Subjective remaining lifetime and concreteness of the future as differential predictors of preparation for age-related changes

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Abstract Demographic changes have been linked to the expectation of cuts in government-provided social security services, emphasizing individual responsibility to prepare for old age and concomitant challenges and changes. Accordingly, the identification of psychological variables predicting preparation is a matter of theoretical as well as practical importance. We thus consider different aspects of a person's future time as theoretically prominent psychological predictors of preparation. The subjectively perceived quantity of remaining lifetime, the concreteness of future time, and preparation for life domains indicative of an active third age as well as of a more dependent fourth age were assessed in a longitudinal study in a core sample of $N = 593$ participants (30–80 years old at T_1) at two measurement occasions 4 years apart. The quantity of subjective remaining lifetime predicted subsequent changes in preparation, but this effect was restricted to preparation for the fourth age. In contrast, a more open and concrete outlook on ones' personal future predicted changes in preparation for an active third age. Our findings highlight the importance of distinguishing between different aspects of future time—its quantity versus its relation to goals and action plans—when predicting specific facets of developmental self-regulation.

Keywords Future time experience · Preparation · Subjective life expectancy · Life span · Life domains

Introduction

Old age can be characterized as a life phase that is less structured by external demands, rules, and obligations and that has to be planned, organized, shaped, and filled with meaning by the individual (Freund et al. 2009). Therefore, individual preparation for age-related changes that are expected to happen in the future not only serves as a means to avoid late life poverty, but also facilitates the adaptation to age-related changes and challenges that occur in many life domains (e.g., regarding leisure activities, family life, social relations, work, physical and mental health, fitness, or housing). People who individually prepare for old age seem to be better off in many respects, such as enhanced late life well-being, reduced depression and anxiety, and better health (e.g., Noone et al. 2009; Pinquart and Sörensen 2002; Sörensen et al. 2012; Yeung 2013). In order to prepare for age-related changes, the anticipation of the future is a necessity. Individual differences regarding the perception and expectation of one's future time have been shown to be highly relevant for motivation, action regulation, and goal setting across the life span. Thus, the current study investigates the role of future time as a predictor for individual differences in age-related preparation.

Predictors of preparation and planning

Considering the importance of individual preparation for age-related changes for successful adaptation in later life, identifying which factors influence preparation is a highly relevant research topic. Depending on the outcome variable

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(financial preparation, preparation for future care needs, retirement preparation), research on preparation has already identified a variety of demographic (gender and marital status, Noone et al. 2010; income and wealth, Griffin et al. 2012), as well as structural and domain-specific (work involvement and centrality, Earl and Archibald 2014; financial knowledge, Hershey et al. 2007) variables that influence whether and how much people prepare for age-related changes. However, psychological factors are also influential in determining preparatory activity and predict, for example, financial planning above and beyond economic factors (Noone et al. 2012). Among those psychological variables are more positive views on one's own aging (Kornadt et al. 2015), control and mastery beliefs (Earl and Archibald 2014), personality traits (Hershey and Mowen 2000; Sörensen et al. 2008), and as central predictors, aspects of future time.

The role of different aspects of future time

Because preparing in younger years for challenges and changes expected in old age requires thinking about the future, age- and time-related variables have been shown to be influential when it comes to preparation and planning for older age. Variables that in some way or the other measure and conceptualize how people experience, expect, and frame their future time have been extensively studied in psychological research (e.g., Brandtstädter and Rothermund 2003; Lewin 1951; Zimbardo and Boyd 1999). One important operationalization of future time is the quantity of time one expects to have left to live, or subjective remaining life expectancy (SRLE), which has been shown to be a good predictor of actual time left to live (Kotter-Grühn et al. 2010), and also of well-being in later life (Hoppmann et al. 2015). SRLE and in particular the perception that one's lifetime is running out play a central role in life-span developmental theories such as Socioemotional Selectivity Theory (SES; Carstensen 2006; Carstensen et al. 1999). The perceived shrinking of remaining life time influences goal setting (e.g., Lang and Carstensen 2002) and is deeply influential with regard to individual life planning, action regulation, the perception of gains and losses, and also the perception of meaning in life (Brandtstädter and Rothermund 2003; Brandtstädter et al. 1997). For example, a study by Brandtstädter et al. (2010) demonstrated that shrinking lifetime resources were linked to a shift in goal orientations and rationality perspectives, away from an instrumental pursuit of individual goals toward a more ego-transcendent focus on core values. Taken together, these findings indicate that SRLE is closely related to developmental regulation processes and should thus also affect preparation.

