Gratitude From Early Adulthood to Old Age

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Abstract

Are there age differences in gratitude from early adulthood to old age? The current studies tested several ways by which an association between age and dispositional gratitude may present, by considering multiple measures on both fronts. We used data from three cross-sectional studies (total $N = 1{,}736$; total age range: 19–94). The results indicated that (a) age effects in gratitude are more likely to occur for subjective age in terms of future time perspective (i.e., people's perceptions of their remaining opportunities and time) than chronological age; (b) chronological age effects are more domain specific than general in nature; and (c) they are more likely to occur for the instrumental domain as compared to the interpersonal domain. Finally, the results indicated that (d) perceived future time, particularly with respect to remaining opportunities, mediates the relation between chronological age and general gratitude. Overall, the findings suggest that gratitude is subject to a variety of developmental influences across adulthood.

Are there age differences in gratitude from early adulthood to old age? Previous work suggests age trends in affective experiences in adulthood. For example, negative affect tends to decrease with aging (excluding very old people), whereas positive affect and life satisfaction tend to demonstrate stable levels across adulthood or even improve (Charles, Reynolds, & Gatz, 2001; Mroczek & Kolarz, 1998). Moreover, age differences with respect to specific affective experiences such as anger, sadness, and joy have been found (Grühn, Kotter-Grühn, & Röcke, 2010; Kunzmann, Richter, & Schmukle, 2013). Despite a growing interest in age differences in specific affective experiences, very little is known about gratitude across the adult years. This lack of work is surprising, given the benefits of gratitude for well-being, health, and social relationships (Emmons & McCullough, 2003; Watkins, Van Gekder, & Frias, 2009; A. M. Wood, Froh, & Geraghty, 2010). For example, research demonstrates that gratitude is associated with self-reported physical health (Hill, Allemand, & Roberts, 2013), predicts greater subjective sleep quality and duration (Wood, Joseph, Lloyd, & Atkins, 2009), strengthens social relationships (Algoe, Haidt, & Gable, 2008), and helps maintain intimate bonds (Gordon, Impett, Kogan, Oveis, & Keltner, 2012). The primary objective of the current research was to fill that gap by broadening our understanding of dispositional gratitude in adulthood. To achieve that objective, we examined gratitude in three large cross-sectional samples covering early adulthood to old age and focused on different perspectives of age and gratitude.

Defining Gratitude

Gratitude can be considered as an enduring affective disposition, as a mood, or as a temporary emotional state that reflects a response to a meaningful situation such as receiving a gift from others (McCullough, Emmons, & Tsang, 2002; Rosenberg, 1998). The current research is primarily concerned with general and domain-specific dispositional gratitude. We borrow this distinction from the literature on life satisfaction that defines that construct either as a subjective, global evaluation of the positivity of life as a whole, or with respect to specific life domains (Diener, Suh, Lucas, & Smith, 1999). Based on this distinction, dispositional gratitude can be conceptualized as a *broad* and *decontextualized* construct. It is defined as a "generalized tendency to recognize and respond with grateful emotion to the roles of other people's benevolence in the positive experiences and outcomes that one obtains" (McCullough et al., 2002, p. 112) or "as part of a wider life orientation toward noticing and appreciating the positive in the world" (A. M. Wood et al., 2010, p. 891). It has

been suggested that people high on this affective disposition typically experience gratitude more frequently and intensely, and that for these people gratitude might be elicited through a wide range of stimuli (McCullough et al., 2002). In addition, dispositional gratitude can be conceptualized as the result of enduring affective experiences in specific domains or areas of life and is thus *narrower* and more *contextualized*. This perspective assumes that gratitude can be manifest differently across contexts and life areas such as health or work.

Age and Gratitude

Very few studies on the link between age and dispositional gratitude exist. Of the handful of studies conducted, most focused on childhood and adolescence (e.g., Froh et al., 2011; Froh, Sefick, & Emmons, 2008). The extant work suggests little evidence for age effects in adulthood. For example, Wood, Maltby, Stewart, and Joseph (2008, Study 1) did not find a significant age correlation with dispositional gratitude in a sample of adults aged 18 to 82 years (M_{age} = 26 years). In addition, Kashdan, Mishra, Breen, and Froh (2009, Study 2) found an age effect for appraisals of gratitude narratives but not for dispositional gratitude in a sample of students aged 18 to 48 years and a sample of older adults aged 59 to 85 years. The scarce available empirical evidence suggests no age differences in dispositional gratitude in adulthood. However, these studies may have been too limited in their consideration of both age and gratitude during the adult years.

Therefore, the current studies tested two ways by which an association between age and dispositional gratitude may present. First, the *subjective aging hypothesis* would suggest that age effects in gratitude are more likely to occur for perceived future time as a subjective indicator of aging than chronological age. In addition, future time perspective may help explain any association between chronological age and gratitude. Second, the *breadth of measurement hypothesis* would posit that chronological age effects in gratitude are more domain specific than general in nature. Specifically, chronological age effects in gratitude may be more likely to occur in instrumental areas such as health than interpersonal relationships such as family and friends. We discuss each of these predictions in greater detail below.

The Subjective Aging Hypothesis

In order to better understand age effects in gratitude, it is important to go beyond chronological age and to explicitly consider the subjectivity of the aging process. In the current research, we thus examined both chronological age and perceptions of future time. Future time perspective (FTP) refers to people's general tendency to perceive their time in life either as open ended or as limited. It is grounded in a life span theory of motivation—the socioemotional selectivity theory (SST; Carstensen, Isaacowitz, & Charles, 1999)—that argues that the

subjective perception of time has important implications for the selection of goals, activities, and preferences. The SST asserts that people change their priorities as a function of FTP. When future time is perceived as open ended or expansive, as is typical in young adulthood, people are strongly motivated to optimize their future by pursuing information and knowledge-related social goals. When people view their future as limited, as is typical in later life, the focus shifts from the optimization of future possibilities to the maximization of meaningful activities and experiences in the present. They are more motivated to pursue emotion-focused goals to maintain emotional and social well-being (Lang & Carstensen, 2002). The SST argues that changes in priorities as a function of limited FTP would motivate investments in meaningful activities and adaptive regulation processes to maintain social and emotional well-being (Carstensen et al., 1999). The shifts in priorities are thought to reflect not chronological age per se but rather the subjectivity of the aging process. Accordingly, several variables that appear to influence FTP, including serious illnesses, natural disasters, geographic relocations, or temporary time constraints such as retirement, can also influence the perceptions of time horizons (Fung & Carstensen, 2006).

There are at least two approaches to studying FTP. An experimental approach uses hypothetical scenarios or mental imagery to manipulate FTP (e.g., Allemand, 2008; Demeyer & De Raedt, 2014; Fung & Carstensen, 2004). In contrast, an individual differences approach uses self-report measures such as the Future Time Perspective Scale (FTPS; Lang & Carstensen, 2002). Previous research using the FTPS reports systematic but not perfect associations between age and open-ended time perspective. For example, Lang and Carstensen (2002) reported a correlation of −.70. But perhaps more important, research demonstrated an incremental effect of FTP over and above the effect of age (Carstensen et al., 1999; Kooij, de Lange, Jansen, & Dikkers, 2013).

