relationships varied across domains of functioning, both within and across personality traits, supporting multidimensionality of aging attitudes. For neuroticism, mediation effects were significant for all domains. Mediation effects involving conscientiousness were significant in the domain of work and life management. However, in contrast with our hypotheses, significant positive effects involving conscientiousness were also found in the domains of family and friends. With respect to agreeableness, significant positive effects were observed in the domains of family, friends, life management, and work. For

openness and extraversion also reflected a context-specific perspective with significant effects in the domain of work and social relations, respectively. Lastly, consistent with our expectation, moderation of the relationship between aging attitudes and well-being tended to increase with age, though significant effects were not observed for all domains with all personality traits.

In this manuscript, we highlighted a possible mechanism involved in the stereotype internalization process, with the probability of internalization related to individual personality traits. Also, the increasing strength of mediation effects with advancing age supports the proposition of stereotype embodiment theory that aging attitudes become more self-stereotyped with advancing age. The fact that mediation effects involving aging attitudes become stronger with age suggests something unique about attitudes, which may become more powerful as they become more self-relevant with advancing age. It is also possible that this moderated mediation reflects a transformation of attitudes to be more consistent with perceptions of current functioning as one transitions into old age.

The Effects of Personality and Aging Attitudes on Well-Being in Different Life domains

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## The effects of personality and aging attitudes on well-being in different life domains

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### ABSTRACT

**Objectives:** Personality plays a major role in determining the way people adjust to life experiences, ultimately affecting life satisfaction. Aging attitudes also impact well-being, but there is little research on whether these personality and attitudinal effects reflect the same mechanism. The purpose of this study was to examine whether aging attitudes mediate the relationship between personality and well-being across seven different domains of everyday functioning, and whether this effect depends on age.

**Methods:** Data from 563 adults ranging in age from 30 to 89 were used. Sociodemographic information as well as the Big Five Inventory, aging attitudes, and well-being (i.e. current self-views and life satisfaction) in seven different life domains was assessed.

**Results:** The mediating effect of aging attitudes in the relationship between personality and well-being was strong for neuroticism, conscientiousness, and agreeableness and varied across domains. Significant mediation effects were limited for openness and extraversion. Significant moderated mediations were rather limited but the effects were stronger in later life.

**Discussion:** These results suggest that personality influences aging attitudes, which in turn affect well-being. Further, our results indicate that such relationships are context-specific, suggesting that the global assessments of attitudes and well-being may not fully characterize significant aging outcomes.

### ARTICLE HISTORY

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 aging attitudes; well-being; context

In recent years, an increasing amount of research has demonstrated that attitudes about aging are significant predictors of functioning and well-being. Individuals with positive aging attitudes exhibit enhanced cognitive function (Mazerolle, Régner, Rigalleau, & Hugué, 2015; Wurm, Tesch-Römer, & Tomasik, 2007) and report lower levels of depression and anxiety along with higher life satisfaction in old age (Bryant et al., 2012; Kornadt & Rothermund, 2011; Mock & Eibach, 2011), even after taking into account levels of physical health (Bryant et al., 2012). Longitudinal studies have also demonstrated that older adults with more positive aging attitudes are more likely to engage in preventive health behaviors (Levy & Myers, 2004) and live an average age of 7.5 years longer than those with less positive perceptions of aging (Levy, Slade, Kunkel, & Kasl, 2002).

Despite the evidence for the importance of aging attitudes, our understanding regarding the determinants of individual differences in aging attitudes is still limited. For example, Levy's (2009) stereotype embodiment theory has been used to highlight the possible mechanisms through which attitudes and beliefs have their impact, proposing that aging stereotypes are internalized from the individual's culture at a young age and become self-stereotypes at some point as one gets older. However, whereas the theory may do a good job of elucidating how belief systems might account for between-group or cross-cultural differences in aging outcomes, the mechanisms through which negative attitudes are internalized are less clear. Even within a culture where negative aging stereotypes are pervasive, some individuals are more likely to exhibit negative

stereotypes than others. Given the positive as well as potentially deleterious effects associated with aging attitudes for well-being, it is important to identify the factors that contribute to individual differences in attitudes. Such information has the potential to both help identify people susceptible to negative aging attitudes – and the associated negative outcomes – and contribute valuable information regarding mechanisms underlying attitude development that could be employed in prevention or intervention programs.

One factor that may be linked to individual differences in attitude internalization and subsequent well-being is personality (e.g. Big Five traits). Personality refers to the set of characteristic patterns of cognition, emotion, and behavior in people (Cloninger, 2009). Given the presumed general influence on functioning across contexts, it seems reasonable to assume that personality will exert some influence on attitudes toward socially significant objects, groups, or events. Indeed, personality traits have been shown to be predictive of attitudes in contexts as diverse as immigration (Dinesen, Klemmensen, & Norgaard, 2016), politics (e.g. Johnston & Wronski, 2015), social values (Sibley & Duckitt, 2008), and work (Wille, Hofmans, Feys, & De Fruyt, 2014).

Little is known about the interrelationships between personality, aging attitudes, and the individual's well-being. However, research examining the bivariate associations between these variables suggests potential links between them. Specifically, positive attitudes about aging have been shown to be associated with higher levels of well-being



(e.g. Brothers, Miche, Wahl, & Diehl, 2017; Bryant et al., 2012; Moser, Spagnoli, & Santos-Eggimann, 2011), as have younger subjective ages, which may reflect attitudes about one's own aging (e.g. Choi, DiNitto, & Kim, 2014; Keyes & Westerhof, 2012). It is also well established that personality traits are associated with well-being. One meta-analysis based on samples covering a wide age range concluded that personality explains 39%–63% of the variance in subjective well-being (Steel, Schmidt, & Shultz, 2008). With respect to specific traits, high neuroticism has been consistently associated with worse mental health (e.g. Hakulinen et al., 2015; Neeleman, Bijl, & Ormel, 2004; Ormel et al., 2013), and high conscientiousness is positively related to objective physical health and longevity (e.g. Friedman, Kern, Hampson, & Duckworth, 2014; Hampson, Edmonds, Goldberg, Dubanoski, & Hillier, 2013). Higher levels of extraversion and lower levels of neuroticism have also been associated with higher levels of life satisfaction in old age (Gale, Booth, Möttus, Kuh, & Deary, 2013; Hillerås, Jorm, Herlitz, & Winblad, 2001). Additionally, agreeableness and openness have been positively related to emotional well-being (e.g. DeNeve & Cooper, 1998; Steel et al., 2008). One recent study concluded that the relationship between personality and well-being varies across personality factors and distinct dimensions of well-being (Sun, Kaufman, & Smillie, 2017), suggesting that this association is multifaceted.

There has been less research conducted examining the relationship between personality and aging attitudes, but existing studies have highlighted the fact that the strength of the relationship is dependent on the specific personality trait being examined. For example, Harris and Dollinger (2003) found that neuroticism was positively related to greater anxiety about aging in a sample of undergraduates, whereas conscientiousness, agreeableness, and extraversion were negatively associated with aging anxiety. Studies with older adults obtained related results. For example, older people with higher levels of neuroticism report more negative attitudes about one's own aging than those with lower levels (Moor, Zimprich, Schmitt, & Kliegel, 2006). A more extensive study using data from the Lothian Birth Cohort 1936 study (Shenkin et al., 2014) examined relationships between different personality traits and specific types of aging-related attitudes. They observed that the strength of association varied with trait type (i.e. neuroticism, extraversion, and conscientiousness were stronger predictors than openness and agreeableness) and with attitude type (e.g. neuroticism was the strongest predictor of attitudes regarding psychosocial loss, whereas extraversion was the strongest predictor of attitudes about physical change and psychological growth).

These two studies also provided evidence relevant to our examination of personality, aging attitudes, and well-being. Specifically, Moor et al. (2006) found that neuroticism was negatively associated with aging attitudes, which in turn influenced perceptions of health. Similarly, Shenkin et al. (2014) found that perceptions of one's own aging were related to health and well-being (i.e. anxiety, depression), with personality being the strongest predictors of these perceptions. These findings suggest that whereas aging attitudes may predict well-being, such attitudes may be partially determined by personality factors. That is,

personality may influence the types of attitudes that people construct about aging, with the impact of personality on well-being potentially operating through these attitudes. Taken together with the aforementioned research, these findings also argue for a multidimensional approach to examining the impact of personality on attitudes and well-being.

The primary goal of the present study was to explicitly investigate the extent to which aging attitudes mediate the relationship between specific personality characteristics and well-being. Consistent with the multidimensional perspective, we were also interested in exploring the possibility that the strength of the hypothesized mediation effects would vary across domains of everyday functioning. There is a growing consensus that aging attitudes are not represented by a single dimension, but are multidimensional in nature (Gluth, Ebner, & Schmiedek, 2010; Kornadt & Rothermund, 2011). This presumably reflects the fact that aging attitudes have context-based characteristics. For instance, aging attitudes tend to be negative in the cognitive domain (i.e. memory) (e.g. Heckhausen, Dixon, & Baltes, 1989), whereas more positive attitudes may prevail in other domains, such as wisdom (e.g. Scheibe, Kunzmann, & Baltes, 2009). Consistent with these observations of domain specificity, Kornadt and Rothermund (2011) observed strong context dependency in attitudes about aging, with negative evaluations occurring for health and fitness and positive ratings in family, religion, and work. In a similar vein, the previously cited research suggests that different aspects of personality will exhibit different relationships with attitudes depending upon relevance to the domain.

In the present study, we explored these ideas regarding context specificity by examining mediation effects involving each of the Big Five personality traits in seven different domains of everyday functioning. Given the salient negative affect associated with neuroticism, we expected high scores on this trait to be associated with negative aging attitudes regardless of life domains (e.g. Moor et al., 2006). Alternatively, as high conscientiousness is characterized by organized and planful instrumental tendencies (e.g. McCrae & Costa, 2010), it is associated with many positive work-related outcomes (e.g. Byrne, Stoner, Thompson, & Hochwarter, 2005). Thus, we predicted that the associated heightened sense of control would lead to more positive attitudes in domains where instrumental behaviors may have a reasonable impact on outcomes (e.g. work) than in those where such behaviors play a less obvious role (e.g. family). The conceptual and empirical bases for making predictions regarding the other three Big-Five personality traits – extraversion, agreeableness, and openness to experience – were less clear, and thus, we considered examination of mediation involving them to be largely exploratory.

Lastly, we considered the possibility that the strength of mediation effects may be moderated by age. Specifically, whereas the strength of the relationship between personality and both aging attitudes and well-being may not vary considerably with age, the impact of aging attitudes on well-being may increase as old age becomes more self-relevant (Kornadt & Rothermund, 2011). In other words, the salience of aging attitudes may increase in middle-age and later life, with the impact of personality on well-being

being increasingly accounted for by these attitudes. For example, recent work examining predictors of subjective age – which can be viewed as self-perceptions of one's own aging – found that the strength of prediction varied with age, with attitudes about aging being somewhat more predictive in middle-aged than in young adulthood (Hess et al., 2017). Adapting this result to our current research regarding personality and age, we predicted that higher levels of neuroticism would be associated with more negative aging attitudes in younger adults, but that these attitudes will not necessarily impact their well-being or will have a reduced impact relative to middle-aged and older adults. As attitudes become more self-relevant in middle and old age, we expect a greater impact of attitudes on well-being. Thus, we hypothesized that the relationship between aging attitudes and well-being will vary by age, with stronger associations in later life due to the increased salience of aging attitudes.

In sum, we hypothesized that personality will explain individual differences in aging attitudes and that aging attitudes will mediate the effect of personality on well-being (See Figure 1). We further predicted that this mediation will vary as a function of both personality and domain of functioning. Distinctive mediation effects associated with personality will vary based on their relationship to the domain of functioning, and the strength of mediation effects will vary partially due to the salience of aging stereotypes within each domain. Finally, we expected that the predicted mediation effects will be stronger with age in adulthood due to the increase in self-relevance of such attitudes.

## Methods

The methods of this research have been reviewed and approved by the North Carolina State University Institutional Review Board.

## Participants

Participants were recruited as a part of the Ageing as Future Study using lists provided by a private marketing firm that contained names, addresses, ages, and sexes of residents of Wake County, NC. Names were randomly selected from the lists, and participation was solicited through the mail in waves until targeted distribution goals with respect to age and sex were achieved. Participants received a \$25 gift card for participation. There were 570 persons recruited. Due to very few people below the age of 30 or above 89, we restricted our sample to 30–89, and both men and women were relatively evenly distributed across this range. The total sample used in this study consisted of 563 persons (51.2% female; mean age = 56.4,  $SD = 15.4$ ). Participants self-identified as White/Caucasian ( $n = 466$ ), Black/African American ( $n = 83$ ), Hispanic/Latino ( $n = 13$ ), American Indian/Alaskan Eskimo ( $n = 1$ ), and Other ( $n = 1$ ). Education level ( $M = 5.59$ ,  $SD = 1.46$ ) was assessed using the 2011 version of the International Standard Classification of Education (UNESCO Institute for Statistics).<sup>1</sup> Current health status was assessed using a single question, 'How would you describe your current state of health?',

with participants responding on the five-point scale (1 = 'Not good at all', 5 = 'Very good';  $M = 3.13$ ,  $SD = 0.85$ ).

## Measures

The packet mailed to participants contained various questionnaires assessing demographic characteristics, views of aging, personality, and attitudes. For the present study, we focused on the following instruments.

### Personality

The Big-Five Inventory – short version (Lang, John, Lüdtke, Schupp, & Wagner, 2011) was used to assess personality. Participants responded to 15 items – 3 items per trait – using seven-point scales ranging from *does not apply to me at all* (1) to *absolutely applies to me* (7). Lang et al. (2011) obtained inter-item reliabilities ranging from .50 to .66, reflecting the broad assessment of each trait based in the three items for each scale. In the present study, Cronbach's  $\alpha$ s for neuroticism, conscientiousness, agreeableness, openness, and extraversion were .69, .52, .50, .66, and .68, respectively.

### Aging attitudes

Attitudes toward aging were assessed by asking participants to rate their agreement with bipolar statements about older people unique to seven different life domains. Previous research has demonstrated that these statements reflect distinct domain-specific views of aging (Hess et al., 2017; Kornadt & Rothermund, 2011). The domains represented were (a) family and one's committed relationship, (b) friends and acquaintances, (c) leisure activities and volunteer activities, (d) life management, (e) financial situation and dealing with money, (f) work and professional life, and (g) health (See Table 1 for sample items). Assessments within each domain included three to five items, each containing a positive and negative endpoint. Participants used an eight-point scale to indicate how their attitudes aligned with these two extremes, with lower scores indicating more agreement with the negative item and higher scores indicating more agreement with the positive item (The complete questionnaire can be found in Hess et al., 2017).

### Well-being

We assessed well-being using two different measures. One involved a single item specifically asking about life satisfaction (i.e. 'How satisfied are you with your personal situation in the domain of \_\_\_\_?') within each of the seven life domains. Ratings were provided on a five-point scale. Satisfaction in the domain of health was assessed using four separate estimates, one for the subcategories of physical fitness, mental fitness, appearance, and health. Responses to the four items exhibited good internal consistency (Cronbach's  $\alpha = .82$ ), and thus, the mean for the four items was used as the satisfaction score in this domain. Although single-item assessments such as these are convenient and used often in research, they are less stable than multi-item instruments (Michalos & Kahlke, 2010), possessing concerns regarding weak validity and narrow focus (Cheung & Lucas, 2014). Thus, we used a



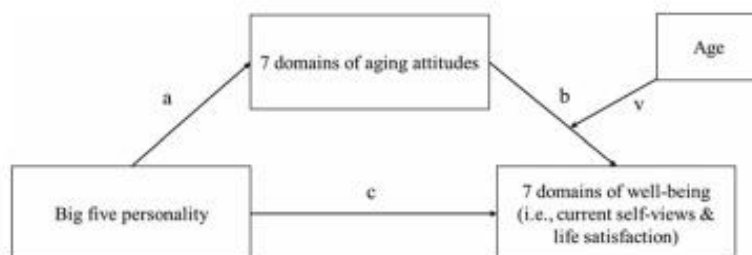


Figure 1. Illustrations of a moderated mediation model. Total effect =  $c + ab$ ;  $c$  = direct effect;  $ab$  = indirect effect;  $v$  = moderation effect.

Table 1. Sample items from the aging attitudes scales and the current self-views scale (for measuring well-being).

Aging attitudes	Current self-views		
	(a) Family and one's committed relationship		
'Old people have many conflicts in their relationship with their family'	'Old people have a harmonious relationship with their family'	'In my current situation, I don't have a fulfilling relationship with a spouse or partner'	'I have a fulfilling relationship with a spouse or partner'
	(b) Friends and acquaintances		
'Old people have difficulty making new friends'	'Old people can easily make new friends'	'In my current situation, I find it difficult to make new friends'	'I find it easy to make new friends'
	(c) Leisure activities and volunteer activities		
'Old people have few opportunities for leisure and volunteer activities'	'Old people have many opportunities for leisure and volunteer activities'	'In my current situation, I have few opportunities for leisure and volunteer activities'	'I have many opportunities for leisure and volunteer activities'
	(d) Life management		
'Old people don't know how to deal with important issues of life'	'Old people find the correct solution for important life questions'	'In my current situation, I don't know how to deal with important issues of life'	'I find the correct solution for important life questions'
	(e) Financial situation and dealing with money		
'Old people have little money and have to be frugal with money'	'Old people have plenty of money and can spend it freely'	'In my current situation, I have little money and have to be frugal with it'	'I have plenty of money and can spend it freely'
	(f) Work and professional life		
'Old people have difficulties doing good work'	'Old people have no problems doing good work'	'In my current situation, I have difficulties doing good work'	'I will have no problems doing good work'
	(g) Health		
'Old people are often sick'	'Old people are seldom sick'	'In my current situation, I am frequently sick'	'I am seldom sick'

more detailed measure of well-being by assessing one's self-perceptions of their own current level of functioning within each of the seven target domains by adapting the same three to five domain-specific items used to assess attitudes toward aging. In other words, participants were asked to assess their perceptions of their own level of functioning for each item as opposed to evaluating attitudes about older people in general (See Table 1 for sample items). The complete questionnaire can be found in Hess et al. (2017).

#### Control variables

The aforementioned self-rating of health was used as a covariate in our analyses to control for possible influences on well-being unrelated to our variables of interest.<sup>2</sup> Education was also included as a covariate to control for possible associations with well-being.

#### Statistical analysis

M-plus 7.31 was used to obtain latent factor scores for aging attitudes and current self-views within each domain from a confirmatory factor analysis that supported the domain-specific nature of attitudes and current self-views (for specific details, see Hess et al., 2017). From the confirmatory factor analysis, Hess et al. (2017) indicated

reasonable fit indexes for both measures (aging attitudes:  $\chi^2(296)=505.409$ , RMSEA=.035 [90% CI: .030, .040], CFI=.959, SRMR=.043; current self-views:  $\chi^2(294)=616.929$ , RMSEA=.044 [90% CI: .039, .049], CFI=.941, SRMR=.064).

In the present study, we found significant positive correlations between the single-item life satisfaction rating and ratings of one's current situation within each domain ( $r_s = 0.309-0.556$ ). However, we were unable to achieve satisfactory model fits with a composite score when attempting to establish measurement invariance across ages. Thus, we thought it would be instructive to perform separate analyses for the two measures within each domain and to compare results.

Mediation analyses using the PROCESS macro for SPSS (Hayes, 2013) were conducted to explore the hypothesis that aging attitudes would mediate the relationship between personality and life satisfaction. This macro used 5000 bootstrap samples at 95% confidence interval to test direct and indirect relationships. The significance of an indirect effect is identified in the case that the 95% CI does not include zero at  $p < .05$  (two-tailed), indicating that the effect of the independent variable on the dependent variable is incidental upon the effect of the mediator (Preacher & Hayes, 2004). This procedure has been found to maintain the highest level of power while still having reasonable control over Type I error rate (MacKinnon, Lockwood, & Williams, 2004). As shown in Figure 1, direct effects (c) refer



Table 2. Correlations of age and personality with domain-specific aging attitudes, current self-views, and life satisfaction.