Besides the amount of time left to live, psychological research has highlighted the importance of individual differences in variables that are related to questions of how one's future time can be used to accomplish goals and plans. Those variables were shown to be related to developmental regulation throughout the life span (Brandtstädter and Rothermund 2003; Brandtstädter and Wentura 1994; Brandtstädter et al. 1997; Zimbardo and Boyd 1999). One operationalization of future time with strong motivational implications is the concreteness of future time, indicating whether people have clear conceptions of and plans for their future.¹ The concreteness of time perspective indicates whether the future provides specific opportunities to pursue personally meaningful goals, and it is positively related to several variables indicative of psychological adjustment in older age, such as lower depression (Brandtstädter and Wentura 1994).

Thinking of preparation for old age as a motivational process that is directed toward goals related to, for example, health, leisure activities, and retirement (Nurmi 1992), different aspects of an individual's future time are promising predictors of preparation because they play an important role in shaping intentional behaviors and motivation (Bonniwell and Zimbardo 2004; Brandtstädter et al. 2010; Carstensen 2006; Coudin and Lima 2011; Lang and Carstensen 2002). On the one hand, the perception of remaining time left to live sets the timeframe that determines whether and which goals should be selected or can still be approached within a limited period of time and how resources have to be allocated accordingly (Griffin et al. 2012). The concreteness of future time on the other hand reflects how time is experienced subjectively. Future time is the "primary 'motivational space'" (Nuttin 1964); as such, it is strongly related to motivation and planning. The concreteness of one's future time determines whether remaining time is actually perceived as meaningful, and being full of opportunities, and thus whether it is worthwhile investing resources to shape one's time according to personal projects (Brandtstädter et al. 1997). Hence, a more concrete outlook on one's future should be positively related to preparation for an active life in old age and should predict preparation over and above subjectively expected amounts of time left to live.

¹ The term "concreteness" might suggest a relation to Construal Level Theory, which distinguishes between concrete and abstract representations of future events, situations, or outcomes (e.g., Trope and Liberman, 2010). However, this does not correspond to the usage of the term "concreteness of the future" in our study. Rather than indicating whether the future is represented in semantically abstract versus concrete terms, high versus low concreteness of the future here refers to an outlook on the future as either providing specific opportunities for goal pursuit (=concrete future) or lacking these concrete action perspectives (=lack of concreteness of the future).

It is not surprising that both aspects of future time have already been included in the study of preparation. A number of studies have demonstrated that a more extended and concrete time perspective is positively related to preparation, especially in the financial domain (Earl et al. 2015; Griffin et al. 2012; Hershey and Mowen 2000; Petkoska and Earl 2009). As an example for another domain, Beyer et al. (2016) demonstrated that individuals with more SRLE started planning earlier in life for a possible relocation in old age. However, in the study by Fowler and Fisher (2009), adult children's perceptions of their aging parents remaining lifetime were negatively related to preparation for their future care needs.