FTP was originally considered a one-dimensional construct ranging from limited to expansive. Recently, however, Cate and John (2007) argued for a multidimensional approach in which individuals may focus on different aspects of time perspective that may influence behavior and experience independently; specifically, research suggests two related but distinct dimensions of FTP (remaining opportunities and time; Cate & John, 2007; Kooij et al., 2013; Zacher & Frese, 2009). People with a strong focus on remaining opportunities perceive their future in positive ways and direct their focus on the options, plans, and goals they can still pursue in their remaining lifetime. People with a strong focus on remaining time perceive their future in terms of time limits, restrictions, and boundaries that lie in the time ahead. These two dimensions may coexist and not just mirror each other. This raises the possibility that a person who sees time as increasingly limited may not necessarily also see time as less full of opportunities and psychological growth.

To the best of our knowledge, no previous research has investigated perceptions of future time with respect to dispo-

sitional gratitude, either with one-dimensional or multidimensional conceptions. The SST would argue that when people view their future as limited, they focus more on adaptive regulation processes to maintain social and emotional well-being (Carstensen et al., 1999). Shorter time horizons become an increasingly important source of motivation that leads to changes in priorities. However, this does not mean that the perception of time running out or decreased opportunities in the future is positive for one's well-being. If the perception of limited time were positively associated with positive affective experiences, then changes of priorities and regulatory processes would not be necessary. In line with this argument, recent experimental and correlational research suggests that people who perceive their future time as open ended or expansive tend to score higher on several indicators of subjective well-being, such as positive affect or satisfaction with life, but lower on negative affect and pessimism (Allemand, Hill, Ghaemmaghami, & Martin, 2012; Davis & Hicks, 2013; Demeyer & De Raedt, 2014; Hicks, Trent, Davis, & King, 2012; Kotter-Grühn & Smith, 2011; Windsor, Fiori, & Crisp, 2011). These effects hold even when controlling for age (Allemand et al., 2012). Because dispositional gratitude is related to subjective well-being constructs, one would expect similar associations with FTP, in that an open-ended time perspective would be positively related to gratitude. Moreover, both the perception of remaining opportunities and dispositional gratitude have an orientation toward the positive in life in common, and thus should be more strongly interrelated than the FTP dimension of remaining time and dispositional gratitude. To conclude, the subjectivity of the aging process should be taken into account, not just chronological age, when examining age trends in dispositional gratitude in adulthood.

The Breadth of Measurement Hypothesis

Just as previous work has failed to consider multiple perspectives on age, research is needed that assesses different manifestations of gratitude. In order to better understand age effects in gratitude, it is important to distinguish between a broader and narrower measurement of dispositional gratitude, such as general and domain-specific gratitude. The breadth of measurement is important with respect to the assessment of contextualized personality constructs, as broader constructs are typically less contextualized (Heller, Watson, Komar, Min, & Perunovic, 2007; Roberts, 2007; Roberts & Pomerantz, 2004). Only assessing constructs at a broad level may fail to capture the nuance present when evaluating specific life contexts. For example, when broad constructs are measured, narrower facets that are correlated with criteria in the opposite directions may cancel each other out and mitigate the correlation with the criterion (Paunonen, 1998). In addition, the narrow personality characteristics associated with a broader personality trait have been shown to be negatively correlated, positively correlated, or not correlated at all with an outcome

variable (D. Wood, Nye, & Saucier, 2010), a point that would be obscured by looking at the trait only at the broader level.

The appropriate breadth of measurement is also important from a developmental perspective, as it may moderate age trends. For example, research has begun to investigate how age differences in the broad Big Five traits coincide with age differences in narrower traits, or facet traits, that compose those domains (Jackson et al., 2009; Terracciano, McCrae, Brant, & Costa, 2005). Indeed, a recent study found that related but distinguishable facet traits within each broad trait domain show distinct age trends (Soto, John, Gosling, & Potter, 2011).

These examples point to the need of including both broad and narrow measures of gratitude. If domain-specific gratitude shows identical or nearly identical chronological age trends, then a more generalized measure of gratitude would be sufficient to capture all of the important information about age differences in gratitude. If, however, domain-specific gratitude shows different age trends, then research is needed at the narrow level to achieve a full understanding of gratitude across adulthood. As such, we tested the hypothesis that age effects in dispositional gratitude are more domain specific than general in nature.

Interpersonal and Instrumental Domains

In order to better understand age effects in domain-specific gratitude, a variety of areas such as relationships and health can be distinguished. A few previous studies have focused on identifying different areas in which gratitude is expressed and demonstrating in which areas people express the most gratitude (e.g., Moore, 1996; Teigen, 1997); however, none have tested age differences in these domains. In the current research, we made a distinction between interpersonal and instrumental domains as two broad categories of everyday functioning (cf. Blanchard-Fields, Mienaltowski, & Seay, 2007). The interpersonal domain refers to relationships such as romantic relationships, family, and friends, whereas the instrumental domain refers to areas such as health, job, and financial situations.

Gratitude with respect to these two broad domains may change differentially across adulthood. As people move through adulthood, they are exposed to age-related changes in the interpersonal domain ranging from establishing new social roles in early adulthood to maintaining them in middle adulthood and preventing losses in old age (cf. Hutteman, Hennecke, Orth, Reitz, & Specht, 2014). For example, social roles such as being a spouse or parent systematically change across the adult years (Helson & Soto, 2005), and investments in meaningful social relationships increase with age (Charles & Carstensen, 2010). Despite changes in the structure of the interpersonal domain, the importance of relationships may be relatively constant in adulthood, as relationships reflect important social resources. People are typically interested in positive interactions with other people, giving and receiving affection,

caring for others, and maintaining the feeling of belonging (Baumeister & Leary, 1995). Indeed, recent studies demonstrate the important role of gratitude across different social relationships (Algoe et al., 2008; Gordon et al., 2012; Lambert, Clark, Durtschi, Fincham, & Graham, 2010). We thus assumed that adults are grateful with respect to the interpersonal domain irrespective of their given age.

The instrumental domain, though, may show more changes across adulthood because it seems to become more important with increasing age. For example, old age is characterized by declines in cognitive and physiological functioning and ultimately physical health (Hofer & Alwin, 2008). Having good health would become more important as health problems increase, as is the case in old age. Occupational life is also subject to change, which entails transitions in employment in coordination with changing family responsibilities and later the experience of retiring (Hutteman et al., 2014). These work-related changes also might influence subjective appraisals in other life domains, such as finances (Lachman, 2004). It is possible that younger adults are more prone to view good health or a higher socioeconomic status as given than older adults. Therefore, we expected older adults to be more grateful in the instrumental domain than younger adults.