Domain	Measure	Age	Neuro	Cons	Agree	Open	Extra	AA	CSV	LS
FAM	AA	.085*	-.302**	.094*	-.202**	.051	.025	1		
	CSV	.104*	-.354**	.185**	-.185**	.067	.204**	.473**	1	
	LS	.098*	-.213**	.069	-.179**	.026	.151**	.236**	.431**	1
FRN	AA	.142**	-.217**	.164**	-.208**	.089*	.127**	1		
	CSV	.171**	-.309**	.218**	-.236**	.202**	.410**	.498**	1	
	LS	.202**	-.202**	.136**	-.176**	.088*	.209**	.272**	.522**	1
LEI	AA	-.007	-.204**	.085*	.015	.039	.027	1		
	CSV	.114**	-.322**	.205**	-.122**	.231**	.268**	.283**	1	
	LS	.239**	-.287**	.088*	-.124**	.108*	.146**	.119**	.424**	1
LMA	AA	.096*	-.252**	.141**	-.187**	.063	.034	1		
	CSV	.162**	-.509**	.259**	-.326**	.239**	.162**	.325**	1	
	LS	.138**	-.318**	.108*	-.225**	.152**	.193**	.136**	.358**	1
FIN	AA	.009	-.181**	.048	.019	.003	.033	1		
	CSV	.138**	-.211**	.115**	.031	.061	.072	.384**	1	
	LS	-.239**	.069	.103**	.033	.044	.202**	.222**	.556**	1
WRK	AA	.215**	-.241**	.154**	-.155**	.116**	.014	1		
	CSV	-.188**	-.214**	.397**	-.164**	.122**	.076	.296**	1	
	LS	-.174**	.072	.152**	.043	.064	.136**	.159**	.070	1
HEA	AA	.170**	-.269**	.075	-.156**	.045	.091*	1		
	CSV	-.181**	-.223**	.238**	-.129**	.052	.091*	.271**	1	
	LS	-.271**	.200**	.169**	-.107*	.106*	.161**	.202**	.405**	1

Note. Neuro: Neuroticism; Cons: Conscientiousness; Agree: Agreeableness; Open: Openness; Extra: Extraversion; AA: aging attitudes; CSV: current self-views; LS: life satisfaction; FAM: family and one's committed relationship; FRN: friends and acquaintance; LEI: leisure activities and volunteer activities; LMA: life management; FIN: financial situation and dealing with money; WRK: work and professional life; HEA: health.  
\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

to the relationship between personality (independent variable) and life satisfaction (dependent variables) with control for aging attitudes (mediating variables). Indirect effects (ab) reflect the influence of personality on life satisfaction through the mediator (attitudes). Total effects reflect the combined direct and indirect effects.

The mediation models were first examined with gender, education, and health included as covariates. Education did not emerge as a significant predictor in any analysis, so it was excluded from further consideration. We then ran the mediation models with age as a continuous moderator on the association between attitudes and life satisfaction to test for moderated mediation, also using the PROCESS macro. When significant effects were obtained in these analyses, we followed up with specific tests of mediation at point representative of 1 SD below the sample mean, the sample mean, and 1 SD above the sample mean. We referred to these three points of estimates as younger, middle-aged, and older adults to facilitate communication. These points represented the ages of 41.0, 56.4, and 71.8.

## Results

### Correlations

Correlations among all variables are presented in Table 2. Significant ( $p < .05$ ) negative correlations between neuroticism and both aging attitudes and well-being (i.e. current self-views and life satisfaction) were obtained in most of the seven domains. In contrast, positive associations were observed between the other four personality traits and both aging attitudes and well-being in all domains, although these correlations were generally weaker in strength and not always significant.

### Mediation analyses

We next examined whether aging attitudes mediated the relationship between personality and well-being within each domain. The results of regression analyses for current

self-views are presented in Table 3. Consistent with expectations, mediation effects involving neuroticism were significant and negative for all seven domains; that is, high neuroticism in these domains predicted more negative aging attitudes, and negative attitudes were related to negative current self-views. Also consistent with expectations, attitudes mediated the effects of conscientiousness on current self-views in the domains of life management and work, with high conscientiousness being associated with more positive aging attitudes and positive current self-views. Unexpectedly, significant positive mediation effects involving conscientiousness were also observed for the domains of family and friends. With regard to agreeableness, significant positive mediation effects were found in the domains of family, friends, life management, and work. Meanwhile, significant positive mediation effects were only obtained for openness in the work domain and for extraversion in the domain of friends. Note that all effects reflected partial mediation except for that involving agreeableness and health, in which attitudes fully mediated the association.

These results can be contrasted with those obtained with the single-item life satisfaction measure (Table 4). Significant mediation effects involving neuroticism were obtained in only five out of seven domains (i.e. family, friends, finance, work, and health). For the other four personality traits, significant mediation effects replicated those observed using current self-views, but with smaller effect sizes. Once again, all effects reflected partial mediation except for those of conscientiousness in the domains of friends and life management.

### Moderated mediation analyses

In order to test our hypothesis regarding age differences in the strength of the obtained mediation effects, we first examined the data for evidence of moderated mediation effects for current self-views (see Table 5). That is, did age moderate the extent to which attitudes mediated the relationship between personality and well-being? Bootstrapped

Table 3. Comparison of indirect effects with covariates of personality on current self-views through aging attitudes in full sample with each domain.

		FAM	FRN	LEI	LMA	FIN	WRK	HEA
Neuroticism	R <sup>2</sup>	.284	.293	.186	.325	.194	.179	.277
	TE (SE)	-.220***(.027)	-.216***(.029)	-.204***(.028)	-.345***(.025)	-.126***(.030)	-.122***(.028)	-.120***(.026)
	IE (SE)	-.073* (.015)	-.065* (.015)	-.026* (.009)	-.035* (.010)	-.039* (.012)	-.036* (.010)	-.033* (.009)
	CI	-.103, -.046	-.096, -.036	-.047, -.011	-.057, -.017	-.063, -.017	-.058, -.018	-.053, -.017
Conscientiousness	R <sup>2</sup>	.261	.267	.146	.180	.190	.273	.290
	TE (SE)	.179***(.041)	.214***(.044)	.183***(.042)	.240***(.042)	.119**(.045)	.372***(.039)	.182***(.039)
	IE (SE)	.040* (.020)	.077* (.022)	.020 (.012)	.041* (.015)	.018 (.017)	.029* (.011)	.013 (.010)
	CI	.002, .080	.036, .122	-.001, .045	.015, .071	-.016, .053	.009, .053	-.006, .033
Agreeableness	R <sup>2</sup>	.253	.273	.135	.211	.184	.177	.267
	TE (SE)	.175***(.037)	.217***(.039)	.102***(.038)	.293***(.037)	.039 (.041)	.134***(.037)	.088**(.036)
	IE (SE)	.083* (.019)	.092* (.020)	-.004 (.010)	.047* (.013)	.010 (.016)	.032* (.011)	.029* (.010)
	CI	.048, .123	.053, .133	-.016, .025	.023, .075	-.021, .041	.013, .057	.012, .049
Openness	R <sup>2</sup>	.244	.274	.173	.191	.184	.173	.265
	TE (SE)	.057 (.034)	.172***(.035)	.193***(.034)	.199***(.034)	.058 (.037)	.100**(.034)	.039 (.032)
	IE (SE)	.020 (.017)	.036 (.019)	.009 (.010)	.016 (.012)	.002 (.014)	.023* (.010)	.008 (.008)
	CI	-.013, .055	-.001, .075	-.009, .030	-.006, .040	-.025, .030	.006, .046	-.007, .025
Extraversion	R <sup>2</sup>	.277	.371	.185	.168	.185	.168	.283
	TE (SE)	-.141***(.029)	-.296***(.028)	-.181***(.029)	-.105***(.030)	.054 (.031)	.036 (.029)	.034 (.027)
	IE (SE)	.007 (.013)	.040* (.015)	-.004 (.008)	-.008 (.011)	.010 (.012)	.000 (.008)	.012 (.007)
	CI	-.017, .033	.012, .070	-.011, .020	-.029, .014	-.014, .033	-.015, .016	-.001, .028

Note. TE: total effect; IE: indirect effect; SE: standard error; CI: confidence interval for indirect effects. FAM: family and one's committed relationship; FRN: friends and acquaintance; LEI: leisure activities and volunteer activities; LMA: life management; FIN: financial situation and dealing with money; WRK: work and professional life; HEA: health.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

<sup>†</sup>CI does not contain 0, indicating there is a statistically significant result.

<sup>‡</sup>Indicates a full mediation.

analyses revealed significant moderated mediation involving neuroticism within all domains except for work, with the effects of aging attitudes on current self-views increasing consistently with age within each of these domains. Significant moderated mediations of a similar nature were observed with the following: (a) conscientiousness in the domains of friends and life management; (b) agreeableness in the domains of family, friends, life management, and health; and (c) extraversion in the domain of friends. No moderated mediation was observed for openness. In contrast, moderated mediation effects were less evident for life satisfaction scores. The only significant result was obtained for the leisure domain involving neuroticism,  $b = -.001$ ,  $SE = .001$ , 95% CI  $(-.002, -.0003)$ , with the mediation effect being weak and positive in younger adults,  $b = .015$ ,  $SE = .010$ , 95% CI  $(-.003, .035)$ , and negative in middle-aged,  $b = -.005$ ,  $SE = .006$ , 95% CI  $(-.019, .006)$ , and older adults,  $b = -.026$ ,  $SE = .012$ , 95% CI  $(-.054, -.005)$ .

Notably, even though significant moderated mediation was not observed for all domains with all personality traits, the age effects tended to be consistent with expectations for both current self-views and life satisfactions. That is, the indirect effect of personality on well-being through aging attitudes tends to increase with age. We also considered the possibility that potential variations in the relevance of specific domains to individuals in different age groups might have influenced the results and observed age effects. Supplementary analyses, however, provided little evidence for this. For example, when we eliminated retirees from our analyses in the work domain – which we thought could be considered the domain with the strongest age-relevance biases – our results remained relatively unaffected.

## Discussion

The goal of this study was to examine personality as a predictor of aging attitudes and well-being – as assessed by an index of current self-views and life satisfaction – and

the extent to which aging attitudes mediate the relationship between personality traits and well-being. We further examined the degree to which the strength of these relationships varied as a function of both personality traits and domain of functioning. Finally, we tested the hypothesis that age would moderate the relationship between aging attitudes and well-being, with mediation being strongest in midlife and old age.

Examination of our data revealed results consistent with well-documented associations between personality characteristics and well-being (e.g. McCrae & Costa, 1986). Specifically, we found that neuroticism was negatively associated with well-being in all seven domains, whereas the other four personality traits were positively associated. We also found that aging attitudes were related to personality. Although research in this area is somewhat limited, our results were generally consistent with previous studies that found neuroticism to be negatively associated with self-perceptions of aging (Bryant et al., 2016; Harris & Dollinger, 2003; Moor et al., 2006), and conscientiousness, agreeableness, and extraversion to be positively related to lower aging anxiety (Bryant et al., 2016; Harris & Dollinger, 2003).

Our expectations regarding aging attitudes mediating the relationship between personality and well-being were also supported, with the effects strongest for neuroticism, conscientiousness, and agreeableness based on the number of significant mediating effects. Based on our findings, high neuroticism can be considered a risk factor for negative aging attitudes and well-being, whereas high conscientiousness and agreeableness appear to be protective. Our examination of mediation effects involving openness and extraversion was exploratory, and evidence of mediation was more limited for these facets, perhaps reflecting a more focused, domain-specific influence relative to neuroticism and conscientiousness.

As expected, we also found that the strength of associations varied across domains of functioning, both within and across personality traits, providing further support for the multidimensionality and domain specificity of aging



Table 4. Comparison of indirect effects with covariates of personality on life satisfaction through aging attitudes in full sample within each domain.

		FAM	FRN	LEI	LMA	FIN	WRK	HEA
Neuroticism	R <sup>2</sup>	.095	.139	.131	.157	.152	.087	.216
	TE (SE)	-.165***(.035)	-.145***(.033)	-.219***(.033)	-.229***(.031)	-.186***(.039)	-.155***(.044)	-.164***(.028)
	IE (SE)	-.043* (.013)	-.037* (.011)	-.007 (.007)	-.011 (.008)	-.024* (.010)	-.024* (.011)	-.020* (.009)
	CI	-.072, -.020	-.060, -.018	-.022, .005	-.027, .005	-.046, -.007	-.048, -.005	-.039, -.004
Conscientiousness	R <sup>2</sup>	.077	.127	.068	.087	.094	.073	.201
	TE (SE)	.060 (.053)	.119* (.049)	.061 (.050)	.079 (.047)	.059 (.058)	.062 (.065)	.162*** (.042)
	IE (SE)	.025* (.013)	.045* (.015)	.008 (.007)	.018* (.009)	.012 (.012)	.026* (.012)	.009 (.008)
	CI	.002, .054	.019, .077	-.002, .027	.003, .039	-.010, .040	.006, .054	-.004, .028
Agreeableness	R <sup>2</sup>	.092	.134	.076	.117	.134	.087	.196
	TE (SE)	.193***(.047)	.167***(.044)	.110*(.045)	.209***(.042)	.125*(.052)	.192**(.058)	.138***(.038)
	IE (SE)	.047* (.014)	.051* (.014)	-.002 (.005)	.017* (.009)	.007 (.011)	.022* (.011)	.020* (.009)
	CI	.022, .077	.026, .083	-.008, .014	.001, .038	-.014, .030	.005, .048	.005, .041
Openness	R <sup>2</sup>	.077	.127	.076	.111	.126	.073	.190
	TE (SE)	.024 (.043)	.081*(.040)	-.101*(.040)	.132***(.037)	.039 (.047)	.050 (.053)	.089*(.035)
	IE (SE)	-.013 (.011)	.021 (.011)	.004 (.005)	.007 (.006)	.037 (.046)	.018* (.009)	.006 (.006)
	CI	-.009, .035	.000, .045	-.005, .015	-.002, .020	-.054, .128	.003, .039	-.006, .020
Extraversion	R <sup>2</sup>	.097	.146	.085	.117	.127	.062	.203
	TE (SE)	.119**(.036)	.156***(.034)	.103**(.034)	.136***(.032)	.030 (.041)	.052 (.045)	.054 (.030)
	IE (SE)	.004 (.007)	.023* (.010)	-.002 (.004)	-.004 (.005)	.007 (.009)	.000 (.006)	.009 (.006)
	CI	-.011, .019	.007, .044	-.006, .009	-.016, .006	-.010, .025	-.012, .014	-.001, .022

Note. TE: total effect; IE: indirect effect; SE: standard error; CI: confidence interval for indirect effects.

FAM: family and one's committed relationship; FRN: friends and acquaintance; LEI: leisure activities and volunteer activities; LMA: life management; FIN: financial situation and dealing with money; WRK: work and professional life; HEA: health.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

\*CI does not contain 0, indicating there is a statistically significant result.

†Indicates a full mediation.

attitudes (Gluth et al., 2010; Komadt & Rothermund, 2011). For example, significant mediation effects involving neuroticism, but not the other four personality traits, were evident in the domain of leisure and finance. The association between neuroticism and leisure makes sense given that studies have shown that neuroticism is negatively associated with leisure satisfaction (Liu, 2014; Lu & Hu, 2005). Provided that high neuroticism is predictive of anxiety about finance (Shafer, 2000), and associated with impulsive spending and low motivation for plans to earn money (Spinella & Lester, 2005), significant mediation effects involving neuroticism in the finance also make sense. Consistent with expectations, we also found mediation effects involving conscientiousness in domains in that conceivably would benefit from high levels of control and organization (work and life management) (Byrne et al., 2005). In the meantime, we found significant indirect effects involving conscientiousness in the domains of family and friends, which was somewhat different from our expectations. It could be feasible, however, that individuals high in conscientiousness could have balanced control strategies for both in work and family, due to their ability dealing with multiple demands (Stock & Beste, 2015).

As expected, mediation involving openness and extraversion was less evident, with the two observed effects consistent with a context-specific perspective. Specifically, openness – which reflects intellectual curiosity and active imagination – was involved in mediation in the work domain, whereas extraversion – reflective of sociability – was predictive in the domain of friends and acquaintances. We did, however, observe several significant indirect effects involving agreeableness. Although we did not have specific expectations involving this personality facet, these findings are consistent with some other previous research that found associations between aging attitudes and agreeableness (e.g. Shenkin et al., 2014). Notably, the strongest effects involving this trait are found in domains involving social interactions: family and friends.

With respect to age, our hypothesis for moderation of the mediation relationships between aging attitudes and well-being was generally supported. When well-being was assessed by current self-views, the observed mediation effects were found to be greater in older adults. Although significant moderated mediation was not observed in all of those domains where significant overall indirect effects were obtained (e.g. neuroticism and work), the trend toward increasing effect sizes with age was still in evidence. This supports our assertion that the mediation effects involving personality and aging attitudes will increase in strength as one approaches and enters old age, at which point such attitudes become more personally relevant. Notably, the mediation, and especially moderated mediation effects, tended to be weaker when well-being was assessed using a single item index relating to life satisfaction. Consistent with good psychometric practice, this discrepancy in results across measures of well-being argues for use of multiple-item measures that help control for measurement error.

Our results may have some implications for detailing the mechanisms involved in stereotype internalization – as proposed in Levy's (2009) stereotype embodiment theory – as well as the factors that may determine individual differences therein. Specifically, internalization of aging stereotypes may be, in part, predicated on the individual's personality traits. In addition, the increasing strength of the observed mediation effects with age supports the proposition in that theory that attitudes become more self-stereotyped with advancing age, but perhaps selectively so based on personality.

It is interesting to compare the results of our study with those of a recent study by O'Shea, Dotson, and Fieo (2016), in which they examined the extent to which domain-general self-perception of aging mediated the relationship between Big Five personality traits and depressive symptoms. Though the study by O'Shea et al. (2016) involved adults aged 50 years or older, the observed mediation effects, which tended to be strongest for neuroticism, were

Table 5. Results of (a) moderated mediation within each domain and (b) age-specific mediation effects within each domain.