Preparation as a multifaceted, life-span process

In most previous research, preparation for old age is framed as preparing for retirement or in terms of financial planning for old age (e.g., Adams and Rau 2011). However, there are several additional challenges people have to prepare for or adjust to when they get older. This comprises, *inter alia*, preparation for changing social relationships, living arrangements, health problems, changing work demands, or regarding care and lack of autonomy in older age. Accordingly, more comprehensive approaches to the processes of planning for later life are required and have been proposed in recent years. Löckenhoff (2012) broadens the concept of retirement by framing it as a multi-layered process within a life-span developmental approach. This approach covers a wide time span around the actual date of retirement and includes psychological variables such as management of gains and losses, self-regulation, and time perspective into the prediction of planning and adjustment. Others have addressed preparation from a domain-specific perspective, comprising psychological, financial, psychosocial, and health-related preparation (e.g., Yeung 2013).

Building on research by Hershey et al. (2001), we (Kornadt and Rothermund 2014; Kornadt et al. 2015) integrate both approaches and conceptualize preparation for old age as a multidimensional, domain-specific construct that is important throughout adult life. However, different facets of preparation have differential relevance during specific phases of the adult life span. Preparation in domains such as physical appearance or work might become relevant already in late midlife, because age-related changes can be expected to cumulate in these life domains already during earlier phases of the life span. Preparation for loss of autonomy or death-related issues, however, is triggered by the expectation of age-related changes to occur in very old age. Thus, these separate clusters of preparation might be subsumed under the labels preparation for an active third age or preparation for a

fourth age that focuses on coping with dependency and losses. In a previous study, we provided evidence for the validity of this distinction and labeling. We found differential age gradients for domains related to third and fourth age, with third-age preparation declining after age 70, whereas preparation for the fourth age linearly increases up to very old age. In addition, third- and fourth-age preparations also show differential relationships to personality variables, with third-age preparation being related to extraversion and openness, which was not the case for fourth-age preparation (Kornadt and Rothermund 2014). Therefore, we argue that the identification of predictors of preparation for old age should take different kinds of preparation into account.

The current study

Our aim was to investigate the relations between different aspects of future time and different forms of preparation for age-related changes using a longitudinal design and a sample covering a broad age range. Considering the motivational implications of different facets of future time and the conceptual distinction between preparation for an active third age and a more dependent fourth age, we derived a set of distinct hypotheses: Specifically, considering that preparing for a dependent, fourth age might become more relevant as remaining lifetime is perceived as diminishing, we propose that preparation for the fourth age should increase with decreasing SRLE. This proposition also provides a possible theoretical explanation for the findings of our previous study (Kornadt and Rothermund 2014), where preparation for a fourth age was most pronounced in the oldest age group of our sample (70–80 years old). Conversely, perceiving the future as more concrete and filled with specific plans and goals should lead to more preparation for an active third age, whereas we would not assume any relationship between this variable and fourth-age preparation. Finding differential relationships between these two different aspects of future time and the two facets of preparation would further substantiate the conceptualization of the two clusters of preparation as reflecting preparation activities relating to the third and fourth age.

Furthermore, preparation for old age is not only the result of developmental processes but might in turn also affect time-related perceptions. Preparing for upcoming challenges includes thinking about and clarifying future expectations (Taylor-Carter et al. 1997), identifying options and risks, and finally planning for the future—which, accordingly, might appear more controllable. Therefore, the concreteness of one's personal time might be positively affected by the extent of planning, yielding a bidirectional relationship.

In sum, our study is unique in being the first empirical attempt at investigating the complex structure of relations between time-related variables and different aspects of preparation for old age and age-related changes. Using a longitudinal design allows us to disentangle and separate the different influences between these mutually related constructs and thus provides us with theoretical explanations for the relationship between aspects of future time and developmental regulation processes.

