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Counting down while time flies: Implications of age-related time acceleration for goal pursuit across adulthood

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Abstract

Socioemotional selectivity theory (SST) is a life-span theory of motivation grounded in the subjective awareness of human mortality. The cardinal postulate is that time horizons shape the relative priority placed on emotionally meaningful and knowledge-seeking goals. Because goals are always set in temporal contexts, and time left in life is inversely related to chronological age, SST predicts systematic age differences in goal pursuit. The theory has garnered considerable empirical support. In this paper, we consider the role of age-related time acceleration on goal setting and argue that it may interact with the more gradual age-related changes in time horizons presumed in SST. If so, the favoring of emotionally meaningful goals may follow an exponential (as opposed to linear) function across adulthood.

Socioemotional selectivity theory (SST) is a life-span theory of motivation grounded in the uniquely human ability to monitor life time. The cardinal postulate is that perceived time horizons shape goal setting and goal pursuit [1-3]. When time horizons are long and nebulous, as they typically are in youth, people are motivated to expand their experiences. Knowledge-seeking goals and activities are prioritized even when they are not emotionally satisfying. For example, although learning can be emotionally trying, acquiring new skills can hold considerable future utility when time horizons are long. In contrast, savoring time with loved ones and engaging in emotionally meaningful goals are preferred when time horizons are limited because such goals are realized in their very pursuit [2]. Socioemotional selectivity theory maintains that people adapt to temporal contexts as they move through life. Unlike most developmental theories that are anchored in chronological age, the theory maintains that perceived time *left* in life grows increasingly influential across adulthood, and at some point in adulthood becomes a better predictor of goals and preferences than age [4].

SST offers a falsifiable alternative to loss models of aging. Traditional theories of late-life development presume that late-life changes reflect adaptations to the increasingly unfavorable dynamic between gains and losses [5]. In contrast, SST postulates that, in many cases, age-related changes reflect shifts in goals that occur in the face of time constraints,

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which can also be observed in younger people. A body of experimental research shows that preferences expressed by older people for familiar social partners, for example, are also observed in younger people when facing constraints on time [6, 7] and, importantly, the converse is observed: When older people are asked to imagine expanded time horizons, they express preferences for social partners that resemble those expressed by younger people [8]. The positivity effect [9, 10], heath-related decision-making [11], engagement in physical activity [4], and purchase intents [12-15] are also shaped by perceived time horizons. Thus, time horizons can account for a range of age differences long thought to reflect age-related loss.

Because age is a good proxy for time left in life, most research on SST presumes that shifts in goal priorities follow the same linear path represented by chronological age. An emerging literature on time acceleration, however, raises the intriguing and testable possibility that goal changes may be better represented by an exponential function at advanced ages given that subjective time accelerates with age.

Sensing that time flies

The intriguing and near-universal experience of time acceleration has been a topic of discussion among philosophers and psychologists for over a century [16]. Relatively recently, researchers have attempted to understand related causes, contexts, and conditions that give rise to time acceleration (e.g., having fun [17-19]; affective state/attention [20-23]). This literature suggests that it is not necessarily a moment-to-moment sense of time acceleration that occurs with age [24] but rather the hindsight perception that years and decades passed increasingly faster. Age differences in time acceleration are especially evident when people are asked to reflect on how quickly the past decade has passed [25-29]. Chunking memories produces a sense of time passing more quickly and, as people age, they get better at integrating distant life events into coherent life stories with temporal markers (e.g., elaborating beginnings and endings and streamlining events in chronological order; [30]). Landau and colleagues (2018) found that when participants were instructed to remember events in the last year by mentally grouping experiences into broad categories, they perceived a faster passage of the year compared to those who were not instructed to use this memory technique.

From a life-span developmental perspective, specifically within the framework of SST, the awareness of time holds important implications for goal setting and goal pursuit. Lang and Damm (2018) discuss the implications of this phenomenon in the context of successful aging, suggesting that the subjective acceleration of life’s pace reflects how older people spend their time. John and Lang (2015) observe, for example, that when older adults engage in meaningful activities, they feel that time passes faster than when younger people engage in meaningful activities. In their research, participants were asked to report activities that they did one day before and rate how fast time seemed to go by during each activity. Age-related time acceleration was found only when participants were actively engaged in lively activities (e.g., social engagement, learning). No age differences were observed for routine or consumptive activities (e.g., eating, watching TV). Specifically, participants aged 60 and older sensed that time flew by quickly during lively and engaging activities. The finding was

replicated in another study using a tomorrow construction method (Study 3; [33]) in which participants plan the following day. Participants were randomly assigned to one of three experimental conditions in which they were instructed to create episodes with a focus on (1) accomplishing tasks, (2) relaxing, or (3) freely planning the day with no specific instructions. In contrast to younger people, older people assigned to the accomplishing tasks or relaxing conditions anticipated that time would go by relatively quickly. No age differences were observed in the condition where participants freely planned the day without specific instructions. Thus, it appears that in older people subjective time accelerates during active goal pursuit.