	Neuroticism		Conscientiousness		Agreeableness		Openness		Extraversion	
	$\beta$ (SE)	CI	$\beta$ (SE)	CI	$\beta$ (SE)	CI	$\beta$ (SE)	CI	$\beta$ (SE)	CI
$R^2$	.297		.281		.269		.262		.292	
(a) FAM	-.001* (.001)	-.003, -.0002	.001 (.000)	.000, .002	.001* (.001)	.0002, .003	.000 (.000)	-.000, .001	.000 (.000)	.000, .001
(b) Younger*	-.045* (.016)	-.078, -.016	.026 (.015)	.001, .059	.053* (.019)	.021, .094	.013 (.012)	-.008, .038	.005 (.009)	-.012, .024
Middle	-.070* (.013)	-.098, -.045	.038 (.018)	.003, .074	.079* (.018)	.046, .117	.019 (.016)	-.011, .051	.007 (.012)	-.016, .031
Older	-.094* (.019)	-.133, -.060	.050 (.024)	.004, .097	.104* (.024)	.060, .154	.025 (.021)	-.015, .069	.009 (.016)	-.022, .041
$R^2$	.308		.293		.292		.292		.389	
(a) FRN	-.001* (.000)	-.002, -.0001	.001* (.085)	.0002, .002	.001* (.001)	.0003, .003	.001 (.000)	-.000, .001	.001* (.000)	.0001, .0013
(b) Younger	-.044* (.015)	-.076, -.018	.049* (.019)	.016, .089	.061* (.020)	.028, .104	.025 (.015)	.000, .058	.026* (.012)	.006, .054
Middle	-.060* (.014)	-.090, -.033	.070* (.020)	.031, .109	.085* (.019)	.050, .126	.033 (.018)	.000, .070	.036* (.014)	.010, .065
Older	-.077* (.018)	-.113, -.043	.091* (.025)	.040, .139	.110* (.025)	.064, .161	.042 (.022)	.000, .087	.047* (.017)	.014, .082
$R^2$	.249		.221		.206		.236		.248	
(a) LEI	-.002* (.001)	-.003, -.001	.001 (.001)	-.0001, .003	.000 (.001)	-.001, .002	.001 (.001)	-.000, .002	.000 (.001)	-.001, .001
(b) Younger	-.013 (.010)	-.004, .035	-.006 (.007)	-.022, .006	-.001 (.004)	-.011, .006	-.002 (.004)	-.012, .005	-.001 (.003)	-.008, .004
Middle	-.022* (.008)	-.040, -.008	.017 (.010)	-.001, .040	.004 (.009)	-.014, .021	.007 (.008)	-.008, .025	.004 (.007)	-.010, .017
Older	-.057* (.017)	-.094, -.027	.039 (.023)	-.003, .087	.009 (.020)	-.031, .048	.017 (.019)	-.019, .057	.008 (.015)	-.022, .037
$R^2$	.347		.232		.244		.230		.211	
(a) LMA	-.001* (.001)	-.003, -.0004	.002* (.001)	.001, .003	.002* (.001)	.001, .003	.001 (.000)	.000, .002	.000 (.000)	-.001, .000
(b) Younger	-.006 (.013)	-.032, .020	.008 (.012)	-.014, .034	.011 (.015)	-.017, .043	.004 (.006)	-.005, .020	-.003 (.005)	-.013, .006
Middle	-.032* (.010)	-.053, -.014	.035* (.013)	.012, .063	.042* (.012)	.020, .068	.014 (.011)	-.006, .037	-.007 (.009)	-.025, .012
Older	-.057* (.015)	-.090, -.030	.062* (.021)	.024, .106	.072* (.020)	.037, .116	.024 (.018)	-.010, .062	-.012 (.016)	-.043, .019
$R^2$	.228		.230		.222		.220		.224	
(a) FIN	-.001* (.000)	-.002, -.0003	.000 (.001)	.000, .001	.000 (.000)	-.001, .001	.000 (.000)	-.001, .001	.000 (.000)	.000, .001
(b) Younger	-.020* (.010)	-.041, -.003	.009 (.010)	-.008, .033	.005 (.009)	-.011, .024	.001 (.008)	-.015, .018	.005 (.007)	-.008, .021
Middle	-.038* (.011)	-.060, -.016	.018 (.017)	-.015, .051	.009 (.015)	-.020, .037	.002 (.013)	-.024, .029	.009 (.012)	-.013, .033
Older	-.056* (.017)	-.090, -.024	.026 (.024)	-.022, .074	.014 (.021)	-.030, .053	.003 (.020)	-.036, .043	.014 (.017)	-.018, .049
$R^2$	.242		.318		.239		.234		.224	
(a) WRK	-.001 (.001)	-.002, .000	.001 (.000)	.000, .002	.001 (.001)	.000, .002	.000 (.000)	.000, .001	.000 (.000)	.000, .000
(b) Younger	-.032 (.013)	-.062, -.010	.026 (.013)	.005, .056	.029 (.013)	.008, .058	.021 (.011)	.004, .045	.000 (.007)	-.013, .017
Middle	-.045 (.011)	-.067, -.025	.036 (.013)	.012, .063	.039 (.013)	.016, .067	.029 (.012)	.007, .054	.000 (.010)	-.018, .020
Older	-.058 (.015)	-.088, -.030	.046 (.018)	.015, .084	.050 (.018)	.019, .088	.037 (.016)	.009, .073	.000 (.012)	-.025, .025
$R^2$	.324		.328		.310		.307		.318	
(a) HEA	-.001* (.001)	-.002, -.0002	.000 (.000)	.000, .001	.001* (.000)	.0001, .002	.000 (.000)	.000, .001	.000 (.000)	.000, .001
(b) Younger	-.017 (.010)	-.038, .001	.006 (.006)	-.004, .020	.017* (.009)	.002, .035	.005 (.005)	-.004, .016	.007 (.005)	-.001, .019
Middle	-.037* (.010)	-.056, -.019	.014 (.011)	-.007, .036	.033* (.011)	.014, .055	.009 (.009)	-.008, .027	.014 (.008)	-.001, .030
Older	-.058* (.016)	-.089, -.027	.022 (.017)	-.012, .056	.048* (.017)	.019, .083	.013 (.014)	-.012, .042	.020 (.012)	-.002, .046

Note.  $\beta$ : moderated mediation and age-specific mediation effect; SE: standard error; CI: confidence interval.

FAM: family and one's committed relationship; FRN: friends and acquaintance; LEI: leisure activities and volunteer activities; LMA: life management; FIN: financial situation and dealing with money; WRK: work and professional life; HEA: health.

\*Significant moderated mediation or age-specific mediation effect (CI does not contain 0).

<sup>a</sup>Age effects were estimated at mean sample age (middle aged), 1 SD below the mean (younger), 1 SD above the mean (older).

consistent with the findings from our study. Contrary to our findings, however, they only observed weak mediation for conscientiousness and stronger effects for extraversion. The differences in findings may relate to two factors. First, although their outcome measure of depressive symptoms is certainly associated with well-being, it is focused primarily on assessing negative aspects of functioning, thus potentially limiting the power to identify more general relationships. Our measures assessed gradations of well-being from the very negative to the very positive, providing a better picture of the range of functioning. Second, we assessed well-being and aging attitudes with respect to specific domains of functioning. This is likely to provide a more nuanced assessment of well-being and its predictors (e.g. personality) that takes into account differences in the strength of beliefs about aging across different domains of functioning.

The observed associations between personality, aging attitudes, well-being, and age pose some interesting questions regarding the specific role that aging attitudes play in determining aging-related outcomes. Specifically, to what extent do the negative outcomes related to negative attitudes truly reflect causal mechanisms associated with attitudes as opposed to more stable aspects of one's personality? The fact that mediation effects involving aging attitudes become stronger with age suggests something unique about attitudes, which may become more powerful as they become more self-relevant with advancing age.

It is also possible that this moderated mediation reflects a transformation of attitudes to be more consistent with perceptions of current functioning as one transitions into old age. On the other hand, if aging attitudes reflect more durable aspects of personality across the life span, to what extent are they amenable to modification? This, of course, assumes that the attitudes themselves do have important developmental consequences independent of those associated with personality. Even if attitudes are able to change, an intriguing question concerns whether personality might facilitate or inhibit such change. Facilitation might occur when there is incongruence between the personality and the current set of attitudes (e.g. high conscientiousness and negative attitudes), whereas inhibition would exist in congruent situations (e.g. high neuroticism and negative attitudes). Moreover, if personality does change over time across the life span, we might expect attitudes to exhibit a concomitant shift. For example, Wille et al. (2014) found correlated change between personality and work attitudes over a 15-year period (e.g. increase in conscientiousness associated with an increase in positive attitudes). Future exploration as to whether similar changes occur with respect to aging attitudes would be informative.

The present study focused on well-being as an outcome, but future research might also explore the degree to which the observed mediation effects are operative for other domains. For example, positive relationships have been observed between aging attitudes and cognitive function



(Mazerolle et al., 2015; Wurm et al., 2007), and a recent study found that openness and emotional stability (an opposite label of neuroticism) are positively associated with cognitive ability (e.g. Rammstedt, Danner, & Martin, 2016). This highlights possible relationships involving personality, aging attitudes, and cognition, a topic for future study.

Some limitations have to be considered when interpreting our results. As we analyzed cross-sectional data, we cannot make strong conclusions regarding causality between personality and aging attitudes. Additionally, such data also limit the ability to clearly establish the directions of effects. For example, it may be that changing attitudes have an impact on personality (e.g. Kornadt, 2016). This seems less feasible given the trait-like nature of personality, but it certainly is worth considering as more data become available to assess temporal associations. In addition, the absence of individuals under 30 years of age in our sample might not allow for age-related differences in the effects of attitudes to be fully realized. As a fourth limitation, though personality explained individual differences in aging attitudes, it still remains unclear which specific facets of each personality trait are related to aging attitudes in each domain. For instance, the construct of neuroticism consists of anxiety, angry hostility, depression, self-consciousness, impulsiveness, and vulnerability (McCrae & Costa, 2010). Therefore, future research using a more extensive measure of personality (i.e. more than three items per trait) is necessary to determine which specific facets of five personality traits are important to consider.

Taken together, the current study investigated how individual differences in five personality traits influenced well-being through its effects on aging in different domains of functioning. In particular, we highlight the potentially important role that personality may play in determining the impact of aging attitudes on functioning. In addition, the generally increasing effect size with increasing age in the relationship between aging attitudes and well-being provides evidence for salience of aging attitudes in later life. Despite limitations, our study adds to our understanding of how aging attitudes affect well-being. It also underscores the contextual nature of such relationships, emphasizing the interplay between the specific aspects of personality and attitudes across different domains of functioning.

## Notes

- 0—Early childhood education, 1—Primary education, 2—Lower secondary education, 3—Upper secondary education, 4—Post-secondary non-tertiary education, 5—Short-cycle tertiary education, 6—Bachelor's or equivalent level, 7—Master's or equivalent level, 8—Doctoral or equivalent level
- Although desirable to control for other aspects of health (e.g. depressive symptoms), more extensive health data were not collected as part of the project.

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## **Manuscript 2: The Impact of Perceived Control and Future-Self Views on Preparing for the Old Age: Moderating Influences of Age, Culture, and Context**

The second manuscript examines subjective views of aging in participants from the US, Hong Kong, and Germany in an effort to disentangle individual and societal level factors, and explores preparations for old age that may lead to well-being in later life. This study investigated the relationship between perceived control, views of oneself as an older adult (i.e., future-self views), and preparations for old age. I hypothesized that perceived control would be positively associated with preparations, with increasing effects with age. Also, I predicted that the impact of perceived control on preparations would be mediated by views of oneself as an older adult, with the strength of mediation effect increasing with age. Other than age, I also hypothesized that the mediation effects would vary across cultures as well as domains of functioning. For example, within a domain of social relations, I expected these relationships would be weaker in Hong Kong, where there is a strong tradition of filial piety (Cheng & Chan, 2006; Lee & Hong-Kin, 2005), and thus there may be less emphasis on extra-familial relationships than in western societies (i.e., the US and Germany). Regarding finances and work, I hypothesized that the impact of perceived control on preparations would be weaker in Germany than in Hong Kong and the US due to differences in (a) the levels of financial support provided by government-based pension systems and (b) rules about mandatory retirement age. Finally, within the health domain, I predicted that relationships involving perceived control, future-self views, and preparations will be strongest in the US, where government-supported health care is lower and medical expenses are higher than in Germany and Hong Kong.

Participants were recruited as a part of the Ageing as Future Study in 2013. The sample consisted of  $N= 1,813$  persons (aged from 35 to 85) from: (a) Wake County, North Carolina, the

US ( $N= 517$ , 51.7% female); (b) Jena and Erlangen, Germany ( $N= 811$ , 49.4% female); (c) Hong Kong, China ( $N= 487$ , 56.10% female). As done in the US, participants in Germany and Hong Kong also completed a paper-and-pencil questionnaire assessing a wide variety of constructs. The following measures were used for the present study.

- (a) Preparation for the future (Kornadt & Rothermund, 2014). Although the original questionnaire consists of nine different life domains, we used responses of only four domains (i.e., social relations, finances, work, and health) for the current study due to available domains in other measures.
- (b) Perceived control. A single item within four domains assessed perceived control.
- (c) Future-self views (Kornadt & Rothermund, 2012). Participants rated themselves as older persons (“When I am older...”), which are related to a specific domain of functioning.

The Process macro for SPSS (Hayes, 2018) was used to examine a hypothetical model involving moderated mediation on all paths (Model 59) for each domain. Household income and current health were included as a covariate when examined in the domain of finances and health, respectively due to the relevance to these specific domains. Significant age effects were explored at representative points on the age distribution: 1 SD above the sample mean and 1 SD below the sample mean.

I found that the impact of perceived control on preparations was mediated by future-self views, suggesting people who are perceiving high levels of control are more likely to have positive views of themselves in later life, which in turn have a positive effect on engagement in preparations for the old age. As expected, these relationships also varied by age, culture, and context. For example, stronger effects in the domain of social relations were observed in the US



and Germany than in Hong Kong. These results could reflect cultural differences in emphases on preparation for social relations in later life: for example, government support for retiree housing in Germany and geographical dispersion in the US may put an emphasis on building new social relationships in later life, whereas the tradition of filial piety in Eastern culture may be expected to result in a greater emphasis on family.

The Impact of Perceived Control and Future-Self Views on Preparing for the Old Age:  
Moderating Influences of Age, Culture, and Context

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Research Article

## The Impact of Perceived Control and Future-Self Views on Preparing for the Old Age: Moderating Influences of Age, Culture, and Context

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### Abstract

**Objectives:** Preparation for age-related changes has been shown to be beneficial to adjustment in later life. However, an understanding of the factors that influence such preparations is rather limited. This study examines whether perceived control and future-self views (FSV) influence preparations for old age, and if this influence varies across ages, domains of functioning, and cultures.

**Methods:** Assessments of perceived control, FSV, and preparations for old age in each of four different life domains (social relationships, finances, work, and health) were obtained from 1,813 adults (ages 35–85) from Germany, Hong Kong, and the United States.

**Results:** Future-self views partially mediated the relationship between perceived control and preparation for old age across both domains of functioning and cultures. With one exception, the association between perceived control and preparations increased with advancing age across contexts. Evidence for similar age-related moderation of the indirect effect of control through FSV was more limited.

**Discussion:** These results suggest that perceived control that is not necessarily related to aging affect FSV, which in turn influence preparing for old age. Further, our results indicate that such relationships are context- and age-specific, highlighting the importance of considering the salience and diversity of life domains and cultures.

**Keywords:** Context, Culture, Perceived control, Preparations, Retirement

With prolonged life expectancy, more people are experiencing the myriad changes in both personal functioning (e.g., health, cognitive ability) and life circumstances (e.g., finances, social networks) associated with aging over a longer period of time than ever before. This extended period of life during retirement highlights the necessity of making preparations to deal with these changes. Although a variety of social welfare programs for older adults exists in most

developed countries, there are still realms where either individuals are responsible for making their own provisions for their old age or such programs are not sufficient for meeting the needs of the aging individual. As might be expected, research has demonstrated that preparations for age-related changes are associated with many benefits. For example, individuals who engage in planning for their retirement life in advance show better physical (Topa, Moriano, Depolo,

Alcover, & Moreles, 2009; Yeung, 2013, 2017) and psychological benefits (Noone, Stephen, & Alpass, 2013; Sørensen, Mak, Chapman, Duberstein, & Lyness, 2012). Such preparations may foster a sense of security or safety, which in turn is positively associated with overall adaptation in later life (Prenda & Lachman, 2001). Thus, successful planning for old age is an important developmental task for adjustment in later life. The present research takes a multidimensional approach to examine preparation for old age, focusing on both the characteristics of the individual and the contexts in which preparations take place.

### Age-Related Changes and Domain-Specific Preparation

Despite the evidence for the importance of preparation for old age, our understanding with respect to the determinants and contexts of preparation is rather limited. For the most part, research has focused on people approaching retirement (e.g., middle-aged adults) or those who have just retired (Lee & Law, 2004; Noone, O'Loughlin, & Kendig, 2013). In addition, the vast majority of research has focused on financial planning with a major interest in finances for later life (e.g., Hira, Rock, & Loibl, 2009; Topa & Herrador-Alcaide, 2016; Wang & Shultz, 2010). This research has concluded that determinants of more preparation are older age (Moen, Kim, & Hofmeister, 2001), being male (Taylor & Geldhauser, 2007), and having more education (DeVaney & Chiremba, 2005), which are all related to greater probability of earning a higher income. However, as planning for the future, especially for old age, requires a long-term plan, people at any point in the lifespan should benefit from any form of preparation for old age. A few studies have examined preparations by younger and older adults, both of who are often excluded in retirement studies. For example, Anderson, Li, Bechhofer, McCrone, and Stewart (2000) found that even younger adults report experiences of thinking about planning after retirement though the proportion is rather small relative to other age groups. In addition, retirees planning for later in life have been shown to be better adjusted in very old age than those not engaging in such planning (Donaldson, Earl, & Muratore, 2010). This highlights the potential importance of beginning preparations in young adulthood and continuing to do so throughout adulthood.

In addition, given the multifaceted nature of change (e.g., health, cognitive functioning, work status, social networks, finances, as well as with regard to personal goals and living conditions), the limited focus across contexts of functioning in studies of preparation fails to provide a complete picture regarding the nature of preparations and the eventual impact on well-being. Some existing research does focus on planning involving activities (Moen, et al., 2001; Petkoska & Earl, 2009) and interpersonal relationships (Dew & Yorgason, 2010) after retirement, but a focus on the full range of retirement preparation is rare. One recent

study by Kornadt and Rothermund (2014) dealt with both of these limitations by examining preparation within several different life domains using a broad sample of German adults aged 30–80 years. They found preparation for leisure, work, fitness, and appearance increased to around the age of 65 and then decreased, whereas preparation in the domains of emergency situations, dependence/independence, housing, and finances increased linearly up to the age of 80. These results indicate that preparations for old age are multidimensional and that the focus on specific domains may depend on specific characteristics of the individual, such as their age and living conditions, highlighting the importance of taking a much broader approach to examine preparations for old age.

### Perceived Control and Preparation for Old Age

Whereas age has been shown to be one factor that influences preparations, other factors that vary across individuals may also be of interest. One potentially important factor that may be linked to individual differences in preparation for old age relates to control beliefs regarding one's capacity to bring about a given outcome (Krause, 2007; Lachman & Weaver, 1998). That is, people with high control may be more likely to engage in preparations for the future. Some researchers proposed a curvilinear relationship between control beliefs and planning (Lachman & Burack, 1993; Scholnick & Friedman, 1993), suggesting less engagement in planning in both individuals with a high sense of control due to overconfidence as well as in people with low sense of control due to the assumption that they cannot influence outcomes. In later research, a positive relationship between control beliefs and future-oriented planning was found (Prenda & Lachman, 2001). Although these studies highlight the potential role of control in planning, they are limited in terms of the contexts of planning that were studied. In addition, they also do not take into consideration the domain-specific nature of control beliefs (e.g., Lachman & Weaver, 1998). Although general views of control may be of interest in certain contexts, perceptions of control within particular life domains are likely to be influenced by beliefs, knowledge, and experiences associated with that domain (e.g., Skinner, 1996). This suggests that the effects of perceived control on planning in a specific life domain may be best understood by considering perceptions of control within that domain.

As mentioned previously, the research on planning is also somewhat limited in terms of the ages of individuals studied. We suggest that the relationship between control and preparation may be further influenced by the age. For example, control may become increasingly important as the relevance of preparations for old age increases with advancing age, with further moderation being dependent on age. Thus, we expected that the relationship between perceived control and preparation for old age within



each domain will vary by age, with the association generally increasing with age due to the increased salience of preparations.

### Future-Self View as a Mediator

In addition to the aforementioned findings and assumptions regarding perceived control, the question remains as to how perceived control is tied to preparation for one's old age. A first explanation for effects of perceived control on preparation is that individuals with high versus low control differ in their beliefs regarding the capability to execute relevant activities (e.g., low control may undermine the conviction that one can successfully maintain physical activities or save money for later times).