Method

Sample

At T_1 (2009), 769 participants aged 30–80 were recruited via random sampling through local registry offices in two middle-sized cities in Germany (Jena and Erlangen). The sample was stratified for age (birth decades), gender, and place of residence. People who consented to participation were mailed a questionnaire they could complete at home and then send back. At T_2 (2013), those participants who provided a questionnaire at T_1 were asked whether they wanted to participate in a follow-up assessment. The procedure then resembled the one at T_1 , and participation was reimbursed with a gift card or a charity lottery ticket; both worth about US \$25. More details on the general sampling and assessment procedure are described in Kornadt and Rothermund (2011a), Kornadt et al. (2015), and Voss et al. (2017). In total, $N = 593$ persons (49.9% female) participated at both time points (78% of the initial sample). They were similarly distributed among birth decades, with most participants ($n = 130$) in oldest group and fewest ($n = 110$) participants in the youngest group. Their mean age was 55.64 years ($SD = 14.50$), mean net household income was € 2.650 ($SD = 1446$), and they reported to be on average in rather good or good health. Dropout was not systematic with regard to socio-demographic variables (e.g., age, gender, income; Voss et al. 2017), and central study variables, preparation fourth age, $t(248.15^2) = -1.32$, $p = .19$, preparation third age, $t(763) = -1.54$, $p = .13$, concreteness of time $t(243.14) = -1.90$, $p = .06$, and subjective remaining lifetime $t(244.98) < 1$.

Measures

Subjective remaining life expectancy

SRLE was assessed by asking people to fill in the blank in the question “I believe that I am probably going to become

___ years old.” We then subtracted participants’ chronological age and used the difference as an indicator of participants’ expected remaining time (see, e.g., Brandtstädter et al. 1997; Rothermund and Brandtstädter 1998). Higher values thus represent longer expected time left to live.

Concreteness of future time

Participants rated expectations for their future on a short version of the questionnaire adapted from Brandtstädter and Wentura (1994) measuring different aspects of time perspective. For the current study, we selected the scale measuring the perceived concreteness of the future (CO—sample item: “I have clear goals and expectations for my future”) with three items. Participants rated the extent to which the statement reflects their personal experience on a five-point Likert scale between “Does not at all apply” and “Completely applies.” For the final model, the three items were used as manifest indicators of a latent variable. Reliability of the scale was $\omega = .71$ at both measurement occasions. As omega can be interpreted analogously to Cronbach’s alpha (cf. Kovaleva et al. 2014), this indicates an acceptable reliability.

Preparation for age-related changes

Preparation for age-related changes at both time points was measured with a questionnaire developed by Kornadt and Rothermund (2014). Preparation was assessed in nine different domains (finances, emergency situations and exceptional circumstances, mental and physical fitness, housing, appearance, social relations, health, leisure, and work) that were illustrated with several examples each to describe how preparation for old age might look like in the respective domain (e.g., “I am actively providing for my financial situation in old age (i.e., government-provided saving opportunities, pension funds, saving money)” [finances], “I am actively working to maintain my personal relations in old age (e.g., by fostering contacts, being included in social groups.)” [social relations]). For each domain, we asked about active preparation (“I am actively preparing for old age in this domain, e.g., by ...”), thoughts and preoccupation with the topic (“I think about the topic”), and gathering and exchanging information (“I try to gather information about the subject and discuss it with others”). Thus, each domain was assessed with three items (all item wordings are presented in Kornadt and Rothermund 2014 and Kornadt et al. 2015). Participants gave their responses to each item on a four-point scale with the options “not at all,” “a little,” “quite a bit,” and “a lot.”

Second-order factor analyses show that those nine domains can be grouped into two superordinate factors that represent domains for which age- and preparation-related

² Non-integer t values are Welch-corrected due to unequal variances between groups.

changes are expected to occur in earlier phases of old age (leisure, work, physical appearance, fitness, social relations), and domains for which relevant changes are expected to occur later in old age (health, emergencies, finances, housing), which is why we labeled these factors third- and fourth-age preparation, respectively (for more details, see Kornadt and Rothermund 2014). For the current analysis, the respective first-order factors were thus used as indicators for the superordinate latent factors. Reliability of the two higher-order scales was calculated in R using the function “reliabilityL2.” Results indicate acceptable to good reliability, $\omega_{T1} = .79$ and $\omega_{T2} = .77$ for preparation for the third age, and $\omega_{T1} = .77$ and $\omega_{T2} = .82$ for preparation for the fourth age, respectively.