Overview of the Current Research

The overarching goal of this work was to test hypotheses about the link between age and dispositional gratitude from early adulthood to old age. Specifically, we extended the literature by considering multiple approaches toward studying both age and gratitude. In Study 1, we tested the subjective aging hypothesis that age effects in gratitude are more likely to occur for FTP than chronological age, and the mediation hypothesis that FTP explains the association between age and gratitude. In Study 2, we tested the breadth of measurement hypothesis that chronological age effects in gratitude are more domain specific than general in nature, and that they are more likely to occur in instrumental than interpersonal life domains. Moreover, we explored the FTP effects on gratitude with respect to the two domains. The main objective of Study 3 was to replicate and cross-evaluate the results using a larger sample.

STUDY 1

The primary objective of Study 1 was to examine (a) whether general gratitude varies with respect to age and FTP, and (b) whether FTP mediates the association between age and gratitude. Study 1 focused on the FTP dimension of remaining opportunities.

Method
Participants and Procedure. Three hundred thirty-six participants ranging in age from 21 to 94 ($M = 63.1$ years,

$SD = 14.5$) participated in a survey. Eight participants did not indicate their age and thus were excluded from the analyses, resulting in a final sample of $N = 328$ (50.3% women). Only 7.6% were younger than 41 years, 34.1% were between 41 and 60, and 58.2% were older than 60 years. With respect to educational attainment, 4% had a basic education (primary and secondary school), 38.8% had a high school education or equivalent (e.g., vocational school), 23.3% completed a degree from a technical school, and 33.8% had a university degree or equivalent.

The sampling procedure included a random selection of 1,600 addresses from people who are registered at a public social aid service ("Caritas") in Switzerland and who speak German. These people received a study description, information about protection of data privacy, a survey questionnaire, and a postage-paid business reply envelope for mailing the material back to the researchers. The response rate was 21%. All participants were unpaid volunteers.

Measures
General Gratitude. The Gratitude Questionnaire-6 (GQ-6; McCullough et al., 2002) was used to assess general gratitude. Participants rated their level of agreement with six items using a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Sample items include "I have so much in life to be thankful for" and "I am grateful for a wide variety of people." The alpha reliability for the GQ-6 was .65.

Future Time Perspective. Three items from the Future Time Perspective Scale (FTPS; Lang & Carstensen, 2002) were used to assess FTP (cf. Zacher & Frese, 2009). The items were "I feel that many opportunities await me in the future," "I expect that I will set many new goals in the future," and "My future is filled with possibilities." These three items reflect individual differences in perceived remaining opportunities. Participants rated their level of agreement with the items using a 7-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher scores indicate that the individual views his or her future as open ended and with greater remaining opportunities. The alpha reliability was .93.

Analytic Strategy. To perform a simple mediation analysis, we used ordered least square (OLS) regressions by means of the SPSS macro PROCESS (Hayes, 2013). To test mediating effects, two conditions must be met to establish mediation (Hayes, 2013; Rucker, Preacher, Tormala, & Petty, 2011): (a) The independent variable (age) is significantly related to the mediator (FTP), and (b) the mediator is significantly related to the dependent variable (gratitude). This approach does not require a significant association between the independent and dependent variables as a necessary condition for testing mediation (see Hayes, 2013, pp. 166–170, for details; Rucker et al., 2011). In other words, mediation can be tested even if age is unrelated to gratitude. In this type of mediation model, we

estimated three direct effects (*a*, *b*, *c*′), one indirect (mediating) effect (*ab*), and a total effect (*c*). As previous research suggests that women tend to be more grateful than men (e.g., Kashdan et al., 2009), we controlled for potential gender effects. We used bootstrapping with 5,000 samples to test the significance of the indirect effect (Preacher & Hayes, 2008), and we report asymmetric percentile bootstrap 95% confidence intervals (CIs). An effect is statistically significant if its CI does not include zero.

Results and Discussion

The means and standard deviations of FTP and gratitude were $M = 3.80$, $SD = 1.44$ and $M = 5.78$, $SD = 0.68$, respectively. Consistent with previous research (Lang & Carstensen, 2002; Zacher & Frese, 2009), age was strongly related to FTP ($r = -.60$, $p < .01$). However, age was virtually unrelated to gratitude ($r = -.05$).[1] In support of our hypothesis, FTP and gratitude were related ($r = .26$, $p < .01$). This suggests that those participants who view their future with greater opportunities are more grateful than those with fewer opportunities.

According to the mediation analysis, age was indirectly related to gratitude through its effect on FTP. As can be seen from Figure 1, older adults viewed their future with fewer opportunities than younger adults ($a = -.062$, $SE = .005$, $p < .01$), and those with greater opportunities were more grateful than those with fewer opportunities ($b = .195$, $SE = .031$, $p < .01$). The significant indirect effect supported our hypothesis that FTP mediates the association between age and gratitude ($ab = -.012$, $SE = .002$, $p < .01$). The bias-corrected 95% CI for the indirect effect was below zero [$-.017$, $-.008$]. While the univariate analysis evidenced virtually no age effects on gratitude, the multivariate analysis suggested that age is significantly related to gratitude (c′ $= .011$, $SE = .003$, $p < .01$). However, the total effect was very small and nonsignificant ($c = -.001$, $SE = .003$, $p > .10$) because the direct effect of age on gratitude was opposite in sign to the indirect effect, and thus they have canceled each other out. This result reflects an inconsistent mediation (MacKinnon, Fairchild, & Fritz, 2007). In

this case, the mediator (FTP) acts like a suppressor. This might be one reason why previous studies did not find age effects in gratitude. However, a significant limitation of our study was the unequal age distribution, as only 7.6% of participants were younger than 41 years.

Summary. Preliminary evidence from Study 1 supports the subjective aging hypothesis. That is, age effects in general gratitude occurred in terms of perceived remaining opportunities, whereas only an indirect effect of chronological age was found. In other words, older adults potentially report lower levels of gratitude because they tend to perceive fewer remaining opportunities in their future as compared to younger adults. But controlling for remaining time suggests a positive association between age and gratitude.

STUDY 2

The primary objective of Study 2 was to replicate and extend these findings by examining (a) whether chronological age effects in gratitude are more domain specific than general in nature and (b) whether they might be more likely to occur in instrumental than interpersonal domains. To better understand the findings from Study 1 with respect to the subjective aging hypothesis, we additionally included the FTP dimension of perceived remaining time, as Study 1 focused on perceived remaining opportunities. Therefore, we examined (c) the mediating role of the two FTP dimensions for the association between age and gratitude. Finally, we also explored the associations between FTP and general and domain-specific dispositional gratitude, as well as between FTP and gratitude in the interpersonal and instrumental domains; however, we do not have specific hypotheses, as these analyses were exploratory.