Another more indirect influence to help understand potential variability in the impact of perceived control relates to how individuals perceive themselves in old age (i.e., future-self views [FSV]). It is well-established that perceived control and self-efficacy are aspects of self-perception (Bandura, 1990). Thus, a sense of control may be closely related to future-self perceptions. That is, individuals with a high sense of control may have a more positive outlook on their future, because they expect that they can shape their lives in accordance with their goals, and they are confident that they can successfully prevent or overcome any problems that might occur in later life. Such a positive outlook on the personal future will eventually manifest itself in positive FSV, depicting how the person expects to be like in later life. On the other hand, perceiving a low sense of control will typically result in anticipating a negative future for oneself, thus seeing one's life as being influenced by external or unwanted influences. These positive and negative FSV, in turn, provide an important source of motivation for engaging (vs not engaging) in activities related to the personal future and old age. If one's old age is portrayed as something that one is looking forward to, then this facilitates making plans for the future, thinking about what is needed to realize these plans, and implementing the necessary steps toward reaching these goals. Negative FSV, on the other hand, portray old age as a phase in life that is threatening and which is no longer worth living. Having such a negative outlook on one's future will lead people to avoid thinking about this phase of life, and to view it as something that one will have to endure rather than as something that one can actively shape.

Consistent with this perspective, Kornadt, Voss, and Rothermund (2015) suggested that FSV involved expectations, hopes, and fears regarding what the individual would be like in later life. That is, as preparations involve expectations about what is going to happen in the future, future-oriented self-views could serve as a motivational factor for future goals and preparations. Supporting this idea, longitudinal (Kornadt et al., 2015) and cross-sectional (Kornadt, Voss, Fung, Hess, & Rothermund, 2019) studies have demonstrated the linkage between FSV and preparation

for age-related changes: more positive views of one's own aging are related to increased preparations.

In addition, age is expected to moderate the relationships between control, FSV, and preparations for old age. Specifically, with increasing age, FSV of oneself as an old person reflect more immediate future projections that are close to one's current state rather than characterizing a distant and abstract future. Because of this aspect of FSV, linkages between perceived control and FSV of oneself as an old person should thus become stronger with increasing age. Likewise, effects of FSV on preparation behavior should become stronger in old age due to the increasing relevance of age-related preparation.

### Cultural Influences

Finally, preparation for old age does not occur in a contextual vacuum. It is not only influenced by individual, but also by social and cultural factors. Above all, the associations between future-oriented perspectives and preparation may be influenced by cultural differences in values, traditions, and social welfare programs across cultures. Both views of oneself in the future (e.g., Hess et al., 2017; Kornadt & Rothermund, 2011) and preparations (Kornadt et al., 2019) have been shown to differ across cultures and domains of functioning in a complex manner, potentially reflecting these factors. In general, it might be expected that the association between perceived control, FSV, and preparations may be buffered by the degree to which social or institutional supports exist within a culture. Thus, for cultures where strong institutional programs are in place within a specific domain of functioning, weaker associations would be expected (e.g., perceived control would have less of an impact on FSV) than for cultures without such supports. For example, the availability of strong public pension programs or comprehensive socialized health care for older adults within a culture may limit the degree of control as well as the necessity of planning within those domains when compared to cultures with less sufficient retirement and health care systems.

### The Current Study

The goal of the present study was to investigate the interrelationships between perceived control, views of oneself in later life, and preparation for old age. We examined these relationships across four different domains of functioning (social relationships, finances, work, and health) in three different cultures (Germany, Hong Kong, and the United States). We reasoned that this would allow us to investigate planning in areas that are important to adaptive functioning in later life across cultures that vary in terms of both the available social supports and expectations regarding life in old age. We hypothesized that perceived control would be positively associated with preparations, with this effect increasing in strength with age. We further hypothesized

that the impact of control on preparations would be mediated by views of oneself as an older adult (i.e., FSV), with the strength of the mediation effect increasing with age.

Consistent with the foregoing reasoning and our multidimensional perspective, we also hypothesized that the strength of these mediation effects would vary across domains of functioning and culture. Within the domain of social relationships, we expected these relationships to be weaker in Hong Kong, where there is a strong tradition of filial piety (Cheng & Chan, 2006; Lee & Hong-kin, 2005), and thus there may be less emphasis assigned to other social relationships than in the United States and Germany. That is, a tradition of filial piety in Hong Kong may lead to expectations of narrow, prolonged, and cohesive family relationships, with less importance assigned to other social relationships in later life (Adams & Kurtis, 2015). On the other hand, western cultures affected by Christianity hold ideas of more general attitudes or behaviors towards others, which are not limited to consanguinity (Yuan & Wang, 2011). Relatively higher levels of geographic dispersions of family in the United States may result in an especially strong emphasis on developing a supportive social network in later life. In Germany, lower rates of home-ownership than in other developed countries (e.g., Kaas, Kocharkov, Preugschat, & Stassi, 2017) and government-supported finances for retiree communities or apartments since 2013 may lead to increasing preference for moving into those places and the resulting need to develop new relationships.

With respect to work, we hypothesized that the impact of control on preparations would be stronger in the United States than in Germany and, to a lesser extent, Hong Kong, where mandatory retirement policies exist. The absence of mandatory retirement and the associated flexibility in employment opportunities would necessitate greater importance being attached to planning, with the influence of control and associated perceptions of oneself in the future being elevated. We also expected that connections between perceived control, FSV, and preparations in the financial domain would be weaker in Germany than in Hong Kong and the United States due to differences in the levels of financial support provided by government-based pension systems. Finally, within the health domain, we predicted that associations involving perceived control, FSV, and preparations will be strongest in the United States, where government-supported health care is low and medical expenses are high, necessitating greater need for preparation and a potentially stronger impact of perceived control.

## Method

### Participants

The sample consisted of  $N = 1,813$  persons (aged from 35 to 85) recruited as a part of the Ageing as Future Study from: (a) Wake County, North Carolina, the United States ( $N = 515$ , 51.7% female; Mean age = 58.42,  $SD = 14.08$ ); (b) Jena and Erlangen, Germany ( $N = 811$ , 49.4% female; Mean age = 59.28,  $SD = 14.10$ ); and (c) Hong Kong, China

( $N = 487$ , 56.10% female; Mean age = 58.73,  $SD = 13.44$ ). Private marketing firms (the United States and China) or local registry offices (Germany) provided the randomly selected lists to meet targeted age and gender distributions. Data for the present study was obtained based on responses to a questionnaire that was sent to each participant. Participants received a \$25 gift card for participation.

Household income was assessed on an eight-point scale with the currency adjusted to each country. The scale was recoded into five categories for commensurability (Kornadt et al., 2019), indicating higher average income levels in the United States ( $M = 3.89$ ,  $SD = 0.73$ ) than in Hong Kong ( $M = 3.47$ ,  $SD = 1.35$ ), and both were significantly higher than Germany ( $M = 3.04$ ,  $SD = 0.90$ ),  $F(2, 1782) = 110.74$ ,  $p < .001$ . Self-rated general health was assessed with a single item ("How would you describe your current state of health?") using a five-point scale (1 = not good at all, 5 = very good). Mean ratings on this item were higher in the United States ( $M = 3.11$ ,  $SD = .85$ ) than in other two cultures (Hong Kong:  $M = 2.59$ ,  $SD = 0.67$ ; Germany:  $M = 2.51$ ,  $SD = 1.01$ ),  $F(2, 1794) = 75.61$ ,  $p < .001$ .

## Measures

Participants completed a paper-and-pencil questionnaire that contained a short demographic questionnaire as well as several domain-specific and general sets of questions assessing a wide variety of constructs. For the present study, responses to the following three instruments were of particular interest.

### Preparation for the future

Preparation for age-related changes was assessed with a questionnaire developed by Kornadt and Rothermund (2014). Although nine different life domains (e.g., finances, emergency situations, physical and mental fitness, housing, appearance, social relations, health, leisure, and work) were included in the original instrument, we only used responses to the four domains of specific interest to the present study and for which responses were available on the other measures: social relations, finances, work, and health. Respondents provided ratings on three items within each domain: active preparation (e.g., "I am actively working to maintain my personal relations in old age."), thought about it (e.g., "I think about the topic"), and gathering information (e.g., "I try to gather information about the subject and discuss it with others"). Participants rated their responses to each item on a four-point scale (1 = not at all; 4 = a lot). The three items on each domain of preparations seemingly reflect different aspects of preparation proceeding from thinking about preparation to active preparation. However, preparations have been shown to involve "gathering information" and "thinking" as well as "doing something" (Ekerdt, Hackney, Kosloski, & DeViney, 2001; Kornadt & Rothermund, 2014). In addition, confirmatory factor analyses indicated that all three items loaded on the same general preparations factor in each domain (see below).



### Perceived control

A single item assessed perceptions of control in each of the four target domains (i.e., "Regarding my personal situation in the domain of \_\_\_\_"). Participants rated their responses to each item on a five-point scale with the option "I have no control at all," "little control," "some control," "adequate control," and "a lot of control." Higher scores indicated greater perceived control.

### Future-self views

FSV were assessed within each of the four domains using three to five items. For each item, participants rated themselves as older persons ("When I am older...") on an eight-point scale. Each item addressed a specific aspect of functioning associated with the domain using two opposing statements (e.g., "When I am older, I will find it difficult to make new friends" versus "When I am older, I will find it easy to make new friends"). Participants gave their responses to each item on an eight-point scale, with higher scores indicating more positive views and lower scores indicating more negative views (The complete questionnaire can be found in Hess et al., 2017.).

### Statistical Analysis

Confirmatory factor analyses for FSV and preparations for old age were conducted using M-Plus (Muthen & Muthen, 2012). The goal was twofold: to establish measurement invariance across cultures and age groups in order to determine whether participants from different cultures and age groups interpret these measures in a conceptually similar way, and to obtain latent factor scores for FSV and preparation for old age within each domain. Satisfactory model fits providing evidence of metric invariance were obtained for both measures (for details, see Hess et al., 2017 and Kornadt et al., 2019). Note that in addition to the domain-specific preparations factors, the preparations CFA included two additional methods factors to control for shared variance in items having the same stems (i.e., thought and gathering information) across all domains (Kornadt et al., 2019).

We used the PROCESS macro for SPSS (Hayes, 2018) to examine our hypotheses involving moderated mediation. The macro used 5000 bootstrap samples at 95% confidence interval to measure direct and indirect effects, which has been found to maintain the highest power while controlling for Type I error rate (MacKinnon, Lockwood, & Williams, 2004). The significance of an effect is determined by the 95% CI without zero at  $p < .05$  (two-tailed). Listwise deletion was implemented to remove cases with missing data in the Process macro, which resulted in the small percentage of missing data (less than 3.0%) in each domain analysis.

Within each culture, we ran the moderated mediation models with age as a moderator on all paths for each domain (Model 59, see Figure 1). The models were first examined with gender as a covariate. However, given that gender did not emerge as a significant predictor in predicting

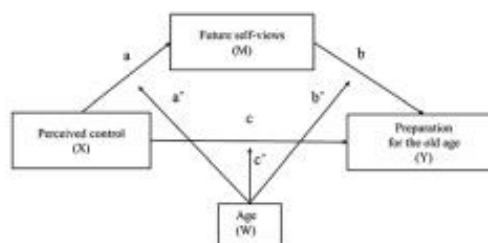
preparations, it was excluded from further consideration. The previously described income and health variables were included as a common covariate across cultures when examined in the domains of finance and health, respectively, due to their relevance to these specific domains.

We explored specific age-related moderation effects at representative points on the age distribution: 1 SD above and below the sample mean. As shown in Figure 1, conditional indirect effects refer to the age-moderated effects of perceived control on preparation through future-self views. Conditional direct effects reflect the age-moderated effect of perceived control on preparations. When the same moderator is entered into more than one path that defines an indirect effect, the moderated indirect effect becomes a nonlinear function of the moderator (Hayes, 2018). In that case, the index of moderated mediation as a whole is not available. Thus, our conclusions regarding moderation are based on comparisons of conditional indirect effects and conditional direct effects at each level of the moderator (age).

## Results

### Correlations

Correlations among all variables are presented in Table 1. Significant ( $p < .05$ ) positive correlations between perceived control and both FSV and preparations were found in four domains across three cultures. In contrast, the associations involving age varied across domains and cultures. For example, within the U.S. sample, positive correlations were found between age and preparations in social relationships, finances, and health, whereas negative associations were observed in work. These comparisons suggest that the impetus for preparing for old age at specific points in life varies as a function of domain (e.g., there is less need to prepare for work in later life when one is no longer part of the workforce). Comparisons within the same domain across cultures may also illuminate similarities or differences in the age-graded expectations associated with behavior in that domain. Regarding finances, for instance,



**Figure 1.** Illustrations of a Model 59. Conditional indirect effect of perceived control on preparation through future-self views =  $(a + a'W)(b + b'W)$ ; Conditional direct effect of perceived control on preparation =  $c + c'W$ ; *a'*: interaction between perceived control and age, *b'*: interaction between FSV and age, *c'*: interaction between perceived control and age.

Table 1. Correlations of Age, Perceived Control, Future-Self Views, and Preparation for the Old Age Within Domains in Each Culture

Domain	Variable	Germany					Hong Kong					United States						
		AGE	CON	FSV	PREP	AGE	CON	FSV	PREP	AGE	CON	FSV	PREP					
SOC	CON	-.291***	1															
	FSV	-.031	.324***	1														
	PREP	-.359***	-.167***	-.295***	1													
FIN	CON	-.087*	1															
	FSV	.013	-.359***	1														
	PREP	.083*	-.166***	-.193***	1													
WRK	(Income)	-.305***	-.270***	-.452***	-.158***	1												
	CON	-.413***	1															
	FSV	.015	-.217***	1														
HEA	PREP	-.249***	-.299***	-.183***	1													
	CON	-.124***	1															
	FSV	-.001	-.409***	1														
(Health)	PREP	-.283***	-.112**	-.490***	1													
	CON	-.301***	-.419***	1														
	FSV	-.001	-.409***	1														
SOC	CON	-.050	1															
	FSV	.032	-.272***	1														
	PREP	-.150**	-.341***	-.210***	1													
FIN	CON	.045	1															
	FSV	-.148**	-.278***	1														
	PREP	-.139***	-.244***	-.201***	1													
WRK	(Income)	-.202***	-.015	-.112*	1													
	CON	-.138**	1															
	FSV	-.061	-.239***	1														
HEA	PREP	-.055	-.232***	-.177***	1													
	CON	-.044	1															
	FSV	-.087	-.466***	1														
(Health)	PREP	-.108*	-.165***	-.119***	1													
	CON	-.128**	-.332***	-.219***	1													
	FSV	-.064	-.490***	1														
SOC	CON	-.052	1															
	FSV	.105*	-.388***	1														
	PREP	-.417***	-.245***	-.372***	1													
FIN	CON	.088*	1															
	FSV	-.079	-.337***	1														
	PREP	.343***	-.349***	-.283***	1													
WRK	(Income)	-.114*	-.209***	-.340***	1													
	CON	-.159***	1															
	FSV	-.028	-.161***	1														
HEA	PREP	-.017	-.138**	-.222***	1													
	CON	-.301**	1															
	FSV	.027	-.431***	1														
(Health)	PREP	-.394***	-.188***	-.301***	1													
	CON	-.334***	-.445***	1														
	FSV	-.145**	-.496***	1														

Note: CON = Perceived control; FSV = Future-self views; PREP = Preparation for the old age; SOC = Friends and other social relationships; FIN = Financial situation and dealing with money; WRK = Work and professional life; HEA = Physical health.  
\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

positive correlations were observed between age and preparations in the United States and Germany, with the correlation being particularly strong in the former. On the other hand, a significant ( $p < .05$ ) negative association was found in the Hong Kong sample within the same age range.

### Moderated Mediation Analyses

Turning to our primary focus, we next examined whether FSV mediated the relationship between perceived control and preparations for old age within each domain and culture, and the extent to which age moderated each relationship in this model. The results are presented for each domain in Table 2. As can be seen, the impact of age as a moderator was generally greater on the direct effects than on the indirect effects. In the following sections, variations in the nature and strength of effects across domains and cultures are described in detail.

### Social relationships

Consistent with our hypothesis, age moderated the impact of perceived control on preparations, with the strength of this relationship increasing with age in each culture. Despite similar patterns of the moderated direct effects, some evidence of cultural differences also existed. Specifically, the strength of moderated mediation involving perceived control and FSV increased with age in Germany and the United States, but decreased in Hong Kong. In addition, the overall strength of effects to account for preparation for social relationships was weaker in Hong Kong than in Germany and the United States, supporting our hypothesis of less emphasis on extra-familial relationships in cultures with a strong tradition of filial piety.

### Finances

Age was a significant moderator of perceived control on preparations, with the strength of the direct effect increasing with age in Hong Kong and the United States, but decreasing with age in Germany. Also, the overall strength of effects for preparations was weaker in Germany than in the other two cultures. The differences between Germany and both the United States and Hong Kong supported our hypothesis that the effects regarding finances would be weaker in cultures with relatively strong government-supported pension system. The form of the moderated indirect effects also varied across cultures, but those effects were small and nonsignificant.

### Work<sup>1</sup>

Age moderated the direct effect of perceived control on preparations, with the strength of this association increasing with age in all three cultures. Conditional indirect effects

<sup>1</sup> We considered the possibility that retirees in the analysis of work domain might have influenced our results. When retirees were eliminated, our results remained relatively unaffected. Thus, all participants were included.



**Table 2. Moderated Mediation—Conditional Indirect Effect and Conditional Direct Effect Within Domains in Each Culture**

	Germany						Hong Kong						United States					
	Conditional indirect effect		Conditional direct effect		Conditional indirect effect		Conditional direct effect		Conditional indirect effect		Conditional direct effect		Conditional indirect effect		Conditional direct effect			
	Younger <sup>a</sup>	Middle	Older	Younger	Middle	Older	Younger	Middle	Older	Younger	Middle	Older	Younger	Middle	Older			
<b>SOC</b>	<i>R</i> <sup>2</sup> = .140																	
<i>b</i> (SE)	.046 <sup>*</sup> (.014)	.059 <sup>*</sup> (.010)	.076 <sup>*</sup> (.007)	.050 (.040)	.107 <sup>*</sup> (.026)	.154 <sup>*</sup> (.037)	.041 <sup>*</sup> (.009)	.036 <sup>*</sup> (.011)	.026 (.019)	.087 <sup>*</sup> (.045)	.103 <sup>*</sup> (.047)	.046 <sup>*</sup> (.019)	.086 <sup>*</sup> (.016)	.110 <sup>*</sup> (.032)	.130 <sup>*</sup> (.046)	.069 (.046)	.089 <sup>*</sup> (.031)	.109 <sup>*</sup> (.051)
CI	.019, .074						.040, .080						.044, .112					
	-.028, .128						.051, .151						.080, .227					
	.016, .060						-.005, .070						-.058, .131					
	.003, .110						.011, .094						.014, .090					
	.057, .118						.072, .195						-.021, .158					
	.024, .150						.008, .230											
	<i>R</i> <sup>2</sup> = .295																	
<b>FIN</b>	<i>R</i> <sup>2</sup> = .077																	
<i>b</i> (SE)	.030 (.007)	.007 (.005)	.005 (.007)	.051 <sup>*</sup> (.024)	.049 (.015)	.039 (.022)	.012 (.005)	.019 (.010)	.029 (.017)	.121 <sup>*</sup> (.037)	.128 <sup>*</sup> (.044)	.025 (.014)	.027 <sup>*</sup> (.008)	.014 (.016)	.131 <sup>*</sup> (.031)	.133 <sup>*</sup> (.046)	.139 <sup>*</sup> (.023)	.144 <sup>*</sup> (.037)
CI	-.004, .025						-.001, .017						-.008, .038					
	.004, .098						.016, .074						-.003, .081					
	.019, .040						-.001, .040						.075, .182					
	.053, .204						-.016, .046						.063, .204					
	.094, .183						.072, .236											
	<i>R</i> <sup>2</sup> = .106																	
<b>WRK</b>	<i>R</i> <sup>2</sup> = .073																	
<i>b</i> (SE)	.023 (.014)	.023 <sup>*</sup> (.008)	.018 <sup>*</sup> (.008)	.102 <sup>*</sup> (.037)	.117 <sup>*</sup> (.023)	.135 <sup>*</sup> (.030)	.013 (.003)	.021 <sup>*</sup> (.010)	.032 (.020)	.080 (.052)	.131 <sup>*</sup> (.045)	.009 (.012)	.020 <sup>*</sup> (.008)	.015 (.015)	.065 (.053)	.065 (.053)	.070 <sup>*</sup> (.031)	.074 (.042)
CI	-.004, .053						.009, .039						.025, .174					
	.005, .035						.029, .174						.073, .162					
	.075, .194						-.009, .044						-.001, .078					
	.022, .182						.063, .199						.039, .288					
	.012, .039						.006, .039						.007, .066					
	.038, .169						.009, .131						.008, .157					
	<i>R</i> <sup>2</sup> = .122																	
<b>HEA</b>	<i>R</i> <sup>2</sup> = .074																	
<i>b</i> (SE)	.015 (.008)	.014 <sup>*</sup> (.006)	.012 (.009)	.068 <sup>*</sup> (.029)	.081 <sup>*</sup> (.021)	.093 <sup>*</sup> (.031)	.0001 (.008)	.005 (.014)	.013 (.024)	.080 (.044)	.067 <sup>*</sup> (.031)	.041 <sup>*</sup> (.020)	.035 <sup>*</sup> (.011)	.028 (.016)	.038 (.042)	.038 (.042)	.059 <sup>*</sup> (.027)	.081 <sup>*</sup> (.043)
CI	-.001, .032						.002, .025						.012, .126					
	.041, .121						-.003, .153						-.033, .038					
	.012, .061						-.021, .033						.056, .116					
	.006, .128						.020, .204						.010, .086					
	.017, .059						-.001, .063						.046, .119					
	.005, .112						.002, .165											
	<i>R</i> <sup>2</sup> = .257																	

Note: CI = confidence interval; HEA = Physical health; FIN = Financial situation and dealing with money; SE = standard error; SOC = Friends and other social relationships; WRK = Work and professional life. \*CI does not contain 0, indicating there is a statistically significant result.