Analytic procedure

In order to assess the bidirectional relation between qualitative and quantitative aspects of future time and preparation for age-related changes, we conducted separate cross-lagged analyses for the two preparation facets using Mplus 7.1 with the MLR estimator. In both models, preparation (for third or fourth age, respectively), concreteness, and SRLE at T_2 were each regressed on concreteness, SRLE, and the respective type of preparation at T_1 . Furthermore, we allowed error variances of the same manifest and latent indicators to covary across time. Figure 1 depicts the simplified structural models. As in Mplus only covariances between latent independent variables but not between latent and observed independent variables are considered, we added those relations. We chose a directional relation instead of a covariance to stay within the same conditional framework. Factor loadings of latent

variables were constrained to be equal across time at all levels to make sure the measures are invariant across the two measurement occasions. Bivariate relationships between manifest variables computed with SPSS 21 are displayed in Table 1.

Results

The model fit of the cross-lagged models was largely acceptable (Hoe 2008; Jackson et al. 1993): $\chi^2(df)_{P4} = 1458$ (437), $CFI_{P4} = .89$, $RMSEA_{P4} = .06$, $SRMR_{P4} = .08$, $\chi^2(df)_{P3} = 2007$ (635), $CFI_{P3} = .90$, $RMSEA_{P3} = .06$, $SRMR_{P3} = .08$. To test our main hypothesis of a differential pattern of relations between qualitative and quantitative aspects of time perspectives with the two facets of preparation, we focused on the respective cross-lagged paths. Results for third-age preparation (P3) are displayed in the upper part of Table 2, and results for fourth-age preparation (P4) are displayed in the lower part of Table 2. SRLE at T_1 was negatively related to subsequent changes in P4, indicating that preparation-related efforts increase with decreasing SRLE. In contrast, P3 was not related to SRLE but instead to differences in concreteness (CO). In line with our predictions, a positive effect emerged for perceiving one's future as more concrete. Additionally, CO was positively related to subsequent changes in SRLE and vice versa, indicating a mutual influence. Although CO did not predict P4, the reversed effect was significant with higher levels of P4 predicting a more concrete perception of one's future time. Furthermore, our results show that the perceived quantity of remaining future lifetime decreases

Fig. 1 Structural model of the cross-lagged regression model. Dashed lines represent cross-lagged paths, and dotted lines represent change correlations. Squares represent manifest variables, and circles

represent latent variables. SRLE subjective remaining life expectancy, CO concreteness, P preparation

Table 1 Bivariate correlation coefficients and stability coefficients of preparation for third and fourth age as well as concreteness and subjective remaining life expectancy at T_1

	1	2	3	4
1. P3	.63	.65	.22	– .23
2. P4		.67	.07	– .32
3. CO			.60	.34
4. SRLE				.93

Values in bold print are significant at $p \leq .05$. Values above the diagonal are correlations at T_1 , and values in the diagonal represent stability coefficients

P3 third-age preparation, *P4* fourth-age preparation, *CO* concreteness, *SRLE* subjective remaining life expectancy

for people who engaged in more preparation for later life, for both types of preparation.

Correlated change coefficients partly mirrored the differential relations obtained in the cross-lagged paths between SRLE and preparation; i.e., a negative coefficient in the model involving P4 indicated that decreasing SRLE was accompanied by increases in this form of preparation, whereas no such association was obtained for changes regarding P3. However, change correlations of preparation and CO reached significance in models for both types of preparation.