Method

Participants and Procedure. Four hundred fifty-one participants ranging in age from 20 to 83 years ($M = 52.3$, $SD = 16.9$) participated in a large-scale survey. One participant did not

indirect effect: $ab = -.012$*

Age → Future time perspective: $a = -.062$*
Future time perspective → General gratitude: $b = .195$*
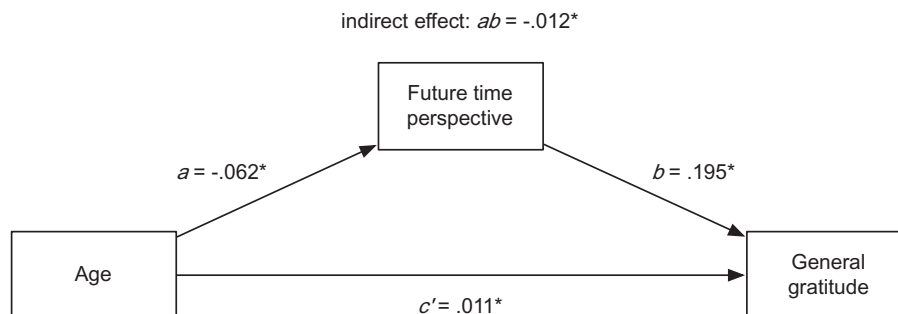Age → General gratitude: c′ $= .011$*

Figure 1 Future time perspective (i.e., remaining opportunities) mediates the association between age and general gratitude (GQ-6), controlled for gender effects (Study 1); unstandardized estimates. *$p < .01$.

indicate age and thus was excluded from the analyses, resulting in a final sample of $N = 450$ (56.7% women). With respect to the frequency distribution of the ages, 28.9% were younger than 41 years, 34.2% were between 41 and 60, and 36.9% were older than 60 years. With respect to educational attainment, 7.8% reported having a basic education (primary and secondary school) as the highest level of education, 44.5% had a high school education or equivalent (e.g., vocational school), 24.9% completed a degree from a technical school, and 22.7% had a university degree or equivalent. Regarding marital status, 32.4% of participants were single, 48.2% were married, 12.3% were either separated or divorced, and 7.1% were widowed.

The sampling procedure included a random selection of 1,800 addresses accomplished by the registration office of the city of Zurich. Parts of the large-scale survey were items on gratitude and FTP. After sending the questionnaires to potential participants, the procedure included the deletion of postal addresses due to the protection of privacy. Thus, we were not able to send reminder mail. The response rate was 25%. All participants were unpaid volunteers (see Steiner, Allemand, & McCullough, 2011, for more details).

Measures

General and Domain-Specific Gratitude. The GQ-6 (see Study 1) was used to assess general gratitude. Participants rated their level of agreement with the items using a 6-point Likert-type scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). The alpha reliability was .67. To assess domain-specific gratitude, we selected seven specific areas that can be collapsed into two broad categories: interpersonal (romantic relationship, family, and friends and acquaintances) and instrumental (health, job situation [work/training], financial situation, and housing situation). Participants were asked how frequently they are grateful in general with respect to each specific domain using a 4-point Likert-type scale ranging from 0 (*never*) to 3 (*often*). They also rated how strongly or how intensely they generally experience gratitude with respect to each specific domain using a 4-point Likert-type scale ranging from 0 (*very weakly*) to 3 (*very strongly/intensely*). The alpha reliabilities were .72 (interpersonal) and .81 (instrumental). Because frequency and intensity were strongly related to each other across domains ($rs = .58$ to .70, $ps < .01$), we used the average of the two indicators as a manifest indicator per domain.

Future Time Perspective. The first three items from the FTPS (Lang & Carstensen, 2002) were used to measure perceived remaining opportunities (see Study 1). Remaining time was also measured with three items from the FTPS (cf. Zacher & Frese, 2009). The items were "Most of my life lies ahead of me," "My future seems infinite to me," and "As I get older, I begin to experience time in my future as limited" (reverse coded). Participants rated their level of agreement with the items using a 5-point Likert-type scale ranging from 1

(*strongly disagree*) to 5 (*strongly agree*). Higher scores indicate that the individual views his or her future as open ended and with greater remaining opportunities and more remaining time. The alpha reliabilities were .94 (opportunities) and .71 (time).

Analytic Strategy

Preliminary Analyses. We tested our hypotheses within a structural equation modeling (SEM) framework and performed two sets of preliminary analyses as prerequisites for the main analyses. First, using confirmatory factor analysis (CFA), we tested the factor structure of FTP by comparing a two-factor measurement model, in which the FTPS items were specified to load on two separate but correlated factors (opportunities and time), with a one-factor model, in which all items were specified to load on a single factor. Similarly, we tested the proposed two-factor structure of domain-specific gratitude (interpersonal and instrumental) in comparison to a one-factor model.

Second, we determined whether the measures of general and domain-specific gratitude were invariant across age. We took advantage of the multiple indicators, multiple causes (MIMIC; Muthén, 1989) modeling approach and used a stepwise procedure as suggested by Brown (2006, pp. 304–316). In the first step, we estimated a CFA one-factor measurement model for the latent construct gratitude using the six items of the GQ-6 as manifest indicators (Model 1). If needed, the measurement model was revised to improve the model fit by freely estimating residual covariances between pairs of items that are reverse worded or very similarly worded (Model 1+). In the second step, we added age as a covariate to the model without allowing for direct effects to the manifest indicators (Model 2). That is, the paths from age to the indicators were constrained to be zero, assuming that there are no direct effects. A significant effect of age on gratitude implies that the latent factor means are different at different levels of the covariate. In the third step, we added direct paths from the covariate (age) to the indicators with the highest modification indices to examine its direct effects on the selected indicators (Model 3). A significant direct effect of the covariate on a manifest indicator of a latent factor indicates that the indicator is non-invariant and shows differential item functioning (DIF). That is, when the latent factor is held constant, the means of the indicator are different at different levels of the covariate (Brown, 2006). In an additional step, we rerun the same set of analyses for domain-specific gratitude after testing for its factor structure by means of a CFA.

As a measurement invariance method, MIMIC is advantageous compared with multiple-group CFA analysis in that it preserves the continuous nature of the covariate age instead of dividing it into age groups (Brown, 2006). This approach allows for explicitly including non-invariant items without excluding them for subsequent analyses. However, MIMIC analysis only allows for testing the invariance of indicator intercepts and factor means (Brown, 2006).

Latent Associations. We examined the associations between age, remaining opportunities and time, and general and domain-specific dispositional gratitude at the latent level. To do so, we estimated a structural model including three latent factors (general gratitude, opportunities, and time) and age as a manifest variable (Model 4). In a second step, we also estimated a structural model that included domain-specific gratitude.

Mediation Tests. We tested whether FTP (opportunities and time) mediates the association between age and general gratitude by means of latent variable mediation analyses (MacKinnon, 2008). In this type of mediation model (Model 5), we estimated five direct effects (a_1, a_2, b_1, b_2, c'), two indirect (mediating) effects (a_1b_1, a_2b_2,), a total effect (c), and a total indirect effect, and controlled for potential gender effects. We used bootstrapping with 5,000 samples to test the significance of the indirect effect (Preacher & Hayes, 2008), and we report bias-corrected bootstrap 95% CIs.