<sup>a</sup>Age effects were estimated at mean sample age (middle aged), 1 SD below the mean (younger), 1 SD above the mean (older).

were rather small, but showed increasing trend in Hong Kong and the United States, but not Germany. Inconsistent with our expectations, however, the overall impact of control, FSV, and age on preparations was somewhat weaker in the United States than in Germany or Hong Kong.

### Health

In line with our hypothesis, the strength of the direct effect of perceived control on preparations increased with age in all three cultures. The conditional indirect effects were somewhat small, with the strength of this relationship decreasing with age in the Germany and the United States. There was no significant conditional indirect effect in Hong Kong. Consistent with our hypothesis, the overall strength of observed effects involving control, FSV, and age on preparations was greater in the United States than in Germany and Hong Kong.

### Discussion

The goal of this study was to investigate the impact of perceived control on preparing for old age, and the extent to which this relationship was mediated by views of oneself as an older adult. Furthermore, we tested the hypothesis that age would moderate both the direct and indirect (through FSV) effects of perceived control on preparations, with the expectation that both would increase in strength with advancing age. We also examined the degree to which the strength of this relationship varied across four domains (social relationships, finances, work, and health) in three different cultures (Germany, Hong Kong, and the United States).

Consistent with past studies, we found positive bivariate associations between perceived control, FSV, and preparations (Kornadt et al., 2019; Prenda & Lachman, 2001). The positive association between perceived control and FSV in our study supports the idea that control is an influential facet of self-perception (e.g., Bandura, 1990). More importantly, our expectations regarding the impact of perceived control on preparations through FSV were also supported, suggesting that people who are perceiving high levels of control are more likely to have positive views of themselves in later life, which in turn have a positive impact on engagement in preparations for the old age. That is, perceived control and FSV can be considered positive factors contributing to preparation for old age.

### Culture and Context

As expected, we also found that the strength of associations varied across domains of functioning and cultures, providing further support for the multidimensionality and domain specificity of aging-related processes (Kornadt & Rothermund, 2011; Kornadt et al., 2019). For example, consistent with our hypothesis, stronger effects in the domain of social relationships were found in the United States

and Germany than in Hong Kong. This was thought to reflect cultural differences in emphases on preparations for future social relationships. Government financial support for living in retiree housing and low home-ownership in Germany as well as geographical dispersion of family with age in the United States were expected to be associated with an emphasis on building new social relationships in later life. In contrast, the tradition of filial piety in Eastern-Asian cultures such as Hong Kong was expected to result in a greater emphasis on family, with reduced focus on building other relationships (Cheng & Chan, 2006; Lee & Hong-kin, 2005). The stronger associations between perceived control, FSV, and preparations in Germany and the United States, compared with Hong Kong, can then be interpreted as a reflection of more self-directed efforts in preparing for later life.

Cultural differences were also observed in the domain of finances. Weaker predictive associations were found in Germany compared to the United States and Hong Kong. Due to a relatively well-provided state-supported pension system in Germany, preparations for finances may be less of an issue, and thus less affected by individual factors such as perceived control and FSV than in cultures where such systems are less generous. For the health domain, the expected pattern of stronger effects in the United States than in either Germany or Hong Kong was observed, conceivably reflecting low government-provided health care and high medical expenses in the United States. In addition, the youth-oriented culture in the United States (Westerhof, Whitbourne, & Freeman, 2012) may also increase the focus on managing and maintaining health. On the contrary, the necessity of preparations for health may not be perceived as strongly in Germany due to a well-provided universal health care for all individuals. Similarly, lower health-care expenses in public hospitals and clinics in Hong Kong may also lessen perceived necessity for preparations.

### Age Effects

We had predicted that age would moderate both the direct and indirect effects of control on preparations. Whereas consistent moderation was observed in the former case, age-based moderation was less evident for the indirect effect. The relatively weak age effects on the mediation through FSV are suggestive of stable relationships across adulthood. For example, young adults with high-perceived control still expect their future-self to be positive, though perception of future-self as an older adult may be distant or abstract. In addition, even for young adults, positive expectations about their old age may induce those young adults to engage in future-related preparations.

For the work domain, the finding of weaker overall impact in the United States than in Germany or Hong Kong was contrary to our hypothesis. This was due to weaker age effects and lower impact of perceived control on preparations for work relative to the other two cultures. Given

that mandatory retirement is not policy in the United States, individuals regardless of age could be more likely to plan for work. However, despite their intentions, fast-changing job markets and low job security in the United States may lessen the impact of perceived control towards preparations for work, potentially accounting for the weaker effect.

### Strengths and Limitations

A strength of the current study is that several domains of preparation for old age were investigated in a sample encompassing much of the adult lifespan comprised of individuals from three different cultures. This allowed us to explore both generalities across cultures as well as effects that were specific to particular life contexts. Whereas there were many commonalities in the nature of the obtained effects, the strength of the effects varied across cultures within specific domains of functioning, with these variations being meaningfully linked to cultural differences in institutional and traditional social support systems. Such findings emphasize the importance of considering aging from a contextual perspective as well as the limitations associated with more general approaches to understanding adaptive processes in later life.

The results of our study also extended recent work by Kornadt et al. (2019), who also examined cultural influences on preparations for old age. Kornadt and colleagues focused on how psychological variables relating to perceptions of the future (e.g., concreteness of perceptions of future time) influence cultural differences in preparations. In contrast, our study provides a somewhat different perspective by examining how current personal attributes (i.e., perceived control) influence both future-related constructs such as views of oneself as an older adult and preparations in each culture. Consistent with our prior work examining the relationship between personality, aging attitudes, and life satisfaction (Park & Hess, 2019), the present results suggest that current personal attributes that are not necessarily related to aging may have important outcomes on behavioral and psychological processes that are supportive of aging.

Nevertheless, some limitations should also be noted. Though we identified the impact of perceived control, FSV, age, culture, and domains on preparations, examination of other potential variables related to preparations would be useful to extend our understanding of planning for old age. For example, individuals who perceive future time as more expansive may be motivated to engage in greater preparation for the future. Also, although our data were obtained from three cultures, more targeted identification of cultures that vary systematically in, for example, the support systems and views regarding aging would allow more precise identification of determinants of cultural variation (see, e.g., North & Fiske, 2015). Moreover, as our data are cross-sectional, we cannot make strong conclusions regarding causality between perceived control, FSV, and preparations. Thus, for example, future longitudinal

studies should look at the extent to which perceived control and FSV at Time 1 predict preparation at Time 2. Such a longitudinal study may be beneficial to examine the effects of specific life transitions at the individual level as well as changes in regulations and values at the societal level. For example, greater financial planning may occur at times in adulthood when more disposable income is available for retirement savings (Flood, King, & Ruggles, & Warren, 2015). Similarly, the impact on preparations and perceptions of control associated with the institution of new social programs (e.g., legislation changes in pensions or retirement age) and within a culture could also be examined as a type of quasi-experiment.

Our conceptual framework and associated models also focused on FSV as predictive of preparations. It might be argued that alternative models may be just as viable (e.g., preparations lead to more positive views of oneself in later life). However, the results of longitudinal analyses demonstrating that change in FSV were more predictive of change in preparations than vice versa (Kornadt et al., 2015) support the present perspective. As a final limitation, although perception of high control is related to both positive views of oneself in later life and greater levels of preparation, it is still unclear which specific facets of control are operative in each domain. For example, other research viewed control beliefs in the context of internal (i.e., a belief that one can control one's life) versus external (i.e., a belief that life is controlled by other outside factors (Furnham & Steel, 1993; Lachman & Weaver, 1998). Shultz and Schultz (2016) found age-related changes in internal locus of control, with increases until middle age, and then decreases. In addition to age, different effects of locus of control across domains of functioning and cultures might be expected. Therefore, future research using a more extensive measure of control would be necessary to determine which specific control, and the extent to which control, are important in preparation for the old age.

### Conclusion

Taken together, the current study investigated the interrelationships between control beliefs, FSV, and preparation for old age within different domains of functioning in individuals across adulthood in three cultures. We found positive effects of control beliefs through FSV on preparations, suggesting that the impact of control may at least partially reflect the extent to which it results in a positive perception of one's future and, potentially, the perceived benefits of preparation. In addition, the consistently increasing or decreasing effect size with age in the relationship between control and preparation provides evidence for importance of age salience in preparation research. Despite the limitations noted above, our study expands understanding of how individual perceptions of control and views of oneself as an older adult affect preparations in different-aged adults across domains of functioning and cultures.



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### **Manuscript 3: A Longitudinal Study of the Effects of Self-Views and Perceived Control on Preparation for Old Age: Moderation of Age, Culture, and Context**

The third manuscript is a longitudinal study examining the relationship between current-self views, perceived control, and preparations in each of four different domains of functioning (social relations, finances, work, and health). The four selected domains were the same as Manuscript 2. I used longitudinal data collected across a five-year period from adults aged from 30 to 85 in the US, Hong Kong, and Germany. In terms of causal relations, I predicted that positive current-self views will be associated with greater perceived control, which in turn will be associated with greater levels of preparations. These greater levels of preparation will predict subsequent positive self-views. Given that two waves of data were available, I opted for a hybrid approach to modeling these associations in which I examined two specific subsets of relationships within this hypothesized causal sequence: current-self views at Year 1 were used to predict perceived control at Year 5, which in turn was used to predict preparations at Year 5; perceived control at Year 1 was used to predict preparations at Year 1, which in turn was used to predict current-self view at Year 5.

I also hypothesized that the strength of all these effects in the current model would be moderated by age, culture, and domains. First of all, these effects were expected to increase with advancing age because preparations for old age become more self-relevant with age. I also hypothesized that there would be variation in the strength of these relationships depending on cultures and domains. In contrast, the relationships between current-self views and perceived control were expected to be positive, with fewer variations, assuming that feeling good about oneself may lead to an enhanced sense of control regardless of age or cultures.

Participants were recruited as a part of the Ageing as Future Study at Time 1 (T1, 2013). They were contacted again and asked to participate in the follow-up study at Time 2 (T2, 2018). We followed the same procedure as T1 and 62% (the US), 77% (Germany), and 65% (Hong Kong) of participants at T1 completed our study at T2. Following measures were used for the present study: preparation for the future (Kornadt & Rothermund, 2014), perceived control, and current-self views (Kornadt & Rothermund, 2012).

This cross-lagged SEM investigated two mediation effects: (A) the effect of CSV at T1 on preparations at T2, mediated by control at T2; and (B) the effect of control at T1 on CSV at T2, mediated by preparations at T1. Stabilities, within-time-point correlations, and change correlations were also assessed in the model to estimate the prospective effects by controlling for an impact of domain-specific variables in each domain. For multigroup comparisons, I examined measurement invariance within each domain across cultures and age groups.

Along with good to acceptable model fits across all estimated models, most paths were positive: that is, positive current-self views predicted greater perceived control, and then predicted preparations, which in turn predicted greater levels of subsequent positive current-self views. The strength of these effects varied by cultural differences and age within each domain. For example, consistent with the second study, age moderated the strength of both two mediation effects in the domain of social relations, with the strength of association increasing with age in Germany and the US. In contrast, the indirect effects were not significant in Hong Kong, supporting our hypotheses of more emphasis on preparation for social relations in Western culture with advancing age and less emphasis on social relations in cultures of filial piety. Above all, over time effects between self-views and control indicate cumulative, lasting effects of current-self views.

A Longitudinal Study of the Effects of Self-Views and Perceived Control on Preparation for Old

Age: Moderation of Age, Culture, and Context

Park, J., Fung, H. H., Rothermund, K., Anna E. Kornadt, & Hess, T. M.

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### Abstract

Extending research on determinants that promote preparations for old age across the lifespan, we examined whether positive current-self views are associated with greater perceived control, which in turn relates to greater levels of preparation, and these greater preparations predict subsequent positive self-views, along with variation in the strength of these relationships depending on cultures, domains, and age. We investigated a longitudinal study across a five-year period, assessing current-self views, perceived control, and preparations in each four different life domains (social relations, finances, work, and health). Data from adults aged from 30-85 in the United States ( $N= 315$ ), Hong Kong ( $N= 317$ ), and Germany ( $N= 623$ ) were part of the Ageing as Future Study. Positive current self-views were associated with greater perceived control, which in turn influenced greater levels of preparations across domains. Also, these preparations predicted more positive self-views later, with one exception of the domain of health. The strength of these effects varied across domains and cultures, reflecting potential differences in social/cultural values and support systems. These results suggest that positive current-self views promote adaptive behaviors in later life, with accumulated effects over time. Thus, focusing on how to enhance self-views may benefit more engagement in preparations for old age. Further our results indicate that these relations in our model vary by context and age, highlighting the importance of variability in age-related process.

Key words: longitudinal study, self-views, preparations, perceived control, culture, context

By 2050, one in six people in the world and one in four people in Europe and Northern America are expected to be over 65 (United Nations, 2019). Along with this dramatic increase in the aging population, the assumption of a standard retirement age of 65 (OECD, 2017) suggests more individuals will spend an extended period of life after retirement than did previous generations. Given that entering old age is a major life transition involving challenges as well as changes (Wang & Schultz, 2010), and planning in advance may offer individuals more autonomy later in life, being prepared for old age is an important developmental goal for most of us. Indeed, preparation for old age has been shown to be beneficial to physical health (Topa, Moriano, Depolo, Alcover, & Morales, 2009) and psychological well-being in later life (Earl, Bednall, & Muratore, 2015; Sörensen, Mak, Chapman, Duberstein, & Lyness, 2012). In addition, the challenges associated with preparing for old age may vary across social and cultural contexts. Even after controlling for socioeconomic and demographic variables, however, the positive effects of preparation on well-being are still observed (Noone, O'Loughlin, & Kendig, 2013; Reitzes & Mutran, 2004). Thus, investigation of what personal and psychological factors influence individuals' preparation for old age is especially important for adjustment in later life. In the present study, we took a comprehensive approach to examining influences on preparation by examining interactions between characteristics of the individual (age, self-views, perceptions of control) and context (culture, domain of functioning) using longitudinal data.

### **Age-Related Changes and Multidimensional Preparation**

In the context of lifespan development, although individuals continually adjust their goals and proactively respond to different challenges with advancing age (Baltes, 1997), most research on preparation for old age has focused on financial planning for retirement in samples of middle-aged/older workers or those who have just retired (e.g., Moffatt & Heaven, 2017; Topa &

Herrador-Alcaide, 2016; van Rooij, Lusardi, & Alessie, 2012). However, as preparation for old age is a life-long process, adults of any age may be engaged in preparation behaviors, but the types and degree of engagement may reflect age differences in constructs or knowledge underlying planning. For example, in a few studies, young adults reported a general understanding of retirement concepts (Koposko & Hershey, 2016) and thinking about planning after retirement (Anderson, Li, Bechhofer, McCrone, & Stewart, 2000), which might reflect the initial stages of actual preparations. Another study (van Rooij et al., 2012) found a strong and positive association between financial knowledge and planning for retirement, but also found that younger adults were less financially knowledgeable than middle-aged and older adults. This may suggest that age differences in planning may be, in part, related to the acquisition of knowledge that may also be motivated by stage of life and degree of focus on the future.

In addition, preparations for old age are not limited to finances (e.g., saving money). Alongside finances, individuals experience changes with advancing age in many different domains, including their social network, health, and work status. Although a few studies have examined preparations beyond finances (Eismann, Verbeij, & Henkens, 2019; Petkoska & Earl, 2009), they only focused on a limited number of domains (e.g., bridge employment, leisure) within a specific group of individuals (i.e., older workers). Taking these concerns into account, Kornadt and Rothermund (2014) examined multidimensional preparations in an adult sample with a broad age range (i.e., 30-80 years). They found age differences in preparation across domains, with this variation meaningfully related to the relevance of each domain to specific periods of adulthood.

### **Self-Views and Preparation for Old Age**

Related to personal relevance, another factor that may account for preparations—and

inter- and intra-individual variation therein—relates to self-views, defined as one’s perceptions of one’s situation within a specific domain. Consistent with dynamic regulatory views of self-concept (e.g., Markus & Wurf, 1987), such self-views may serve an important adaptive function. For example, having positive self-views and accompanying feelings that life is worthwhile may color beliefs about ourselves and the world that encourage behaviors that enable us to seek a more fulfilling life. Similar to preparations for old age, self-views are multidimensional, exhibiting variability across individuals and domains (e.g., Kornadt & Rothermund, 2012). Self-views may also have a temporal component. For example, given that preparation for old age represents future-related elements, one’s perception of oneself in the future (i.e., future-self views) has been examined as a determinant of preparation for old age. Consistent with this perspective, cross-sectional research has suggested that high perceptions of control are associated with positive future-self views (Park, Fung, Rothermund, & Hess, 2019), which in turn predict higher rates of preparations (Kornadt, Voss, Fung, Hess, & Rothermund, 2019). Similarly, Kornadt, Voss, and Rothermund (2015) found that having more positive future-self views led to greater levels of preparation four years later, with age differences across domains being tied to presumed optimal times during adulthood for engaging in preparations within those domains. These results suggest that individuals across the lifespan may engage in preparations for old age, but the extent of this preparation may depend upon the interaction between age, relevance of a specific domain to a given time in one’s life, and perceptions of one’s future self within that domain.