Discussion

Investigating aspects of future time as predictors of preparation for age-related changes, we extend previous research by examining preparation from a multifaceted, life-span perspective, and by simultaneously considering the impact of subjective remaining life expectancy and the concreteness of the personal future (Brandtstädter and Rothermund 2003; Brandtstädter and Wentura 1994; Brandtstädter et al. 1997). We assumed that SRLE and concreteness of future time were differentially related to preparation for domains indicative of preparation for a more active, third age, and domains that instead reflect preparation for dependency and loss in the fourth age. Furthermore, we investigated this question in a 4-year longitudinal study in order to shed light on the directionality of effects, and used a sample that covered a broad range of participants in midlife and older age. This differential perspective enriches theories postulating the central role of time perspectives for motivation and behavior across the life span (Boniwell and Zimbardo 2004; Brandtstädter and Rothermund 2003; Carstensen 2006; Lang and Carstensen 2002) by integrating two facets of future time and investigating their distinct predictive value for a multidimensional outcome variable.

Table 2 Unstandardized coefficients and change correlations of the cross-lagged models including third-age preparation (Model 1) and fourth-age preparation (Model 2)

Variables	Stability			Cross-lagged effects					Change correlation			
	S _P	S _{CO}	S _{SRLE}	C _{CO,P}	C _{SRLE,P}	C _{SRLE,CO}	C _{P,CO}	C _{P,SRLE}	C _{CO,SRLE}	E _{CO,P}	E _{SRLE,P}	E _{SRLE,CO}
Model 1	.68 (.06)	.68 (.07)	.89 (.02)	.05 (.03) [†]	−.002 (.002)	.005 (.003) [†]	.15 (.09)	−1.54 (.62)	1.24 (.38)	.05 (.02)	−.08 (.09)	.44 (.19)
Model 2	.82 (.06)	.68 (.06)	.89 (.02)	.03 (.02)	−.002 (.001)	.005 (.003) [†]	.26 (.15) [†]	−2.03 (.96)	1.03 (.34)	.03 (.01)	−.15 (.08) [†]	.44 (.19)

Standard errors in parentheses

Values in bold print are significant at $p \leq .05$ ([†] $p \leq .10$)

P3 third-age preparation, *P4* fourth-age preparation, *CO* concreteness, *SRLE* subjective remaining life expectancy

Our assumptions were supported by the data: SRLE and concreteness differentially predicted self-reported third- and fourth-age preparations. Controlling for concreteness, SRLE predicted preparation in a cluster of domains that are indicative of concerns and changes that typically refer to a dependent fourth age occurring late in old age. People that perceived their lifetime as more limited at the first time point reported more preparation for the fourth age (i.e., housing, finances, emergencies, and health) four years later compared to people who rated their lifetime as more extended. This corresponds to and extends previous findings, where we showed that older participants reported more fourth-age preparation than younger participants (Kornadt and Rothermund 2014). With decreasing lifetime left to live, preparation for end-of-life concerns becomes paramount and thus preparation for these domains increases (cf. Fowler and Fisher 2009). The results are also in line with theories on time and goal orientation in life-span development. First, they support the assumption that instrumental, information-oriented goals (such as meeting new people, being active and productive) become less important as lifetime diminishes, whereas more emotional, transcendent values and orientations (feeling safe and secure at the end of life, saving one's relatives from difficult decisions and financial strain by taking care of these matters beforehand) increase in importance (Brandtstädter et al. 2010; Carstensen 2006). Furthermore, our findings are also indicative for a shift in goal orientation from gain orientation to prevention and loss orientation that was shown by Ebner et al. (2006). As lifetime decreases, the prevention of losses that is addressed by fourth-age preparation becomes more and more important.

However, our results question the conclusion that SRLE has an effect on preparation in general (e.g., Griffin et al. 2012), because in our study, self-reported preparation for domains that are more reflective of concerns and changes in an active third age was unrelated to SRLE. By contrast, concreteness of one's personal future predicted whether people reported to engage in more third-age preparation four years later, while controlling for differences in SRLE. Participants who perceived their future as more concrete reported preparing more for fitness-, social relations-, and activity-related planning and activities. This yields further support for the concreteness of one's future time as a central predictor of future-related activities, such as preparation. As hypothesized, this relation was restricted to preparation for activities and changes that are expected to occur in an active third age and were not obtained for preparation action activities concerning the end of life. This dissociation of relations is consistent with the notion that the third age is a time of activities that are only engaged in and enjoyed if the future is perceived as being full of options and possibilities (cf. Brandtstädter and

Wentura 1994; Kornadt and Rothermund 2011b). The results are also in line with other studies showing that a more open time perspective is positively related to retirement preparation (e.g., Hershey and Mowen 2000; Petkoska and Earl 2009), because retirement preparation is a central component of third-age preparations.