All analyses were performed using maximum likelihood (ML) estimation with Mplus 6 (Muthén & Muthén, 1998–2012). To assess goodness of fit of the models, we examined the chi-square (χ^2), comparative fit index (CFI), standardized root mean square residual (SRMR), and root mean square error of approximation (RMSEA) statistics. Hu and Bentler (1998) noted that SRMR is less sensitive to distribution and sample size and recommended its use in combination with CFI when using ML estimation. CFI values greater than .95, SRMR values less than .05, and RMSEA values less than .06 are typically considered to indicate that a SEM model is adequately parameterized, although values as low as .90 and as high as .10, respectively, are acceptable (Hu & Bentler, 1998).

Results and Discussion

Descriptive statistics and zero-order correlations are presented in Table 1. The results suggest slightly higher gratitude scores

in the interpersonal domain as compared to the instrumental domain ($d = 0.18$). We first tested the proposed two-factor model of FTP (opportunities and time) using CFA. The two-factor model had a good fit, $\chi^2(8) = 11.68$, $p > .01$, CFI = .998, SRMR = .020, RMSEA = .032. The items had standardized loadings of .93, .92, and .89 for remaining opportunities and .83, .69, and .48 for time. The one-factor model did not fit the data well, $\chi^2(9) = 117.62$, $p < .01$, CFI = .933, SRMR = .071, RMSEA = .164. A comparison of the models showed that the two-factor model fit the data significantly better, $\Delta\chi^2 = 105.94$, $\Delta df = 1$, $p < .01$. These results supported the view of FTP as having two separate, albeit correlated dimensions. The latent correlation between the two factors was $r = .73$, $p < .01$.

Age, FTP, and General Gratitude. We first estimated a series of models as specified in the Analytic Strategy section to investigate measurement invariance of the GQ-6 across age (Table 2, Models 1–3). The results of the MIMIC analysis suggested that item 3 ("When I look at the world, I don't see much to be grateful for"), item 4 ("I am grateful to a wide variety of people"), and item 5 ("As I get older I find myself more able to appreciate the people, events, and situations that have been part of my life history") could be directly predicted by age and thus show DIF. The direct age effects on items 3, 4, and 5 were βs = −.21, .15, and .16, all ps < .01, indicating that they behave differently at the intercept level for different ages. Therefore, we controlled for these DIF effects in all subsequent analyses by explicitly including these direct age effects in the models (cf. Brown, 2006).

Latent Associations. Based on the findings from the MIMIC analysis, we estimated a structural model that consisted of age and three latent factors (opportunities and time, general gratitude), presented as Model 4 in Table 2. Age was negatively related to perceived remaining opportunities ($r = −.56$, $p < .01$) and time ($r = −.72$, $p < .01$). While gratitude was virtually unrelated to age ($r = −.01$), it was positively associated with remaining opportunities ($r = .34$, $p < .01$) and

Table 1 Studies 2 and 3: Descriptive Statistics and Correlations Among Study Variables

Variable	Study 2						Study 3					
	1	2	3	4	5	6	1	2	3	4	5	6
1. Age	—						—					
2. Remaining opportunities (FTPS)	−.54**	—					−.61**	—				
3. Remaining time (FTPS)	−.56**	.59**	—				−.61**	.62**	—			
4. General gratitude (GQ-6)	−.01	.30**	.10*	—			−.03	.26**	.11**	—		
5. Gratitude in interpersonal domain	.09	.13**	.10*	.48**	—		.03	.15**	.11**	.49**	—	
6. Gratitude in instrumental domain	.33**	.03	−.11*	.45**	.39**	—	.29**	.05	−.05	.37**	.44**	—
Potential range	20–83	1–5	1–5	1–6	0–3	0–3	19–84	1–5	1–5	1–6	0–3	0–3
M	52.26	3.31	2.55	4.60	2.31	2.22	52.40	3.46	2.57	4.66	2.31	2.25
SD	16.88	1.06	0.95	0.78	0.50	0.51	17.65	1.01	0.97	0.75	0.49	0.50

Note. Study 2: $N = 450$; Study 3: $N = 958$. FTPS = Future Time Perspective Scale; GQ-6 = Gratitude Questionnaire-6.
*$p < .05$. **$p < .01$.

Table 2 Studies 2 and 3: Fit Indices for Measurement, Structural, and Mediation Models Including General Gratitude

Model	Study 2					Study 3				
	χ^2	df	CFI	SRMR	RMSEA	χ^2	df	CFI	SRMR	RMSEA
Model 1: MIMIC (Step 1)	85.28**	9	.880	.070	.138	158.23**	9	.898	.060	.132
Model 1+: Revised model	19.27	7	.981	.031	.063	47.40**	7	.972	.032	.078
Model 2: MIMIC (Step 2)	62.64**	12	.925	.060	.097	127.01**	12	.925	.057	.100
Model 3: MIMIC (Step 3)	17.99*	9	.987	.025	.047	44.39**	9	.977	.025	.064
Model 4: Structural model	122.48**	55	.975	.038	.052	207.95**	55	.975	.034	.054
Model 5: Mediation model	145.87**	64	.970	.039	.053	234.56**	64	.973	.034	.053

Note. χ^2 = chi-square; *df* = degrees of freedom; CFI = comparative fit index; SRMR = standardized root mean square residual; RMSEA = root mean square error of approximation; Model 1 = CFA one-factor measurement model of general gratitude (GQ-6); Model 1+ = Model 1 plus freely estimated residual covariances between GQ-6 item pairs 3 and 6 (reversed worded) and 4 and 5; Model 2 = Model 1+ plus age as covariate without allowing for direct age effects on the manifest indicators; Model 3 = Model 1+ plus age as covariate with direct age effects on the GQ-6 items 3, 4, and 5; Model 4 = structural model; Model 5 = mediation model. The models are described in detail in the Analytic Strategy section.
*$p < .05$; **$p < .01$.

Table 3 Study 2: Test of Mediation Predicting General Gratitude From Age, With Remaining Opportunities and Time as Mediators

Effects	Unstandardized Estimate	SE	95% CI	Standardized Estimate
Direct effects				
Age → opportunities (a_1)	−.034	.002	[−.039, −.029]	−.559*
Age → time (a_2)	−.051	.003	[−.056, −.045]	−.729*
Opportunities → gratitude (b_1)	.369	.068	[.245, .510]	.499*
Time → gratitude (b_2)	.000	.066	[−.139, .116]	.000
Age → gratitude (c')	.013	.003	[.006, .020]	.284*
Specific indirect effect				
Age → opportunities → gratitude (a_1b_1)	−.013	.002	[−.018, −.008]	−.279*
Age → time → gratitude (a_2b_2)	.000	.003	[−.006, .007]	.000
Total effect				
Total: Age → gratitude (c)	.000	.002	[−.004, .004]	.005
Total indirect: Age → gratitude	−.013	.003	[−.018, −.007]	−.279*

Note. N = 450; asymmetric percentile 95% confidence intervals (CIs) were estimated for all effects using 5,000 bootstrap samples. An effect is statistically significant if its confidence interval does not include zero. We controlled for gender.
*$p < .01$.

time ($r = .13$, $p < .05$). That is, people who perceived greater remaining opportunities and time were also more grateful.