Moving forward, we expect that this speculation has deep implications for advancing our understanding of age differences in goal pursuit. Goals are set in temporal context. Thus, perceived limitations on time in tandem with time acceleration may prompt a stronger sense of urgency to realize emotionally meaningful goals in later life. If so, there may be a non-linear association between chronological age and the shift of goal pursuit across the adult life span. A steeper slope between age and the prioritization of meaningful experiences may be particularly salient when people transition into later life.

Evidence for non-linear associations between age and time horizons

Because perceived time left in life is linearly and inversely related to chronological age, we have assumed that there is also a linear association between chronological age and the prioritization of emotionally meaningful goals. Recent research on age and future time horizons suggests a more nuanced picture. Analyzing data from a national sample of nearly four thousand Americans aged 18 to 93 years, Strough and colleagues (2016) reported a quadratic effect of age on future time perspective, suggesting that the association between chronological age and time constraints grows more pronounced as people age. Moreover, a decreasing trend of seeing future opportunities and an increasing trend of sensing time constraints were observed across adulthood. However, until middle age, people perceived continued future opportunities and did not strongly endorse the feeling that they have limited time. These patterns reversed around 60 years, at which point there were indications that people perceived constraints on time and opportunities. Thus, the awareness of future time constraints may become increasingly salient at advanced ages. Age-graded life transitions such as retirement, drawing Social Security benefits, and becoming a grandparent likely draw greater attention to place in the life course [35, 36]. In addition, although SST maintains that it is unwise to presume that loss is the sole cause of age-related shifts in goals, losses do accrue with age, including the loss of loved ones, physical health, and social status. Combined with ageism [37], various social cues activate the subjective awareness of aging [38], which can also prime limitations on time [39-42]. When mortality is primed increasingly frequently, the prioritization of emotionally meaningful goals may become more pronounced.

Age and the prioritization of emotionally meaningful goals: A potential curvilinear relationship

With advancing age, people increasingly sense that the future is limited and increasingly report the sense that "time flies." As time becomes scarce there may be an increasing sense of urgency to use it wisely. When perceived acceleration of time interacts with an increased salience of a limited remaining lifetime, they may intensify the time pressure to realize important goals. Thus, we argue that more research is needed to discern whether a curvilinear relationship better represents the association of chronological age and prioritization of emotionally meaningful goals. Chu, Grühn, and Holland (*in press*) provide preliminary support for this speculation. Examining how perceived time left affected bucket list goals, they found that, as predicted by SST, both younger and older adults generated more emotionally meaningful and fewer knowledge-seeking bucket list goals when time was perceived as limited than when it was perceived as expansive. Interestingly however, their further analyses revealed that the priming of time constraints exerted stronger effects on goals set by older adults than by younger adults. That is, under the time constraint condition older adults listed even more emotionally meaningful and fewer knowledge-related bucket list goals than younger adults.

Conclusions and Future Directions

Empirical evidence generated through tests of SST suggests that social and emotional goals change systematically across the life span. As time horizons grow limited, goals come to favor emotional meaning over exploration. Findings from recent studies focused on the relationship of age to time horizons suggest that a more nuanced approach may be warranted. There is now intriguing evidence that the subjective sense of time left in life may follow a non-linear trajectory [34, 43]. In addition, findings reported by John and Lang (2015) suggest that time passes faster in older (but not younger) adults while engaging in meaningful activities. It is conceivable that these two phenomena produce feedback loop whereby constraints on time horizons lead people to prioritize meaningful goals and the subsequent engagement in meaningful goals further accelerates the subjective sense that time is passing faster. Future research would greatly benefit from specifying the ways that future time horizons and perceived time acceleration interact to influence goals across adulthood. Answers would contribute to a deeper understanding of the goals that people value and pursue across adulthood and especially at advanced ages.

There are theoretical implications for SST. It may be the case that attention to linear relationships has obscured a secondary and non-linear relationship between age and goal prioritization. Age differences between younger and middle-aged adults, for example, may be less pronounced than differences between middle-aged and older adults. If so, this could reconcile differences in the published literature concerning the strength of correlations between time horizons and age. Whereas strong associations have been observed in studies where samples have included younger, middle-aged, and older adults evenly distributed across the age range [44, 45], only moderate associations have been observed in samples where age distributions are potentially skewed [46, 47].

We see relevance for interventions in the ideas we outline above. Younger people experience far more stress and psychopathology than older people, for example. Barber and colleagues (2016) showed that priming endings induces the positivity effect in younger people. Chunking life events in autobiographical memory may offer similar benefits for young adults by speeding up subjective time [31]. At the older end of the age range, introducing meaningful opportunities at the point in life when time acceleration peaks may increase the likelihood that older people engage in activities, such as volunteering, that appear to confer physical and cognitive benefits. A deeper understanding of the reciprocal interplay among time horizons, time acceleration, and motivation may reveal novel ways to improve well-being in both early and late adulthood.

Acknowledgements

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leads to the perception that time flies. People who were led to chunk the past year, by mentally bundling individual moments of experience into broad categories, perceived the year as passing faster than those who were not instructed to chunk their memories of the year. Chunking appeared to increase individuals' value of nostalgia, suggesting that processes that accelerate time may be associated with shifts in emotional focus.

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