Beyond the relationships between future-self views and preparations, perception of one’s current functioning may also be important given that having positive feelings in the present may positively influence our behaviors. For example, older adults’ self-perceptions of current health

have been shown to predict perceived control in health four years later (Menec, Chipperfield, & Perry, 1999). Given that increased perception of control may also motivate individuals to engage in preparations, we decided to focus on the role that views of one's current level of functioning—current self-views—play in determining preparations. Such views may exhibit less variability across individuals in terms of meaning and specificity. Moreover, given evidence regarding the positive association between self-concept and developmental regulation in a variety of contexts across the lifespan (e.g., Eccles & Wang, 2015; Heckhausen & Wrosch, 2016) we reasoned that positive current-self views may be more likely than perceptions of oneself in the future to be associated with specific psychological mechanisms (e.g., control) that may motivate people to engage in preparation for old, which in turn will enhance subsequent perceptions of well-being.

### **Perceived Control as a Mediator in the relationship Between Current-Self Views and Preparations**

In addition to examining relationships between current-self views and preparation for old age, the mechanism underlying those relationships is also of interest. A possible component of this indirect effect may be perceived control, which refers to beliefs about one's capacity to bring about a given outcome (Lachman & Weaver, 1998; Skinner, 1995). Given that better initial appraisal in the domain of health and social support has been shown to be associated with subsequent increases in perceived control (Gerstorf, Röcke, & Lachman, 2011), and that control beliefs are related to future planning (Park et al., 2019; Prenda & Lachman, 2001), feeling good about one's current situation may lead to a heightened sense of control. This, in turn, may motivate individuals to engage in preparation for old age.

In addition, a sense of control has been identified as a multidimensional construct,



varying by domains of functioning (Lachman, Neupert, & Agrigoroaei, 2011; Lachman & Weaver, 1998). Indeed, Lachman and Weaver (1998) found that domain-specific control belief differed by age in their sample of adults aged 25 to 75. For instance, higher control over work, finances, and marriage were found with advancing age, whereas decreasing control was found for domains of relationship with children and sex life. That is, an individual may perceive high control in some domains, but not in other domains simultaneously, with this domain-specificity varying across ages and contexts. Thus, perceived control was assessed specific to the same contexts as current functioning and preparations.

### **Culture and Society as a Moderator**

Preparation for old age is influenced not only by psychological factors at the individual level, but also by contextual factors at cultural and societal levels. Given that an individual exists within a set of nested contextual systems, and the interaction between the individual and environment occurs over time (Bronfenbrenner, 1994), preparations also do not occur in a vacuum. Above all, due to increasing older populations but decreasing family ties in most industrialized societies, demands for support in later life at societal levels have been increasing, which in turn influence individuals' preparations for old age. For example, preparations may be less of an issue for individuals in a country where a broad structure of support systems exists than for those in countries with weaker support. Although Kornadt et al. (2019) only examined samples from three countries (i.e., the US, Germany, and Hong Kong), cultural differences in preparation for old age were found for each domain. For example, Americans reported more preparations in the domain of finances and work than did Germans, with the lowest level of preparation found in people from Hong Kong. Above all, the interaction between different institutional structures and domain of functioning (i.e., exosystem; Bronfenbrenner, 1994) may

lead to different levels of individuals' preparations in each country.

Given these contextual effects, the relationship between current-self views, perceived control, and preparation at the individual level should be buffered by the extent to which social support influences life domains within each culture. Presumably, a culture where weak support systems exist within a specific domain may increase the importance of person-based attributes (e.g., control), as evidenced by greater associations between these factors and preparation for old age. For instance, strong pension programs by government and mandatory retirement age in Germany may be expected to lessen the level of or need for personal control on financial preparations, whereas less sufficient social security in the US than in Germany would increase the necessity of preparation along with the effect of perceived control on those preparations. On the other hand, strong institutional support may promote one's perception of control. In either case, culture is a moderator. Thus, we expected that the effects of current-self views and perceived control on preparations will be moderated by cultures due to differences in societal and institutional support.

### **The Current Study**

In the present study, we examined the relationship between current-self views, perceptions of control, and preparations in each of four domains of functioning (social relations, finances, work, and health). To do so, we used longitudinal data collected across a five-year period from adults aged from 30 to 85 years in three different cultures (Germany, Hong Kong, and the US). In terms of directional relations, we predicted that positive current-self views will be associated with greater perceived control, which in turn, will be associated with greater levels of preparation. These greater levels of preparation will predict subsequent positive self-views. Ideally, three waves of data would be used to examine these links, allowing us to examine the

extent to which control mediates the relationship between self-views and preparations. However, given that only two waves of data were available, we opted for a hybrid approach in which we examined two specific subsets of relationships within this hypothesized causal sequence. For Model A (indicated by bold lines in Figure 1), current-self views at Year 1 were used to predict perceived control at Year 5, which in turn was used to predict preparations at Year 5. In Model B (indicated by double lines in Figure 1), control was used to predict preparations at Year 1, which in turn were used to predict current-self view at Year 5. These two models are not mutually exclusive and do not compete with each other. Instead, the two models capture different parts of a larger chain of relations that we postulated on the basis of theoretical and conceptual arguments. As our data does not contain enough measurement points to cover the entire chain in a series of longitudinal effects, we decided to separate the postulated relations into two parts.

We also hypothesized that the strength of all these effects would be moderated by age, culture, and domains. First of all, the indirect effects in both Models A (i.e., current-self views predicting preparations) and B (i.e., control predicting current-self views) were expected to increase with advancing age because preparation for old age becomes more self-relevant with age. We also hypothesized that there would be variation in the strength of these relationships depending on cultures and domains. In contrast, the relationships between current-self views and control were expected to be positive, with fewer variations, assuming that feeling good about oneself may lead to an enhanced sense of control regardless of age or cultures.

Within the domain of social relations, we expected variations in indirect effects between Western society (i.e., the US and Germany) and Eastern society (i.e., Hong Kong). Older adults in the US may feel a stronger need for social relations in later life due to geographic dispersion of family members. Also, for older Germans, lower home-ownership compared to the US (e.g.,

Kaas, Kocharkov, Preugchat, & Siassi, 2017) and financial support for retiree communities or apartments by the German government may facilitate moving into those places in later life, with increasing need for how to build new social relations. In contrast, the tradition of filial piety in Hong Kong may lead older adults to expect narrowed relationships involving family members or relatives, with less need to create new social relations in later life (Adams & Kurtiş, 2015). For the domains of finances and work, we hypothesized variations in indirect effects between cultures depending on whether well-provided pension system and mandatory retirement age exist. Thus, the need for personal preparations for finances and work with advancing age in Germany was expected to be less than that in the US, to a lesser extent in Hong Kong, leading to the prediction that the causal pathways involving control would be stronger in the US. In the health domain, indirect effects were expected to be the strongest in the US, where people may feel a strong need to engage in preparations due to higher medical expenses and lower government-provided health care systems compared to other two cultures.

## **Method**

### **Participants**

As a part of Ageing as Future study, participants were recruited from: (a) Wake County, North Carolina, the US; (b) Jena and Erlangen, Germany; and (c) Hong Kong, China. Randomly selected people for targeted age and gender distributions by private marketing company (the US and China) and local registry offices (Germany) were contacted at Time 1 (T1, 2013). Upon consenting, participants were mailed a questionnaire packet and received a gift card worth approximately \$25 for reimbursement. Participants at T1 were contacted again and asked to participate in our follow-up study at Time 2 (T2, 2018). We followed the same procedure as T1 and 62% (the US), 77% (Germany), and 65% (Hong Kong) of participants at T1 completed our

study at T2. Drop-out with regard to central variables (e.g., age, gender, income; Voss, Kornadt, & Rothermund, 2017) indicated that the US participants dropping out at T2 were significantly younger ( $M= 54.71$ ,  $SD= 16.90$ ) than those participated in both T1 and T2 ( $M= 57.63$ ,  $SD= 14.26$ ),  $t(570)= -2.24$ ,  $p= .025$ . Participants in Hong Kong and Germany did not show any systematic dropout.

Information about the final sample ( $N= 1, 255$ ) is listed in Table 1. For further group comparison analyses by age, we divided the sample into three age groups based on ages at T1: younger (aged 30-49), middle-aged (aged 50-65), and older (aged 66-85). Subjective health was assessed with a single item (“How would you describe your current state of health?”) on a five-point scale (1= not good at all, 5= very good). Mean ratings of self-rated health were higher in the US than in the other two cultures,  $F(2, 1244) = 60.75$ ,  $p < .001$ . Moreover, significant age group differences in subjective health were found in Germany,  $F(2, 619) = 20.37$ ,  $p < .001$  such that mean health rating was significantly higher in younger adults than in middle-aged adults, and both were significantly higher than in older adults ( $p < .001$ ). Household income was assessed on an eight-point scale with adjusted currency for each country. Higher income levels were observed in the US than in Germany, and the income levels of the US and Germany were significantly higher than those in Hong Kong,  $F(2, 1208) = 47.24$ ,  $p < .001$ . Significant age group differences in household income were found in Germany,  $F(2, 617) = 25.19$ ,  $p < .001$  such that household income was significantly higher in young adults than in middle-aged adults, and both were significantly higher than in older adults ( $p < .001$ ). Age differences in household income were also found in the Hong Kong subsample,  $F(2, 284) = 28.66$ ,  $p < .001$ , with significantly higher income in younger adults than in middle-aged adults, and both higher than in older adults ( $p < .001$ ). Means for all comparisons are presented in Table 1.



## Measures

**Preparation for old age.** Preparation for age-related changes at both time points was assessed with a questionnaire developed by Kornadt and Rothermund (2014). Although this measure includes nine different domains of preparations, we focused on four domains that matched domains of other measures of interest in the present study: social relations, finances, work, and health. For each domain, respondents rated three items on a four-point scale (1 = not at all; 4 = a lot). The first item assessed active preparation: Social relations, “I am actively working to maintain my personal relations in old age (e.g., by fostering contacts, being included in social groups, etc.); Finances, “I am actively providing for my financial situation in old age (e.g., retirement accounts, savings, etc.); Work, “I am actively preparing for successful professional activity in old age (e.g., through continuing education, avoidance of job-related illness and disability, etc.); Health, “I am actively working to maintain my health in old age (e.g., by regular checkups, avoidance of behavior that is harmful to my health, etc.). The other two items assessed thinking about the topic (e.g., “I think about the topic”) and gathering information (e.g., “I try to gather information about the subject and discuss it with others”). These two items were worded the same for all domains.

**Current-self views.** Current-self views (CSV) were assessed within each of the four target domains by three domain-specific items that assessed perceptions of their own current level of functioning. Each item contained a specific aspect of functioning related to each domain that contrasted two opposing statements (e.g., “I find it difficult to make new friends” versus “I find it easy to make new friends” in the social relation domain). Participants responded to each item on an eight-point scale. Higher scores indicated more positive current-self views. The complete questionnaire can be found in Hess et al. (2017).

**Perceived control.** Participants rated a single item asking how one's control can have a positive effect on each life domain (i.e., "Regarding my personal situation in the domain of \_\_\_") on a five-point scale (1= "I have no control at all"; 5 = "I have a lot of control")

### **Statistical Analysis**

Our cross-lagged SEM (see Figure 1) investigated two mediation effects: (A) the effect of CSV at T1 on preparations at T2, mediated by control at T2; and (B) the effect of control at T1 on CSV at T2, mediated by preparations at T1. Stabilities, within-time-point correlations, and change correlations were also assessed in the model to estimate the prospective effects by controlling for impact of domain-specific variables in each domain. Given the limitations associated with a two-wave model to test mediation, we assumed that the effect of perceived control on preparation would be more immediate than that of current-self views on perceived control. Thus, we examined the former relationship within each wave. For multigroup comparisons, we examined measurement invariance within each domain across cultures, time, and age groups. Based on previous findings with these data (e.g., Kornadt et al., 2019), we also allowed correlated errors between two items (i.e., "I think about the topic" , " I try to gather information about the subject and discuss it with others" ) on the preparations scale. With respect to control variables, gender, income, retirement status as a dichotomous variable, and self-rated health as a continuous variable were included as common covariates across cultures when examined in the domains of social relations, finances, work, and health, respectively, due to relevance to specific domains. To adjust for missing data, multiple imputation with fully conditional specification for longitudinal data (Huque, Carlin, Simpson, & Lee, 2018) was implemented using SPSS 26.0 (IBM Corp, 2018). The significance of an indirect effect in SEM was assessed using 2000 bootstrap samples at  $p < .05$  (two-tailed) in AMOS 26.0 (Arbuckle,

2019).

## **Results**

### **Mediation SEM**

In evaluating each model, we used the following guidelines as measures of good fit (Awang, 2012): CFI > .90, TLI > .90, and RMSEA < .05 (< .08 is considered an acceptable fit). Model fit indices and path estimates in each domain are presented in Table 2. All estimated models yielded good to acceptable model fits. Significant initial correlations and change correlations between CSV and perceived control were found in all domains. Moreover, considerable stabilities in CSV, perceived control, and preparation were observed. To test our main hypotheses, we were especially interested in mediation pathways associated with the previously described Models A and B. Consistent with expectations, most paths in both models were positive, involving significant indirect effects. For Model A, positive CSV at T1 predicted greater perceived control at T2, and then predicted preparations at T2 in the domains of social relations, finances, and work. For Model B perceived control at Year 1 predicted preparations at T1, which in turn predicted current-self views at T2 in the domains of social relations, work, and health. Unexpectedly, the prediction effects from CSV at T1 to perceived control at T2 in the finances domain and from preparations at T1 to CSV at T2 in the health domain were small, involving nonsignificant indirect effects.

### **Multigroup SEM Comparing Age Groups Within Each Culture**

All multigroup structural equation models yielded good to acceptable fit, indicating measurement invariance across ages and cultures. Moreover, significant initial correlations and change correlations between CSV and perceived control, and considerable stabilities in CSV, perceived control, and preparation were found with only a few exceptions in all domains across

cultures and age groups. However, cultural and age group differences reflecting variations in strengths of the effects associated with our main hypotheses were observed in each domain.

### *Cultural differences within each domain*

With respect to our main interest in testing the relations depicted in Models A and B, bootstrap analyses revealed different effect sizes depending on cultures and domains (see Table 3). Consistent with our expectations, different effects were found in the domain of social relations between Western and Eastern societies. That is, significant mediation effects in both models were observed in Germany. Despite nonsignificant mediation effects in Model A in the US, the effect size associated with Model B was greater in the US than in the other two countries. No evidence for indirect mediation effects for either model was obtained for the Hong Kong sample, supporting our hypotheses of less emphasis on extra-familial relationships in the tradition of filial piety. With respect to finances, the only significant indirect effect was observed in the US for Model B. The effects of perceived control on preparations at both T1 and T2 across cultures also revealed specific cultural differences; that is, those direct effects were greater in the US than in Hong Kong and, to a lesser extent, Germany. This difference supported our hypothesis that the hypothesized effects associated with personal preparations in the domain of finances would be smaller in cultures such as Germany, where there exist strong government-driven pension systems. Inconsistent with our expectations, significant indirect effects associated with both models were observed in the domain of work for Germany, whereas no significant indirect effects were obtained for the US. Also, inconsistent with our hypotheses in the health domain, the strength of the observed indirect effect for model A was greater in Germany than in the US and Hong Kong, with no significant indirect effects for Model B in any culture.

***Age group differences within each culture.***

*Social relations.* Regarding indirect effects depicted in Models A and B (see Table 4), consistent with our hypothesis, age moderated the strength of both models, with the strength of association increasing with age in Germany and the US. In contrast, the indirect effects were not significant in Hong Kong, supporting our hypotheses of more emphasis on preparation for social relations in Western cultures with advancing age and less emphasis on social relations in cultures of filial piety.

*Finances.* Age differences within each culture were found despite few significant indirect effects (see Table 5). Whereas indirect effects for both models increased with age in the US, the indirect effects in older adults of both Germany and Hong Kong were smaller than in other age groups in those countries. These age and cultural differences are consistent with our expectation that the overall effects in preparations for finances would become greater in later life in cultures with a relatively weaker pension system.

*Work.* As seen in Table 6, only German middle-aged adults showed a significant indirect effect for Model A in the work domain. Given that the US does not have mandatory retirement age in contrast to Germany and Hong Kong, the observed nonsignificant effects in the US are inconsistent with our hypotheses.

*Health.* Consistent with the previously discussed effects in the health domain, there were no mediation effects observed in any age group in any culture (see Table 7). Thus, our hypotheses about age-related moderation—particularly in the US—were not supported.

## **Discussion**

This study was designed to investigate the relationships between current-self views, perceived control, and preparations for old age in four domains of functioning (i.e., social



relations, finances, work, and health) over a time span of five years. Using two hybrid longitudinal models, we tested the hypothesis that positive views of one's current level of functioning would bolster perceptions of control, which in turn would lead to greater levels of preparations. In turn, these greater levels of preparations were expected to enhance subsequent self-views. We also examined the degree to which these relationships vary by age, domains of functioning (i.e., social relations, finances, work, and health), and culture (i.e., the US, Hong Kong, and Germany).

In line with previous studies of positive associations between perceived control and preparations (e.g., Park et al., 2019; Prenda & Lachman, 2001), we found positive associations between perceived control and preparations in each domain. Also, consistent with our predictions, feeling good about one's current situation predicted a greater sense of control 5 years later. More importantly, with the exception of the domain of health, our expectations regarding the positive impact of preparations on subsequent self-views were also supported, suggesting that people who are engaged in greater levels of domain-specific preparations have a more positive view of their subsequent levels of functioning within that domain. That is, preparation behaviors are a positive factor for future well-being, which may also perpetuate a heightened sense of control and continued engagement in preparations.

### **Moderating Effects of Culture and Domains**

We also investigated the extent to which the strength of these associations would vary based on cultural views and structural supports within specific domains. Our findings were generally consistent with this expectation, supporting the context-specificity and multidimensionality of aging-related processes (Kornadt & Rothermund, 2011; Kornadt et al., 2019).

Within the domain of social relationships, we found that mediation effects were stronger in Germany and the US than in Hong Kong. This may reflect cultural differences in emphases on preparations for social relationships in later life based on different traditions and demographic trends across cultures. For example, higher levels of geographical dispersion of family members in the US may emphasize the necessity of developing supportive extrafamilial social relations in later life. Similarly, lower rates of home-ownership in Germany compared to the US (e.g., Kaas et al., 2017) along with government support for living in retiree housing may also heighten the emphasis on preparations for social relations in later life. On the other hand, people living in Hong Kong are more likely to live closer to family members than people in other two countries, and the tradition of filial piety—relating to children feeling that they have the duty to obey and support their parents (Cheng & Chan, 2006; Lee & Hong-kin, 2005)—may be associated with less emphasis on social relations outside the family.

Within the domain of finances, cultural differences were also observed, although the mediation effects were rather small. Specifically, relatively stronger effects of perceived control on preparations were found in the US than in Hong Kong and, to a lesser extent, Germany. Relative to the US, the weaker effects in the other two cultures may be related to a relatively strong government-based pension system in Germany, or the expectation of financial support from family members in Hong Kong (Chou et al., 2015). In the US, where retirement pensions from the government and private sources (e.g., companies) may be viewed as less certain and generous, more emphasis may be placed on self-directed efforts to ensure financial well-being.

Contrary to our hypothesis that the absence of a mandatory retirement policy in the US would encourage greater planning within the work domain, weaker mediation effects were observed in the US than in the other two countries. It may be that the impact of other

environmental and contextual factors such as low job security in the US compared to the other two countries may weaken the degree of individuals' perceived personal control.

Finally, within the health domain, our hypothesis that stronger mediation effects would be observed in the US than in the other two countries was also not supported. Given that health care is strongly institutionalized in Germany, we were particularly surprised that the mediation effects associated with perceived personal control were stronger here than in the other two cultures. One possible explanation may be that the availability of strong social programs associated with health care may actually increase a sense of control. For example, highly accessible medical services and associated medical checkups in Germany may promote feeling greater perceived control given that individuals may be more likely to have problems diagnosed and receive advice for prevention and maintenance within the health domain. In contrast, given that health preparation is more self-reliant in the US due to high cost and uncertain availability of services, individuals may feel less control along with low self-efficacy in age-related changes in health.