Mediation Tests. We tested remaining opportunities and time as mediators for the association between age and general gratitude, controlling for potential gender effects. Because the two mediators were interrelated, a residual covariance was freely estimated. The model demonstrated an acceptable fit (Table 2, Model 5). The estimates for direct, indirect, and total effects, as well as the 95% bootstrap CIs for all effects, appear in Table 3. All direct effects were substantial and significant ($p < .01$), except for the path from remaining time to gratitude. An examination of the indirect effects supported our hypothesis that FTP mediates the association between age and gratitude. The total indirect effect was significant, ($\beta = -.28$, $p < .01$, 95% CI [−.40, −.16], and was driven by remaining opportunities, $\beta = -.28$, $p < .01$, 95% CI [−.38, −.18]. Remaining time did not act as a significant mediator, $\beta = .00$, 95% CI [−.14, .14]. Similar to Study 1, the direct age effect on grati-

tude only appeared in the multivariate analysis. Including FTP in the regression increased the predictive validity of age.

Age, FTP, and Domain-Specific Gratitude. We first tested the proposed two-factor structure of domain-specific gratitude (interpersonal and instrumental) using CFA. The two-factor model had an acceptable fit (Table 4, Model 1). The items had standardized loadings of .45, .62, and .52 for the interpersonal domain and .58, .59, .68, and .52 for the instrumental domain. A one-factor model did not fit the data well (Table 4, Model 0). A comparison of the models showed that the two-factor model fit the data significantly better, $\Delta\chi^2 = 27.03$, $\Delta df = 1$, $p < .01$. The latent correlation between the two factors based on Model 1+ (see Table 4) was $r = .70$, $p < .01$.

We next tested whether the measure of domain-specific gratitude was invariant across age. The results of the MIMIC analysis (Table 4, Models 1–3) demonstrated that two specific instrumental areas (health and job) seemed to behave differently across age in terms of DIF. Allowing for direct age effects

Table 4 Studies 2 and 3: Fit Indices for Measurement and Structural Models Including Domain-Specific Gratitude

Model	Study 2					Study 3				
	χ^2	*df*	CFI	SRMR	RMSEA	χ^2	*df*	CFI	SRMR	RMSEA
Model 0: One-factor model	59.47**	14	.896	.049	.086	107.04**	14	.911	.044	.084
Model 1: MIMIC (Step 1)	32.44**	13	.955	.035	.058	53.15**	13	.962	.029	.057
Model 1+: Revised model	22.60*	12	.976	.029	.045	36.91**	12	.976	.024	.047
Model 2: MIMIC (Step 2)	54.89**	17	.925	.043	.071	116.41**	17	.918	.041	.079
Model 3: MIMIC (Step 3)	31.33**	15	.968	.031	.050	60.96**	15	.962	.028	.057
Model 4: Structural model	136.65**	65	.971	.044	.049	223.49**	65	.973	.039	.050

Note. χ^2 = chi-square; *df* = degrees of freedom; CFI = comparative fit index; SRMR = standardized root mean square residual; RMSEA = root mean square error of approximation; Model 0 = CFA one-factor measurement model of domain-specific gratitude; Model 1 = CFA two-factor measurement model of domain-specific gratitude (interpersonal and instrumental); Model 1+ = Model 1 plus freely estimated residual covariance between the financial and housing situations; Model 2 = Model 1+ plus age as covariate without allowing for direct age effects on the manifest indicators; Model 3 = Model 1+ plus age as covariate with direct age effects on health and job situation; Model 4 = structural model. The models are described in detail in the Analytic Strategy section.
*p < .05. **p < .01.

on health and job (βs = −.22 and −.27, all *p*s < .01) improved the model fit considerably (Model 3). We thus controlled for these DIF effects in all subsequent analyses.

Latent Associations. The results of the structural model (Table 4, Model 4) indicated that age is unrelated to gratitude in the interpersonal domain (r = .08, p > .10) but strongly associated with the instrumental domain (r = .55, p < .01). This suggests that older adults are more grateful with respect to the instrumental domain than younger adults. Remaining opportunities was related to gratitude in the interpersonal domain (r = .22, p < .01) but was virtually unrelated to gratitude in the instrumental domain (r = −.05). The opposite pattern was found for remaining time: It was not significantly related to the interpersonal domain (r = .10, p > .10) but was negatively associated with the instrumental domain (r = −.33, p < .01). These results suggest that people who perceived greater opportunities in their future time were on average more grateful for their relationships than those with fewer opportunities. People with more remaining time tended to be less grateful with respect to the instrumental domain.[2]

Summary. The results from Study 2 replicated the finding that age effects in general gratitude are more likely to occur for FTP than chronological age. The results suggested that both dimensions of FTP are related to general gratitude, indicating that people who view their future time as open ended in terms of remaining opportunities and time tend to be more grateful. However, only remaining opportunities mediated the association between age and general gratitude. It thus appears that an explanation for why older adults reported less gratitude is that they tend to perceive fewer remaining opportunities compared to younger adults. The results from Study 2 also support our breadth of measurement hypothesis, suggesting that chronological age effects are more domain specific than general in nature, and are particularly evident for the instrumental domain.

STUDY 3

The primary objective of Study 3 was to replicate and cross-evaluate these findings using a larger sample, again with a multidimensional measure of FTP.

Method

Participants and Procedure. Nine hundred sixty-two participants ranging in age from 19 to 84 years (M = 52.4, SD = 17.7) participated in a large-scale survey. Four participants did not indicate their age and thus were excluded from the analyses, resulting in a final N = 958 (57.3% women). With respect to the frequency distribution of the ages, 30.5% were younger than 41 years, 31.3% were between 41 and 60, and 38.2% were older than 60 years. With respect to educational attainment, 7.0% reported having a basic education (primary and secondary school) as the highest level of education, 39.7% reported a high school education or equivalent, 24.4% completed a degree from a technical school, and 28.9% had a university degree or equivalent. Regarding marital status, 35.3% of participants were single, 45.8% were married, 12.5% were either separated or divorced, and 6.5% were widowed.

The sampling procedure included a random selection of 4,026 addresses accomplished by the registration office of the city of Zurich. As in Study 2, we were not able to remind potential participants to fill out the questionnaires due to protection of privacy. The response rate of 24% is respectable, particularly given that all participants were unpaid volunteers (see Steiner, Allemand, & McCullough, 2012, for more details).[3]

Measures and Analytic Strategy. The same measures and the same analytic strategy from Study 2 were used. The alpha reliabilities were .68 (GQ-6), .74 (domain-specific gratitude: interpersonal), .81 (domain-specific gratitude: instrumental), .94 (FTPS: opportunities), and .72 (FTPS: time).

Results and Discussion

Descriptive statistics and zero-order correlations are presented in Table 1. Similar to Study 2, we found slightly higher gratitude scores in the interpersonal domain as compared to the instrumental domain ($d = 0.12$). A CFA supported the distinction into two domains of FTP, $\chi^2(8) = 41.67$, $p < .01$, CFI = .991, SRMR = .024, RMSEA = .066. The items had standardized loadings of .93, .89, and .92 for remaining opportunities and .88, .73, and .42 for remaining time. The one-factor model did not fit the data well, $\chi^2(9) = 279.53$, $p < .01$, CFI = .927, SRMR = .067, RMSEA = .177. A comparison of the two models showed that the two-factor model fit the data significantly better, $\Delta\chi^2 = 237.86$, $\Delta df = 1$, $p < .01$. The latent correlation between the two factors of FTP was $r = .77$, $p < .01$.