In addition to the effects of time perspectives on preparation, our longitudinal design allows us to also estimate effects in the other direction. However, our results do not provide strong support for the assumption that preparation might also lead to a more concrete outlook on one's future time (e.g., Prenda and Lachman 2001; Taylor-Carter et al. 1997). This lack of relations might be due to the fact that the 4-year longitudinal interval of our study was too short to detect strong or reliable influences in this direction. Since age-related preparation does not aim at producing immediate consequences but is directed at bringing about long-term benefits for the individual, it is perhaps not surprising that we did not find any evidence for an effect of third-age preparation on the concreteness of future time of individuals in our study. Preparation for an active third age probably needs more time to result in manifest consequences that tangibly affect everyday experiences of the individual (e.g., increased feelings of fitness, new intimate social relations). Future research should address the question of reciprocal relations between preparation and future time with longer longitudinal intervals.

Theoretical implications for psychological models of time and development

Our study was not designed as a direct test of superordinate theories of time and development (e.g., SES theory, Carstensen 2006), motivational implications of time in general (e.g., Nuttin 1985) or models of time, meaning, and rationality (e.g., Brandtstädter et al. 2010; Erikson 1959; Tornstam 1997). Rather than extensively collecting data on measures of time perspective that were developed within these frameworks (e.g., Future Time Perspective Scale, Lang and Carstensen 2002; Zimbardo Time Perspective Inventory, Zimbardo and Boyd 1999), we assessed some aspects of future time for which we derived specific hypotheses regarding their relation to different forms of preparation activities. Still, our findings can be seen as being broadly consistent with existing accounts in that they reveal implications of individual differences in future time for preparation and planning, which is a core feature of developmental regulation.

Beyond that, our findings provide interesting additional input for existing theories to elaborate and distinguish more precisely between more quantitative (i.e., the amount of time left to live) and more qualitative (i.e., how one's

remaining time is experienced) facets of future time and to develop conceptual distinctions that relate these facets to different types of developmental outcomes. Our finding that a shorter SRLE predicted engagement in *more* preparation, albeit only for certain domains that gain importance in late life, goes beyond and extends previous findings that were reported in the literature (e.g., Beyer et al. 2016).

In addition, the complete dissociation of relations between SRLE/concreteness on the one hand, and self-reported third versus fourth-age preparation on the other, sheds an interesting light on the complexity of the aging process itself. Our findings thus highlight the important fact that aging is not a homogeneous phenomenon. Instead, aging has to be conceived of as a conglomerate of opportunities and challenges, comprising new possibilities for shaping an individually active and meaningful life in a context of surprisingly few external constraints, but also the threatening prospect of losing one's autonomy and having to face dependency and—eventually—dying and death. Any theory that treats aging as a continuous or unidimensional transition will ultimately fall short of grasping the diversity of aging phenomena, reflecting differences between life domains (Kornadt and Rothermund 2015), phases of the aging process (Baltes and Smith 2003; Laslett 1989), and also between aging individuals that differ with regard to their preferences, resources, abilities, and social ties (Baltes et al. 1992).