### **Moderation Effects of Age**

We tested the general prediction that mediation effects would be strengthened with increasing age due to the increased salience of making preparations as one approaches old age. The results, however, were not consistently supportive of such moderation, with the hypothesized effect being further moderated by culture and domain of functioning. In most cases, the moderation made sense. For example, in the domain of social relations, the mediation effect associated with control increased with age in Germany and the US, but not in Hong Kong. In the former two cultures, this may reflect the aforementioned pressures to form new extrafamilial relationships as one approaches old age. In Hong Kong, where there is a stronger

emphasis on family, such preparations may be less essential.

Within the domain of finances, a more complex pattern emerged, with mediation effects increasing with age in the US, but decreasing in the other two cultures. In the US, this could reflect reduced family pressures on finance with increasing age, along with relative uncertainty about income in later life. In the other two cultures, mediation effects associated with control may have become less strong with age as the perceived need for preparation perhaps dissipated with age and the benefits of a relatively stable financial support system in later life became more salient. In contrast, there was little evidence of age-related moderation in the domains of work or health.

Taken together, these results emphasize the relatively complex interaction between age, the contexts in which people function, and their involvement and control over preparations for old age. Unfortunately, we were only able to speculate about sources of these effects based on knowledge of general differences between culture. Future research directing measuring, for example, availability of resources—perceived or factual—would help establish the factors that account for these context-related variations.

### **Limitations**

There are certain caveats regarding this research. First, although we investigated the relationships between current-self views, perceived control, and preparations within a longitudinal design, other potential variables not included in the current study might also determine preparations. For example, individuals who have a more concrete future time perspective may be engaged in preparations for the future because they regard their future as providing some opportunities to pursue goals. In fact, Kornadt et al. (2019) found positive relationships between concreteness of time perspective and preparations. Also, our study only

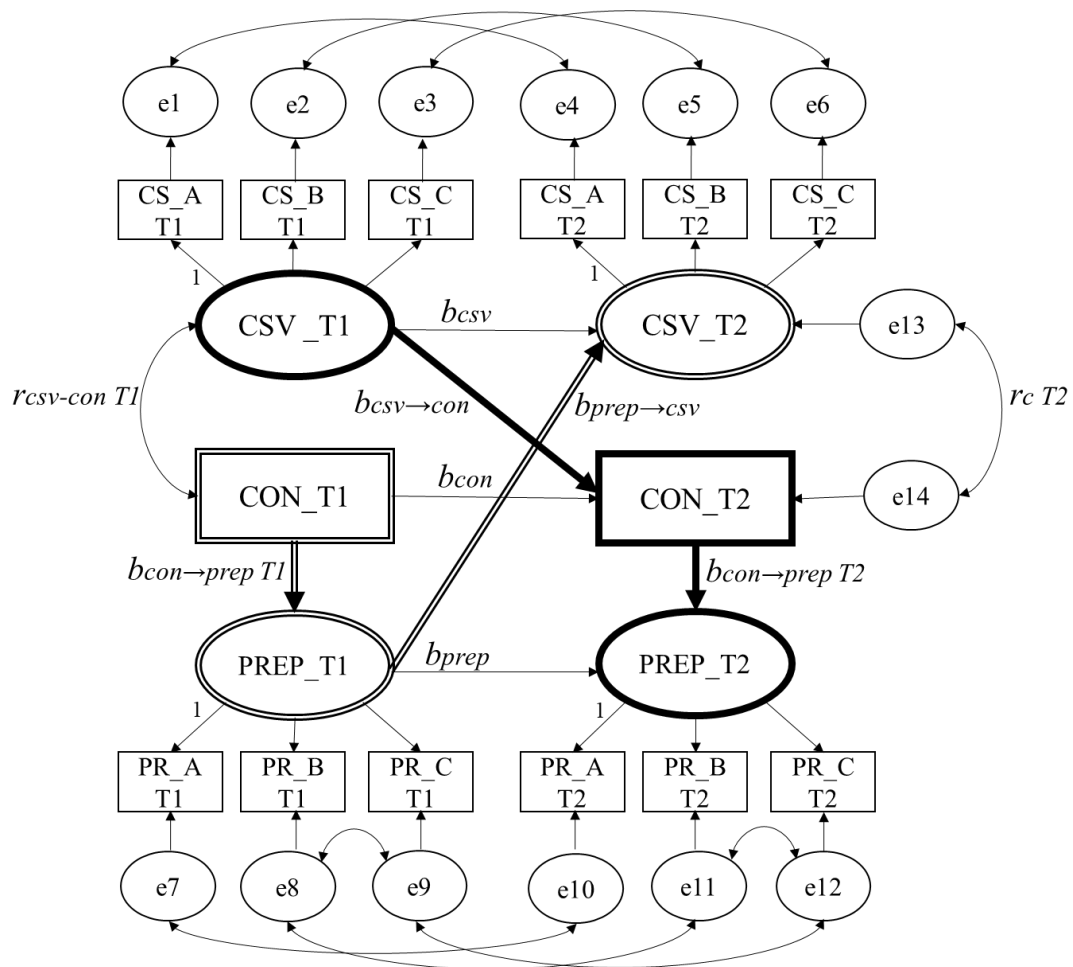
examined three cultures. Further attempts to replicate our study in more diverse cultures may show more systematic differences, potentially further highlighting the factors underlying cultural variation. In addition, only two waves of data were available, whereas three or four would have been more desirable in investigating the hypothesized causal relationships. We should also note that mediation models cannot be taken as strong evidence for causal effects because alternative models might show similarly good fit with the data (Fiedler, Schott, & Meiser, 2011). However, our models show much consistency in the pattern of effects across the two hybrid longitudinal models, and alternative models that reversed the patterns of associations (e.g., control predicting current functioning) provided poor fits to the data. Thus, we are reasonably confident in the reliability of the proposed model.

## **Conclusion**

The main goal of the present research was to further understand the factors that promote preparing for old age across cultures, domains of functioning, and ages in adulthood. Our main finding is that current-self perceptions are associated with perception of personal control, which in turn impact preparations and their impact on subsequent self-views. The positive associations between these variables suggests that positive self-perceptions serve as a resource for promoting adaptive functioning in later life, with the benefits appearing to accumulate over time. Of course, this also implies the possibility of negative self-perceptions having a maladaptive impact on control, preparations, and future self-perceptions over time. This suggests that interventions focused in improving positive self-views may be beneficial in promoting preparations for old age. Consistent with a contextual perspective on development, the varied effects across cultures and domains of functioning in our study also highlight the variability in the experience of aging and the factors that influence adaptive functioning. This further argues against attempts to



generalize research findings largely obtained within a limited cultural sphere in attempts to characterize the process of aging. We would also argue that cross-cultural research of the type presented here not only illustrates variability in age-related processes, but also has the potential to identify factors promoting adaptive functioning in one culture that might then be fruitfully “weaponized” in innovate programs in other cultures.



*Figure 1* A Hypothetical Model Through Current-Self Views, Perceived Control, and Preparations Across Two Time Points Within Four Domains (i.e., Social, Finance, Work, and Health) and Age Groups (i.e., Younger, Middle-Aged, and Older); The bold lines represent the cross-lagged mediation Model A; The double lines represent the cross-lagged mediation Model B.

Table 1 *Demographic Characteristics at Time 1, in 2013*

Culture	Age Group (Total <i>N</i> , % female)	Age <i>M</i> ( <i>SD</i> )	Subjective Health <i>M</i> ( <i>SD</i> )	Household Income <i>M</i> ( <i>SD</i> )
US	Younger (95, 60%)	39.94 (5.10)	3.25 (0.72)	6.09 (1.31)
	Middle-aged (110, 56.4%)	57.82 (4.66)	3.23 (0.79)	5.92 (1.75)
	Older (108, 47.2%)	72.99 (5.64)	3.18 (0.86)	5.66 (1.61)
	All ages (315, 54.3%)	57.63 (14.26)	3.22 (0.79)	5.88 (1.58)
Germany	Younger (205, 49.0%)	42.14 (4.63)	2.91 (0.93)	5.44 (1.32)
	Middle-aged (209, 57.3%)	57.90 (4.37)	2.64 (0.90)	5.11 (1.40)
	Older (209, 52.0%)	73.71 (5.06)	2.33 (0.95)	4.52 (1.28)
	All ages (623, 50.7%)	58.02 (13.71)	2.62 (0.95)	5.02 (1.39)
Hong Kong	Younger (100, 48.8%)	43.07 (4.21)	2.58 (0.71)	5.58 (1.16)
	Middle-aged (117, 53.1%)	57.62 (4.92)	2.58 (0.62)	4.87 (1.89)
	Older (100, 50.2%)	72.73 (5.21)	2.53 (0.73)	3.59 (2.12)
	All ages (317, 53.0%)	57.80 (12.73)	2.56 (0.68)	4.67 (1.96)

Table 2 Influences of Perceived Control, Current-Self Views, Preparation Across Two Time Points: Standardized Estimates and Model Fits Within Each Domain

	Initial correlations (rcsv-con T1)	Stability			Effects of A			Effects of B			Change correlations (rc T2)							
		(bcsv)	(bcon)	(bprep)	(bcsv→ con)	(bcon→ prep T2)		(bcon→ prep T1)	(bprep→ csv)									
Domains	CSV_t1 ↔ CON_t1	CSV_t1 → CSV_t2	CON_t1 → CON_t2	PREP_t1 → PREP_t2	CSV_t1 → CON_t2	CON_t2 → PREP_t2	Indirect effects of A	CON_t1 → PREP_t1	PREP_t1 → CSV_t2	Indirect effects of B	CSV_t2 ↔ CON_t2	$\chi^2$	df	<i>p</i>	TLI	CFI	RMSEA [90% CI]	
SOC	<b>.372</b>	<b>.603</b>	<b>.417</b>	<b>.520</b>	<b>.125</b>	<b>.226</b>	<b>.028</b>	<b>.254</b>	<b>.165</b>	<b>.042</b>	<b>.210</b>	404.011	70	.000	.951	.967	.062 [.056, .068]	
FIN	<b>.393</b>	<b>.554</b>	<b>.397</b>	<b>.587</b>	.018	<b>.182</b>	.003	<b>.270</b>	<b>.101</b>	<b>.027</b>	<b>.290</b>	380.336	70	.000	.946	.964	.059 [.054, .065]	
WOR	<b>.267</b>	<b>.443</b>	<b>.292</b>	<b>.421</b>	<b>.138</b>	<b>.150</b>	<b>.021</b>	<b>.210</b>	<b>.092</b>	<b>.019</b>	<b>.206</b>	273.045	70	.000	.968	.979	.048 [.042, .054]	
HEA	<b>.458</b>	<b>.530</b>	<b>.304</b>	<b>.619</b>	<b>.178</b>	<b>.142</b>	<b>.025</b>	<b>.197</b>	-.014	-.003	<b>.356</b>	216.860	70	.000	.978	.986	.041 [.035, .047]	

Note. Values in bold print are significant at  $p < .05$ . CSV: Current-self views; CON: Perceived control; PREP: Preparation for the old age; SOC: friends and other social relationships; FIN: financial situation and dealing with money; WRK: work and professional life; HEA: physical health.

Table 3 Influences of Perceived Control, Current-Self Views, Preparation Across Two Time Points: Standardized Estimates and Model Fits Within Each Culture Across Domains

Domains	Culture	Initial correlations ( <i>r</i> <sub>CSV-CON T1</sub> )	Stability			Effects of A ( <i>b</i> <sub>CSV→CON</sub> → <i>b</i> <sub>CON→PREP T2</sub> )		Effects of B ( <i>b</i> <sub>CON→PREP T1</sub> → <i>b</i> <sub>PREP→CSV</sub> )		Change correlations ( <i>r</i> <sub>C T2</sub> )			$\chi^2$	df	<i>p</i>	TLI	CFI	RMSEA [90% CI]
		↔ CON_t1	CSV_t1 → CSV_t2	CON_t1 → CON_t2	PREP_t1 → PREP_t2	CSV_t1 → CON_t2	CON_t2 → PREP_t2	CON_t1 → PREP_t1	PREP_t1 → CSV_t2	Indirect Effects of A	Indirect Effects of B	CSV_t2 ↔ CON_t2						
SOC	US	<b>.485</b>	<b>.675</b>	<b>.362</b>	<b>.568</b>	.088	<b>.159</b>	.014	<b>.288</b>	<b>.177</b>	<b>.051</b>	<b>.328</b>	670. 908	210	.000	.940	.958	.040 [.037, .044]
	HK	<b>.395</b>	<b>.493</b>	<b>.355</b>	<b>.418</b>	.147	<b>.106</b>	.016	.092	<b>.126</b>	.012	<b>.251</b>						
	GER	<b>.358</b>	<b>.686</b>	<b>.355</b>	<b>.534</b>	.161	<b>.238</b>	<b>.041</b>	<b>.173</b>	<b>.189</b>	<b>.033</b>	<b>.188</b>						
FIN	US	<b>.487</b>	<b>.525</b>	<b>.382</b>	<b>.629</b>	.059	<b>.226</b>	.013	<b>.432</b>	<b>.244</b>	<b>.105</b>	<b>.326</b>	481. 579	210	.000	.952	.968	.032 [.028, .036]
	HK	<b>.309</b>	<b>.407</b>	<b>.347</b>	<b>.350</b>	.031	<b>.188</b>	.006	<b>.203</b>	.059	.012	<b>.388</b>						
	GER	<b>.426</b>	<b>.626</b>	<b>.391</b>	<b>.684</b>	.068	<b>.131</b>	.009	<b>.138</b>	.003	.000	<b>.270</b>						
WOR	US	<b>.181</b>	<b>.521</b>	<b>.230</b>	<b>.451</b>	.034	<b>.161</b>	.005	<b>.115</b>	.092	.011	<b>.174</b>	438. 139	210	.000	.964	.976	.029 [.026, .033]
	HK	<b>.324</b>	<b>.300</b>	<b>.126</b>	<b>.395</b>	.205	<b>.163</b>	<b>.034</b>	<b>.222</b>	.039	.009	<b>.365</b>						
	GER	<b>.258</b>	<b>.447</b>	<b>.289</b>	<b>.412</b>	.155	<b>.186</b>	<b>.029</b>	<b>.241</b>	<b>.118</b>	<b>.028</b>	<b>.139</b>						
HEA	US	<b>.349</b>	<b>.373</b>	<b>.206</b>	<b>.573</b>	.157	.102	.016	.056	-.076	-.004	<b>.293</b>	395. 359	210	.000	.971	.981	.027 [.023, .031]
	HK	<b>.479</b>	<b>.352</b>	<b>.227</b>	<b>.364</b>	.155	.074	.012	<b>.080</b>	-.051	-.004	<b>.433</b>						
	GER	<b>.385</b>	<b>.682</b>	<b>.353</b>	<b>.675</b>	.172	<b>.135</b>	<b>.023</b>	<b>.167</b>	-.012	-.002	<b>.330</b>						

Note. Values in bold print are significant at  $p < .05$ . CSV: Current-self views; CON: Perceived control; PREP: Preparation for the old age; SOC: friends and other social relationships; FIN: financial situation and dealing with money; WRK: work and professional life; HEA: physical health.



Table 4 Influences of Perceived Control, Current-Self Views, Preparation Across Two Time Points: Standardized Estimates and Model Fits Within Age Groups Across Cultures in the Domain of Social Relations

Culture	Age group	Initial correlations (rcsv-con T1)	Stability			Effects of A		Effects of B			Change correlations (rc T2)	$\chi^2$	df	p	TLI	CFI	RMSEA [90% CI]	
		CSV_t1 ↔ CON_t1	CSV_t1 → CSV_t2	CON_t1 → CON_t2	PREP_t1 → PREP_t2	CON_t1 → CON_t2	PREP_t1 → PREP_t2	CON_t1 → PREP_t1	PREP_t1 → CSV_t2	CON_t1 ↔ CON_t2								
US	Y	<b>.440</b>	<b>.676</b>	<b>.330</b>	<b>.610</b>	<b>.240</b>	-.045	-.011	.139	<b>.182</b>	.025	<b>.428</b>	351.580	220	.000	.919	.943	.044 [.035, .052]
	M	<b>.378</b>	<b>.707</b>	<b>.319</b>	<b>.581</b>	-.094	.212	-.020	<b>.264</b>	<b>.158</b>	<b>.042</b>	<b>.324</b>						
	O	<b>.606</b>	<b>.738</b>	<b>.342</b>	<b>.434</b>	<b>.241</b>	<b>.277</b>	<b>.067</b>	<b>.405</b>	<b>.153</b>	<b>.062</b>	.202						
HK	Y	<b>.306</b>	<b>.272</b>	<b>.302</b>	<b>.223</b>	.073	.066	.005	-.068	<b>.114</b>	-.008	<b>.368</b>	305.336	220	.000	.965	.975	.035 [.025, .044]
	M	<b>.373</b>	<b>.279</b>	<b>.304</b>	<b>.329</b>	.148	<b>.190</b>	.028	.138	<b>.163</b>	.023	.113						
	O	<b>.451</b>	<b>.328</b>	<b>.348</b>	<b>.304</b>	.105	.103	.011	.123	<b>.117</b>	.014	<b>.278</b>						
GER	Y	<b>.365</b>	<b>.771</b>	<b>.378</b>	<b>.547</b>	.030	<b>.257</b>	.008	<b>.146</b>	<b>.150</b>	.022	<b>.209</b>	476.997	220	.000	.927	.947	.043 [.038, .049]
	M	<b>.366</b>	<b>.765</b>	<b>.377</b>	<b>.471</b>	<b>.217</b>	<b>.249</b>	<b>.054</b>	<b>.152</b>	<b>.169</b>	<b>.026</b>	<b>.185</b>						
	O	<b>.400</b>	<b>.663</b>	<b>.348</b>	<b>.547</b>	<b>.275</b>	<b>.254</b>	<b>.070</b>	<b>.352</b>	<b>.199</b>	<b>.070</b>	<b>.194</b>						

Note. Values in bold print are significant at  $p < .05$ . CSV: Current-self views; CON: Perceived control; PREP: Preparation for the old age. Y: younger adults aged 30-49; M: middle-aged adults aged 50-65; O: older adults aged 66-85.

Table 5 Influences of Perceived Control, Current-Self Views, Preparation Across Two Time Points: Standardized Estimates and Model Fits Within Age Groups Across Cultures in the Domain of Finances

Culture	Age group	Initial correlations (rcsv-con T1)	Stability			Effects of A		Indirect Effects of A	Effects of B		Indirect Effects of B	Change correlations (rc T2)	$\chi^2$	df	p	TLI	CFI	RMSEA [90% CI]
		↔	(bcsv)	(bcon)	(bprep)	(bcsv→con)	(bcon→prep T2)		(bcon→prep T1)	(bprep→csv)		↔						
		CSV_t1 ↔ CON_t1	CSV_t1 → CSV_t2	CON_t1 → CON_t2	PREP_t1 → PREP_t2	CSV_t1 → CON_t2	CON_t2 → PREP_t2		CON_t1 → PREP_t1	PREP_t1 → CSV_t2		CSV_t2 ↔ CON_t2						
US	Y	<b>.403</b>	<b>.513</b>	<b>.400</b>	<b>.689</b>	-.049	<b>.162</b>	-.008	<b>.448</b>	.170	.076	<b>.228</b>	323.724	210	.000	.920	.947	.042 [.033, .051]
	M	<b>.567</b>	<b>.603</b>	<b>.398</b>	<b>.627</b>	.064	<b>.313</b>	.020	<b>.342</b>	<b>.315</b>	.108	<b>.355</b>						
	O	<b>.444</b>	<b>.411</b>	<b>.380</b>	<b>.300</b>	.105	<b>.215</b>	.023	<b>.668</b>	<b>.332</b>	<b>.221</b>	<b>.397</b>						
HK	Y	<b>.359</b>	.151	<b>.255</b>	<b>.318</b>	-.156	.051	-.008	.078	.093	.007	<b>.565</b>	272.717	210	.000	.957	.971	.031 [.019, .041]
	M	<b>.282</b>	<b>.523</b>	<b>.402</b>	<b>.347</b>	.111	<b>.410</b>	.045	<b>.162</b>	.000	.000	<b>.378</b>						
	O	<b>.406</b>	<b>.478</b>	<b>.369</b>	.278	.036	.065	.002	<b>.425</b>	.000	.000	.125						
GER	Y	<b>.362</b>	<b>.658</b>	<b>.422</b>	<b>.835</b>	.092	.071	.007	.158	.067	.011	<b>.267</b>	351.905	210	.000	.950	.967	.033 [.027, .039]
	M	<b>.506</b>	<b>.619</b>	<b>.301</b>	<b>.744</b>	<b>.246</b>	<b>.202</b>	<b>.050</b>	<b>.220</b>	.024	.005	<b>.362</b>						
	O	<b>.404</b>	<b>.564</b>	<b>.441</b>	<b>.498</b>	<b>-.179</b>	.126	-.023	.143	-.028	-.004	<b>.166</b>						

Note. Values in bold print are significant at  $p < .05$ . CSV: Current-self views; CON: Perceived control; PREP: Preparation for the old age. Y: younger adults aged 30-49; M: middle-aged adults aged 50-65; O: older adults aged 66-85.