Age, FTP, and General Gratitude. The results of the MIMIC analysis (Table 2, Models 1–3) suggested that the GQ-6 items 3, 4, and 5 (see Study 2) could be directly predicted by age. The direct age effects on these items were βs = −.20, .11, and .18, all ps < .01, indicating that they behave differently at the intercept level for different ages. We controlled for these DIF effects in the following main analyses.

 Latent Associations. The results (Table 2, Model 4) suggest that age was negatively related to remaining opportunities ($r = −.63$, $p < .01$) and time ($r = −.78$, $p < .01$). While gratitude was virtually unrelated to age ($r = −.04$), it was positively associated with remaining opportunities ($r = .32$, $p < .01$) and time ($r = .15$, $p < .01$). People with greater perceived remaining opportunities and more remaining time tended to be more grateful.

 Mediation Tests. The mediation model showed an acceptable model fit (Table 2, Model 5). The estimates for direct, indirect, and total effects, as well as the 95% bootstrap CIs for all effects appear in Table 5. All direct effects were substantial and significant ($p < .01$), except for the path from remaining time to gratitude. The results supported the mediating role of FTP. The total indirect effect was significant, $\beta = −.33$, $p < .01$, 95% CI [−.42, −.24]. In replication of Study 2, the current results showed that the indirect effect was driven by remaining opportunities, $\beta = −.32$, $p < .01$, 95% CI [−.39, −.25], whereas time was not a significant mediator, $\beta = −.01$, 95% CI [−.11, .09]. Similar to the results from Studies 1 and 2, the direct age effect on gratitude only appeared in the multivariate analysis.

Age, FTP, and Domain-Specific Gratitude. The two-factor model of domain-specific gratitude (interpersonal and instrumental) demonstrated an acceptable model fit (Table 4, Model 1). The items had standardized loadings of .48, .56, and .58 for the interpersonal domain and .64, .59, .65, and .56 for the instrumental domain. The one-factor model did not fit the data well (Table 4, Model 0). A comparison of the two models showed that the two-factor model fit the data significantly better, $\Delta\chi^2 = 53.89$, $\Delta df = 1$, $p < .01$. The latent correlation between the two factors based on Model 1+ (see Table 4) was $r = .74$, $p < .01$.

The MIMIC analysis for domain-specific gratitude (Table 4, Models 1–3) suggested direct age effects on health and job, βs = −.17 and −.29, all ps < .01. These results show DIF for these two items. We thus controlled for these effects in the subsequent analyses.

 Latent Associations. Table 4 (Model 4) shows the model fit for a structural model that consisted of age and four latent factors (opportunities and time, interpersonal and instrumental). Age was virtually unrelated to latent gratitude in the interpersonal domain ($r = .02$), but significantly related to gratitude in the instrumental domain ($r = .50$, $p < .01$). Remaining opportunities were strongly associated with gratitude in the interpersonal domain ($r = .24$, $p < .01$) but not in

Table 5 Study 3: Test of Mediation Predicting General Gratitude From Age, With Remaining Opportunities and Time as Mediators

Effects	Unstandardized Estimate	SE	95% CI	Standardized Estimate
Direct effects				
Age → opportunities (a_1)	−.036	.001	[−.039, −.033]	−.646*
Age → time (a_2)	−.056	.002	[−.059, −.052]	−.784*
Opportunities → gratitude (b_1)	.356	.042	[.278, .442]	.495*
Time → gratitude (b_2)	.008	.038	[−.065, .082]	.013
Age → gratitude (c')	.012	.002	[.008, .017]	.308*
Specific indirect effect				
Age → opportunities → gratitude (a_1b_1)	−.013	.002	[−.016, −.010]	−.320*
Age → time → gratitude (a_2b_2)	.000	.002	[−.005, .004]	−.011
Total effect				
Total: Age → gratitude (c)	−.001	.001	[−.004, .002]	−.022
Total indirect: Age → gratitude	−.013	.002	[−.018, −.009]	−.330*

Note. $N = 958$; asymmetric percentile 95% confidence intervals (CIs) were estimated for all effects using 5,000 bootstrap samples. An effect is statistically significant if its confidence interval does not include zero. We controlled for gender.
*$p < .01$.

the instrumental domain ($r = -.04$). Remaining time was related to both domains (interpersonal: $r = .12$, $p < .01$; instrumental: $r = -.27$, $p < .01$).

Summary. The results from Study 3 replicated the findings from the two other studies. We found evidence for the subjective aging hypothesis, suggesting that age effects in general gratitude are more likely to occur for FTP than chronological age. Moreover, the results demonstrated that, specifically, remaining opportunities mediate the association between age and general gratitude. We also found evidence for the breadth of measurement hypothesis, suggesting that chronological age effects are more domain specific than general in nature. Age effects were particularly evident for the instrumental domain.

GENERAL DISCUSSION

The scientific understanding of age differences in gratitude in adulthood is in its infancy. This article makes multiple important contributions to our knowledge of cross-sectional age trends in dispositional gratitude from early adulthood to old age. First, in support of our *subjective aging hypothesis*, we found evidence for age effects in gratitude with respect to perceived FTP, whereas chronological age was unrelated to general gratitude. Second, our results suggest that the link between age and gratitude might be explained by perceived FTP, notably with regard to remaining opportunities. As such, the current results indicate age effects depending on the conceptualization of age. Third, in support of our *breadth of measurement hypothesis*, we found that chronological age effects in gratitude were domain specific rather than general and thus demonstrated the importance of the distinction between broader and narrower conceptualizations of gratitude. We discuss these primary and other findings in greater detail below.

On the one hand, our findings suggest that general gratitude does not vary with respect to chronological age. These results are consistent with the few existing studies (Kashdan et al., 2009; Wood et al., 2008) and are largely consistent with cross-sectional and longitudinal research on positive affective experiences across adulthood (Charles et al., 2001; Mroczek & Kolarz, 1998). On the other hand, we found evidence for age effects using a more subjective conceptualization of age. People who perceived their future time as open ended reported higher levels of gratitude compared to people who perceived their time as limited. These results are consistent with recent work suggesting that perceptions of open-ended or expansive time are associated with higher levels of well-being (Allemand et al., 2012; Demeyer & De Raedt, 2014; Hicks et al., 2012). If gratitude reflects an orientation toward noticing and appreciating the positive in the world (A. M. Wood et al., 2010), people may be more likely to do so when they perceive greater opportunities for future experiences.