Limitations and directions for future research

Our study comprises a variety of strengths, such as the longitudinal design, the sample covering a broad age range and the differentiated assessment of future time and preparation. Still, some limitations of our study have to be kept in mind, highlighting the necessity of further research in this area. Even though our measure of preparation assesses generic preparation intentions in a multifaceted and multidimensional way (Kornadt and Rothermund 2014; Kornadt et al. 2015), future studies should explore the relation of time-related variables to preparation measured with actual behavioral indicators, rather than relying solely on self-report indicators. However, to establish specific behaviors as indicators of preparation for old age and age-related changes, it is important to ask for the intentions with which the behaviors are performed. To count as a form of age-related preparation, behaviors have to be performed primarily in order to prepare for the changes and challenges that are expected to occur in old age, so as not to confound preparation with activities that are performed for other reasons (e.g., someone may keep a diet in order to reduce weight and become more attractive, which is completely unrelated to any age-related concerns).

Another concern relates to our interpretation of preparation for a more active third age, and for a more dependent fourth age. The two clusters of preparation domains we obtained might also be interpreted differently, for example as preparation for basic/essential versus non-basic/advanced life domains (e.g., Schindler and Staudinger 2008; cf. Kornadt and Rothermund 2014). Our participants were neither instructed to rate preparation for a “third” and a “fourth” age, nor do we assume that they thought in such terms when rating their preparation activities in the different domains. Instead, our labeling provides a post hoc interpretation we derived from the content of the domains clustered together. From a theoretical point of view, the emerging two-factorial superordinate structure of preparation activities indicates a functional organization of preparation referring to different and independent phases of old age and their challenges that can be straightforwardly described as early, active versus late, dependent phases of old age. This functional distinction goes beyond a mere re-description of the empirical clustering of preparation activities. Even though we are aware about alternative interpretations, and the need for further validation of our interpretation in future studies, there is empirical evidence that supports our distinction. First, the differential age gradients we obtained in a previous study (Kornadt and Rothermund 2014) highlight the fact that the two preparation factors refer to topics that become more relevant at different stages of the life span: They address age-related changes, opportunities, and challenges that are expected to occur either early or late in old age and that are thus characteristic of the third and fourth age, respectively. Furthermore, we find differential relationships of the superordinate third- and fourth-age preparation clusters to variables such as personality characteristics and specific preparation behaviors (Kornadt and Rothermund 2014). Most notably, the differential results for the two aspects of future time that were obtained in the present study provide further evidence for the validity of our distinction between third- and fourth-age preparation: While third-age preparation depends on having concrete goals and plans for the future, fourth-age preparation is triggered by perceptions of shrinking absolute amounts of future time to be lived.

Finally, although our study was primarily concerned with the influence of aspects of future time on preparation, our data do not allow us to fully disentangle effects of future time and chronological age. Conducting analyses that included age as an additional predictor did not provide meaningfully interpretable results, due to the very high correlation between chronological age and SRLE in our sample ($r_{\text{age,SRLE}} = -.90$). Thus, we cannot be sure whether our results regarding fourth-age preparations are entirely due to future time left to live (SRLE) or whether they also reflect influences of past time already lived

(chronological age; e.g., by increasing knowledge about the importance of preparation). There are studies showing that SRLE predicts outcome variables such as depression and life satisfaction over and above chronological age (Brandtstädter and Wentura 1994; Brandtstädter and Rothermund 2003); however, these studies were based on samples with a much narrower age range, which allows a more stringent test of the effects of future time that go beyond chronological age. Importantly, however, the influence of concreteness on changes in third-age preparation did not change when chronological age instead of SRLE was used as an additional predictor, indicating that concreteness of future time is a significant predictor of preparation even when effects of chronological age were controlled.

Implications

In conclusion, our results support the assumption that neither subjective remaining time left to live nor the concreteness of an individual's future time alone determines preparation for old age. Using more differentiated concepts of time and preparation, and also considering preparation for domains for which preparation is most important in different stages of old age (third vs. fourth age) allows us to draw a more comprehensive and differentiated picture of the relations between future time and preparation. Focusing on aspects of future time that are not only known to be central to motivation and behavior but have also been shown to be malleable within interventions (e.g., Schuitema et al. 2014), our findings also introduce a new potential starting point for interventions that aim at increasing preparation for old age and age-related changes.

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