Table 6 Influences of Perceived Control, Current-Self Views, Preparation Across Two Time Points: Standardized Estimates and Model Fits Within Age Groups Across Cultures in the Domain of Work

Culture	Age group	Initial correlations ( <i>r</i> <sub>CSV-CON T1</sub> )	Stability			Effects of A		Indirect Effects of A	Effects of B		Indirect Effects of B	Change correlations ( <i>r</i> <sub>C T2</sub> )	$\chi^2$	df	<i>p</i>	TLI	CFI	RMSEA [90% CI]
		↔ CON <sub>T1</sub>	( <i>b</i> <sub>CSV</sub> ) → CON <sub>T2</sub>	( <i>b</i> <sub>CON</sub> ) → CON <sub>T2</sub>	( <i>b</i> <sub>PREP</sub> ) → PREP <sub>T2</sub>	( <i>b</i> <sub>CSV</sub> → CON)	( <i>b</i> <sub>CON</sub> → PREP T2)		( <i>b</i> <sub>CON</sub> → PREP T1)	( <i>b</i> <sub>PREP</sub> → CSV)		↔ CON <sub>T2</sub>						
US	Y	.094	.356	.075	<b>.384</b>	.099	<b>-.219</b>	-.022	.179	.176	.032	-.045	295.012	210	.000	.932	.955	.036 [.026, .045]
	M	.179	<b>.616</b>	<b>.328</b>	<b>.538</b>	.150	.104	.016	-.016	.166	-.003	.116						
	O	.170	<b>.583</b>	<b>.253</b>	<b>.417</b>	.159	<b>.316</b>	.027	.138	-.051	-.007	<b>.378</b>						
HK	Y	<b>.483</b>	<b>.508</b>	.031	<b>.289</b>	.159	.169	.027	<b>.186</b>	<b>-.198</b>	-.037	<b>.443</b>	281.670	210	.000	.967	.978	.033 [.022, .043]
	M	<b>.364</b>	.135	.145	<b>.397</b>	<b>.262</b>	.102	.027	.107	.111	.012	<b>.287</b>						
	O	<b>.194</b>	<b>.386</b>	<b>.190</b>	<b>.418</b>	<b>.192</b>	.175	.034	<b>.423</b>	.113	.048	<b>.457</b>						
GER	Y	<b>.183</b>	<b>.570</b>	<b>.317</b>	<b>.349</b>	.125	<b>.208</b>	.026	<b>.172</b>	<b>.181</b>	.031	<b>.261</b>	319.875	210	.000	.961	.974	.029 [.022, .035]
	M	<b>.340</b>	<b>.454</b>	<b>.205</b>	<b>.341</b>	<b>.254</b>	<b>.138</b>	<b>.035</b>	<b>.274</b>	.074	.020	.146						
	O	.091	<b>.440</b>	<b>.277</b>	<b>.464</b>	.092	<b>.139</b>	.013	<b>.188</b>	.079	.015	.078						

Note. Values in bold print are significant at  $p < .05$ . CSV: Current-self views; CON: Perceived control; PREP: Preparation for the old age. Y: younger adults aged 30-49; M: middle-aged adults aged 50-65; O: older adults aged 66-85.

Table 7 Influences of Perceived Control, Current-Self Views, Preparation Across Two Time Points: Standardized Estimates and Model Fits Within Age Groups Across Cultures in the Domain of Health

Culture	Age group	Initial correlations (rcsv-con T1)	Stability			Effects of A		Indirect Effects of A	Effects of B		Indirect Effects of B	Change correlations (rc T2)	$\chi^2$	df	<i>p</i>	TLI	CFI	RMSEA [90% CI]
		↔	(bcsv) →	(bcon) →	(bprep) →	(bcsv→con)	(bcon→prep T2)		(bcon→prep T1)	(bprep→csv)		↔						
		CSV_t1 ↔ CON_t1	CSV_t1 → CSV_t2	CON_t1 → CON_t2	PREP_t1 → PREP_t2	CSV_t1 → CON_t2	CON_t2 → PREP_t2		CON_t1 → PREP_t1	PREP_t1 → CSV_t2		CSV_t2 ↔ CON_t2						
US	Y	.017	.322	<b>.443</b>	-.061	<b>.273</b>	<b>.036</b>	.010	.027	-.104	-.003	.262	367.147	210	.000	.872	.914	.049 [0.041, 0.057]
	M	<b>.441</b>	<b>.448</b>	.165	.119	.058	<b>.080</b>	.005	.036	.108	.004	<b>.276</b>						
	O	<b>.418</b>	<b>.347</b>	.115	<b>.438</b>	.179	-.006	-.001	.238	-.035	-.008	<b>.395</b>						
HK	Y	<b>.420</b>	<b>.547</b>	<b>.331</b>	<b>.355</b>	<b>.273</b>	.078	.021	.199	-.094	-.019	<b>.339</b>	303.463	210	.000	.953	.968	.038 [0.028, 0.047]
	M	<b>.455</b>	<b>.259</b>	.108	<b>.342</b>	<b>.214</b>	.046	.010	.042	.059	.002	<b>.455</b>						
	O	<b>.557</b>	.191	<b>.236</b>	.326	.026	.000	.000	.057	-.073	-.004	<b>.440</b>						
GER	Y	<b>.288</b>	<b>.807</b>	<b>.470</b>	<b>.632</b>	.120	.113	.014	<b>.171</b>	.066	.011	.157	373.088	210	.000	.949	.966	.035 [0.029, 0.041]
	M	<b>.364</b>	<b>.537</b>	<b>.336</b>	<b>.590</b>	.149	<b>.263</b>	<b>.039</b>	.130	.008	.001	<b>.432</b>						
	O	<b>.465</b>	<b>.720</b>	<b>.260</b>	<b>.684</b>	<b>.179</b>	.074	.013	<b>.214</b>	-.058	-.013	<b>.305</b>						

Note. Values in bold print are significant at  $p < .05$ . CSV: Current-self views; CON: Perceived control; PREP: Preparation for the old age. Y: younger adults aged 30-49; M: middle-aged adults aged 50-65; O: older adults aged 66-85.

### **Authorship for Three Manuscripts**

As a first author on all three manuscripts, I generated the basic research questions, performed the statistical analyses, and wrote the papers. As a research supervisor and a primary co-author, Thomas M. Hess consulted and provided feedback at each step in all three projects. As co-authors on the 2<sup>nd</sup> and 3<sup>rd</sup> papers, Helene H. Fung, Klaus Rothermund participated in the final stages of manuscript draft review before submission due to a previous agreement within the research team relating to use of data collected under their supervision.

### **General Discussion**

#### **Summary of Major Findings**

The overarching goal of the three studies for this dissertation is to identify what personal attributes influence subjective views of aging (i.e., aging attitudes toward older adults and future-self views) and the mechanisms underlying the relationship between views of aging and adaptive outcomes. Of further interest was an examination of the interactions with different contexts, such as domains of functioning and cultures.

Across all studies, variation in the nature and strength of effects across contexts highlight that individuals experience aging-related changes in multidimensional domains associated with specific phases of adulthood or with different cultures across the lifespan. Those differences may result from macrolevel constructs such as cultural/societal values and institutional support systems within each domain of functioning. Along with contextual effects associated with experiences of aging, self-perceptions as well as attitudes towards older adults were found to be important factors in predicting adaptive behaviors for old age. To be specific, even though individuals were not in the phase of old age, how individuals perceive themselves in the present or project themselves in later life influenced their adaptative responses. Above all, personal

characteristics (i.e., personality, perceived control), along with domains of functioning and cultures, were found to shape self-perceptions, subjective views of aging, and associated adaptive outcomes.

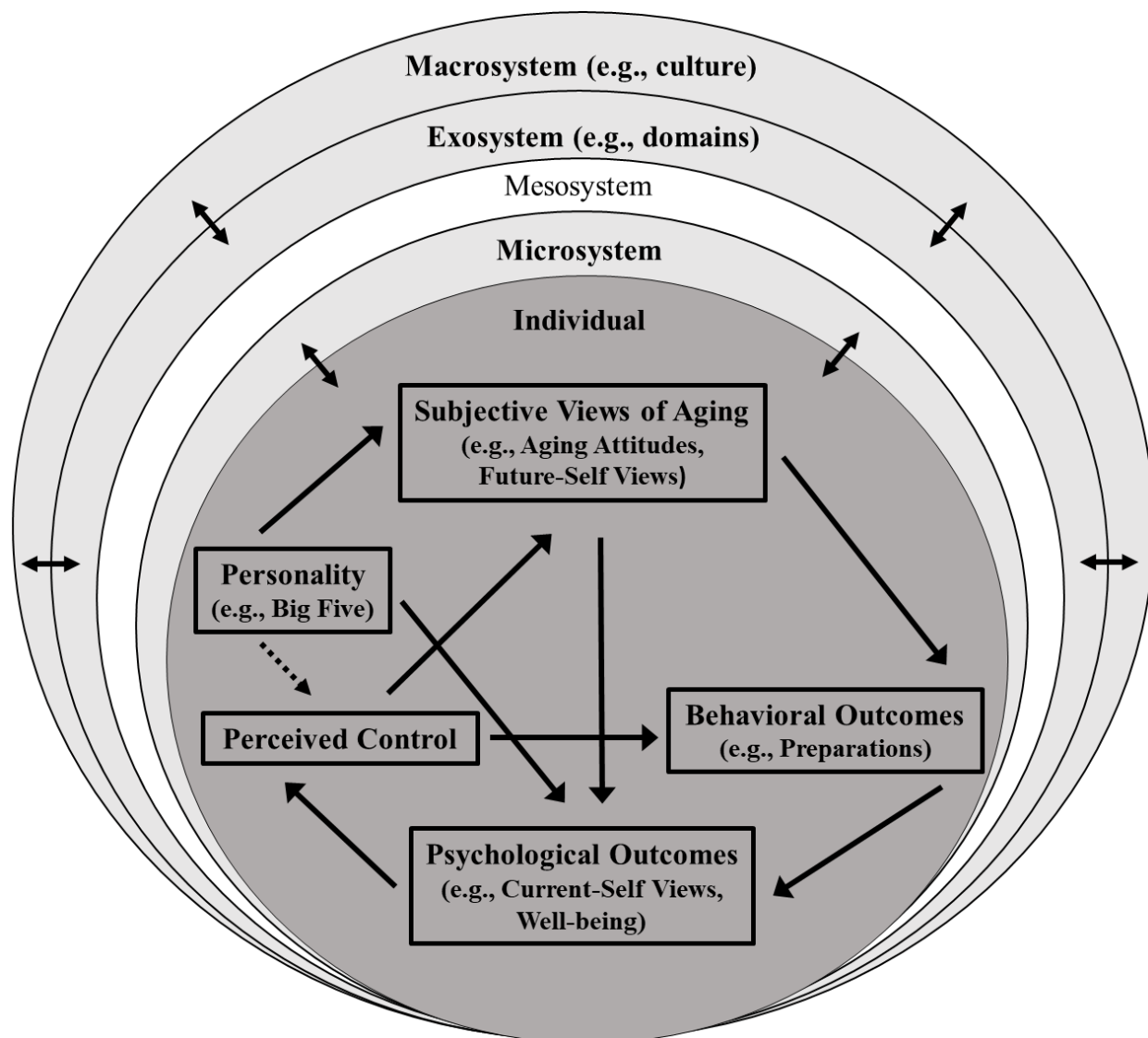
### **Aging and Adaptation Across the Lifespan**

From a lifespan contextualism perspective (e.g., Baltes, 1987; Bronfenbrenner, 1994), individual development is an ongoing process within and across multiple contexts, reflecting age-graded influences, history-graded influences, and nonnormative influences. Findings from my three papers reflect these three influences. With advancing age, individuals experience relatively similar trajectories of biological and psychological aging, shaping views of aging and, presumably, affecting the perceived importance of preparation for old age. Despite these general trends, each individual may show differences in views of aging and related behavioral outcomes, along with dynamic interactions with personal attributes and context. In these three studies, personal attributes (i.e., personality, perceived control) determined individual differences in views of aging and related outcomes, along with variations across contexts (i.e., domains of functioning and cultures). That is, personal attributes reflect partially nonnormative influences, which lead to distinctive views of aging and outcomes across one's lifespan. For example, in the first study (Park & Hess, 2019), the findings that high neuroticism was a risk factor for negative aging attitudes toward older adults and well-being whereas high conscientiousness and agreeableness were protective factors highlight individual characteristics that may influence one's response to getting older. Though the three studies did not measure history-graded influences, long-term effects of history-graded events on individuals and interactions with contexts could also be presumed. For example, the Social Security System in Germany of 1889, the Age Discrimination in Employment Act of 1967 and Employee Retirement Income Security



of 1974 in the US, or the Mandatory Provident Fund in Hong Kong of 1998 may have differentially influence individuals' perceptions and behavioral outcomes regarding retirement, pension system, or work across cultures, resulting in context-specific responses and adaptations to old age. In fact, for the second and third studies, weaker predictive associations related to control and future-self views in the domain of finances found in Germany compared to the US and Hong Kong may be in accordance with a long history of a government-sponsored social security system in Germany.

Figure 1 gives an overview of a life-span framework from all three papers. Within this framework, the individual exists within a set of nested contextual system and interacts with environment over time. Although the effects of personality on perceived control (indicated dotted arrow in Figure 1) was not investigated, a longitudinal study showed that personality traits predict perceived control for aging adults (Toyama, 2020). Thus, further research involving the longitudinal effects of personality on perceived control, views of aging, and related outcomes could elaborate the current model. Also, given a lifespan contextualism by Bronfenbrenner (1994), the individual's interactions within proximal environments (microsystem: family/friend relationship, social network) may compose the individual's personal attributes, views of aging, and related outcomes. Views of aging and related outcomes are shaped by ongoing interactions of aging individuals with the immediate environment.



*Figure 1* Illustration of a Model Involving Personal Attributes, Views of Aging, Behavioral/Psychological Outcomes Along With Moderation Effects of Contexts and Age ; Bold prints indicate findings in three papers.

### **Limitations and Future Directions**

Although limitations specific to each study were described in three papers, additional caveats that are common to at least two of papers can be highlighted: (a) need for additional

waves of data; (b) sampling a broader range of age; (c) consideration of other potentially useful variables; (d) target age; and (e) limits in cultural diversity.

As our data are cross-sectional in the first and second studies, I cannot make a strong conclusion regarding causality between variables. In the first study, for example, changes in aging attitudes may influence personality (e.g., Kornadt, 2016). Also, although I investigated the effects of perceived control through future-self views on preparations in the second paper, changing preparations for old age may also impact perceived control and future-self views. Given the dynamic interaction process between individuals and contexts through the lifespan (Bronfenbrenner, 1994), a longitudinal design is ideal. Although the third paper analyzed longitudinal data, a hybrid longitudinal model was selected due to only two waves of data available. Thus, additional waves of a longitudinal study in the future may show causality and directions of effects.

Another limitation of three studies is the absence of individuals under 30 years of age. Although three manuscripts indicated that the strength of relationships between variables tends to increase with age, young adults in 20s may be different from those in 30s. For example, very young adults may draw a larger distinction between themselves and older adults, with ideas that they do not belong to a group of older adults. These ideas of very young adults may lead to different facets regarding aging attitudes within each domain of functioning. Thus, young adults in 20s may strengthen our interpretation regarding age-related differences or changes in the effects of views of aging on outcomes across the adult lifespan.

Also, although I investigated the relationships between personal attributes (e.g., personality, perceived control), subjective views of aging, preparations, and well-being in the three studies, these investigations were limited by the data available in this Ageing as Future

project. Additional or more specific measures may be useful in extending our understanding. With respect to personal attributes, the specific facets of personality or perceived control associated with views of aging and psychological outcomes may highlight more distinct mechanisms associated with these factors. For example, the construct of neuroticism is not a single unit, but consists of anxiety, depression, self-consciousness, impulsiveness, anger, hostility, and vulnerability (McCrae & Costa, 2010). Also, given that other research viewed perceived control in the context of internal versus external control belief (e.g., Schultz & Schultz, 2016), future research on locus of control may strengthen the current models. For example, whereas a high internal locus of control may be a positive factor in the domain of social relations, a high external locus of control by institutionalized support system in the domain of finances or work may be a positive predictor. In addition, for the second and third studies, preparations for old age may be further investigated through future time perspective, given positive relationships between concreteness of future-time perspective and preparations (Kornadt et al., 2019).

For all three studies, the target of old age might be arguable. Although I did not specify the age of target, attitudes toward the old-old (aged over 80) tend to be more negative than toward the young-old (aged 65-80). In addition, self-perception as an older adult may have a different age range of target for each individual. For older adults, when thinking about their old age, they may identify more limited age range, particularly the old-old, than young and middle-aged adults. Thus, in a sample of young and middle-aged adults, attitudes toward older adults and self-perception as an older adult may compromise the strength and meaning of observed effects.

Lastly, and common to all three studies, my research could be enriched by further cultural diversity. With respect to the second and third paper, although I presumed that relatively weaker effects of perceived control on preparations for social relations in Hong Kong than in the US and Germany are related to filial piety prevalent in Eastern culture, differences in attitudes towards older adults may also exist within Eastern culture. Contrast to our common beliefs of filial piety within Eastern culture, a meta-analysis on attitudes toward older adults showed older adults are most derogated in especially East Asia, compared with South East Asia (North & Fiske, 2015). Thus, given that bioecological model (Bronfenbrenner, 1994) highlights the effects of social and cultural values on individuals, further investigation of views of aging and related outcome across diverse cultures may elaborate the current model.

## **Conclusion**

In sum, the three studies highlight personal attributes (e.g., personality, control beliefs) that may lead to important outcomes on behavioral and psychological processes related to aging. The positive associations between protective personal attributes (e.g., high agreeableness, conscientiousness, or perceived control), views of aging, and adaptive functioning (e.g., well-being, preparations for old age) suggest potential factors that should be addressed for better understanding successful aging. In addition, findings of the accumulated benefits of current well-being in the third paper imply that focusing on improvement of well-being may be a specific strategy for our adaption to older age. Also, the fact that the strength of effects varied across cultures or age across specific domains emphasizes the importance of consideration of a contextual perspective to understand adaptive behaviors in aging-related research. That is, within a contextual perspective on development, exploration of potential factors in age-related process

that are specific to each context may contribute to more optimized intervention programs or legislation across culture or age within each domain.



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