Our findings seem to be in contrast with the results of a recent experimental study showing that reflecting on death in a specific and vivid manner significantly enhanced the momentary feelings of gratitude in comparison to participants who did not think about their own mortality (Frias, Watkins, Webber, & Froh, 2011). However, the two studies differed in several ways. First, although the process of appreciating life as a limited resource in response to a death reflection may increase gratitude as a temporary emotional state, it may not necessarily be related to dispositional gratitude. Second, unlike the Frias et al. (2011) study, we were not asking participants to reflect upon the fact that they believe they have a limited life perspective. This reflection process likely leads individuals to better realize what they have, and be grateful for it, instead of assessing FTP as an individual difference. Indeed, Frias et al. (2011) and King, Hicks, and Abdelkhalik (2009) explicitly note the importance of reflection as a process. Third, it is worth noting that Frias et al. (2011) only found evidence that gratitude increased in the death reflection condition, but not in the mortality salience condition. This work, along with our own, points to the need for future research that disentangles these seemingly similar variables (i.e., mortality salience, death reflection, and FTP) that lead to very different effects. Similarly, further work is needed to clarify the differences between using individual difference and priming methods.

We also found evidence that FTP mediated the link between age and gratitude, suggesting that aging is negatively related to an open-ended FTP with greater perceived remaining opportunities, whereas the latter is positively related to gratitude. The current results are consistent with recent work demonstrating the potential of FTP as a connecting link between chronological age and dependent variables such as work-related growth and esteem motivations (Kooij et al., 2013). The consideration of perceived remaining opportunities increased the predictive validity of chronological age. Put differently, after controlling for the effect of FTP, the results demonstrated positive age effects for chronological age. We evidenced this pattern of "inconsistent" mediation in three studies. Such a pattern may occur when at least one mediated effect has a different sign than other mediated or direct effects (MacKinnon et al., 2007). Then it could be that the association between the independent and dependent variables is not significant but there is still mediation. In our case, FTP acted like a suppressor variable that concealed the total effect of age on gratitude. The current results are of theoretical and practical importance, as an omission of suppressors will lead to either an underestimation or an overestimation of the effect of an independent variable on the dependent variable, thereby either reducing or artificially inflating the magnitude of the relationship between two variables. These results have implications for research beyond the field of gratitude. Consider research on personality development. It is possible that chronological age effects on personality traits such as the Big Five may be larger or weaker after controlling for the effects of FTP. This is an interesting avenue for future research.

Furthermore, our findings support the distinction between perceived remaining opportunities and time (e.g., Cate & John,

2007; Zacher & Frese, 2009). Although an open-ended FTP with respect to both dimensions was positively related to general gratitude, the multivariate results clearly demonstrated that only remaining opportunities mediated the link between age and general gratitude, and remaining time did not relate to gratitude. Gratitude is typically shown in response to positive experiences and outcomes (McCullough et al., 2002), and as such, it may be particularly evident when the future is perceived as full of opportunities that one can still pursue in the remaining lifetime.

Regarding the breadth of measurement hypothesis, chronological age effects were particularly evident in the instrumental domain, whereas no age effects were found for the interpersonal domain. These age effects in the instrumental domain are notable because later parts of adulthood are usually characterized by an accumulation of problems and losses within different areas (e.g., health, functional ability, and social network) and a relative decrease of gains (Freund & Baltes, 1998). As such, people appear to become more grateful for those things that they are becoming more likely to have problems with or lose. Likewise, people who tended to view their future in terms of time limits, restrictions, and boundaries were more grateful for instrumental areas of life. In contrast, the FTP dimension of remaining opportunities was positively associated with gratitude in the interpersonal domain. Put differently, people who tended to view their future as full of opportunities reported higher levels of gratitude regarding social relationships. This result is consistent with the main finding of the current research suggesting that the FTP dimension of remaining opportunities is particularly associated with general gratitude. To conclude, the present results clearly emphasize the importance of taking the breadth of measurement (i.e., broader and narrower measurement) into account when considering age trends in dispositional constructs such as traits (Heller et al., 2007; Roberts, 2007; Roberts & Pomerantz, 2004) or affective experiences (Rosenberg, 1998). Very little is known about age trends in contextualized traits. As such, this work provides a potential avenue for future research.

Some limitations of the current research have to be noted. First, the cross-sectional design of the studies demands caution in the interpretation of the data. However, as previously noted, our results with respect to age effects in general gratitude are comparable to the findings of previous cross-sectional and longitudinal studies on age trends in positive affective traits and experiences (Charles & Carstensen, 2010; Mroczek & Kolarz, 1998). Second, findings of the current research were based on self-reports, leaving open the possibility that participants responded on the basis of what would be socially desirable. Consequently, future developmental studies on gratitude might enrich self-report data with observer reports by close informants (e.g., friends, family members) and behavioral measures.

Third, the orders of the questionnaires in all studies were not random and thus might have produced some priming effects. In most cases, the gratitude questionnaires were administered before the FTPS. Fourth, the GQ-6 evidenced somewhat lower reliabilities than the original validation studies (McCullough et al., 2002), specifically for older adults. The alpha reliabilities of the GQ-6 in Studies 2 and 3 with a balanced frequency of ages were as follows: younger than 41 years (.71, .70), between 41 and 60 years (.73, .71), older than 60 years (.60, .67). Fifth, research demonstrated that dispositional gratitude is strongly related to various measures of well-being (cf. A. M. Wood et al., 2010). Therefore, future research might examine whether the same predictions and results can be found with other affective dispositions and aspects of well-being. Finally, the current work focused on perceptions of future time as one indicator of subjective aging. An avenue for future work is to include other markers of subjective aging, such as the age an individual feels (e.g., Stephan, Sutin, & Terracciano, 2014).

CONCLUSION

The current research provides one of the first investigations on general and domain-specific dispositional gratitude from early adulthood to old age. First, it is clear from our findings that it is important to consider the subjectivity of the aging process when studying gratitude across adulthood. Age effects in general gratitude are more likely to occur for subjective age in terms of future time perspective than chronological age. Second, it appears that the consideration of the breadth of measurement is important in the study of gratitude across adulthood. Chronological age effects are more domain specific than general in nature, and they are more likely to occur for gratitude in the instrumental domain than in the interpersonal domain. As such, the current findings add greatly to our understanding of age trends in dispositional gratitude during adulthood, pointing to the nuance and complexity inherent in these relations.

Declaration of Conflicting Interests

Funding

Notes

1. Across all studies, we explored nonlinear age effects by regressing gratitude (the GQ-6 in all studies, and domain-specific gratitude in

Studies 2 and 3) hierarchically on linear, quadratic, and cubic age to test whether each step explained a significant amount of incremental variance. No evidence for nonlinear age effects was found for general gratitude as measured with the GQ-6. Two small quadratic age effects were found for domain-specific gratitude, but they only explained 0.4% to 1% of variance in gratitude and were not consistent across the studies. We thus decided not to include these two quadratic effects in the subsequent analyses to simplify the interpretation.

2. Across all studies, we did not report results of mediation tests with respect to domain-specific gratitude because they were outside the primary aims of the article.

3. Two studies used this sample to investigate the link between gratitude, forgivingness, and well-being (Hill & Allemand, 2011) and between gratitude and self-reported health (Hill, Allemand, & Roberts, 2013).

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