Feeling Young and in Control: Daily Control Beliefs are associated with Younger Subjective

Ages

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Abstract

Objectives: Daily variations in control beliefs are associated with developmental outcomes. We predicted that on days when older adults feel more in control than their personal average, they would also report feeling younger, and explored the relationship in younger adults.

Methods: 116 older and 107 younger adults completed a 9-day daily diary study. On Day 1 participants reported on demographic variables. On Days 2-9, participants reported their daily subjective age, daily control beliefs, daily stressors, and daily physical health symptoms. All measures were completed online via Qualtrics. Results were analyzed using multilevel models.

Results: Controlling for age, gender, education, daily stressors, daily physical health, and average control, there was a significant main effect of daily control beliefs on daily subjective age. Older adults felt significantly younger on days with a greater sense of control than usual, but this effect was absent in younger adults. For younger adults, average exposure to daily stressors and daily fluctuations in physical health were better predictors of daily subjective age.

Discussion: These findings suggest that higher daily control is associated with younger subjective ages in older adults, whereas other factors may play a more central role in the daily variations of younger adults' subjective ages.

Keywords: control, subjective aging, intraindividual variability, daily diary

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Having a greater sense of personal control predicts greater well-being. Personal control

beliefs refer to individuals' confidence that they can influence events and outcomes in their lives

(Agrigoroaei & Lachman, 2010). Control beliefs have often been studied as an individual

differences (stable, trait-like) variable, and findings suggest that control beliefs can function as

an important resource allowing for greater goal engagement and more resilient responses to

stressors (Chipperfield, Hamm, Perry, & Ruthig, 2017; Neupert, Almeida, & Charles, 2007).

More recent reviews of the literature suggest that perceptions of control are not entirely

stable and can vary from day to day (Robinson & Lachman, 2017). Daily fluctuations in control

beliefs have been associated with better daily cognitive performance (Neupert & Allaire, 2012)

and fewer everyday memory problems (Hahn & Lachman, 2015). We propose that daily

fluctuations in control beliefs may also be an important factor for understanding daily subjective

age (i.e., how old individuals perceive themselves to be).

Younger subjective ages are associated with numerous positive developmental outcomes

in middle and older age adults: longer life expectancies (Kotter-Grühn, Kleinspehn-Ammerlahn,

Gerstorf, & Smith, 2009), increased interest in sexual activity (Estill, Mock, Schryer, & Eibach,

2018), and flourishing mental health (Keyes & Westerhof, 2012). Furthermore, research suggests

that those with higher control beliefs are also more likely to report feeling younger (Baum &

Boxley, 1983; Bergland, Nicolaisen, & Thorsen, 2014; Hubley & Hultsch, 1994), but these

studies did not examine fluctuations in control beliefs nor subjective age. In older adults, control

is an important resource that can facilitate adaptation and continued active engagement, and is a

better predictor of feeling young than cognition, loneliness, and depression (Infurna, Gerstorf, Robertson, Berg, & Zarit, 2010).

Just as perceptions of control can vary from day to day, so too can perceptions of age. Thus far daily changes in subjective age have been linked to stress (Bellingtier & Neupert, 2018; Bellingtier, Neupert, & Kotter-Grühn, 2017), health, affect (Kotter-Grühn, Neupert, & Stephan, 2015), and cognitive engagement (Armenta, Scheibe, Stroebe, Postmes, & Van Yperen, 2018). Thus daily subjective ages may function as an indicator of daily well-being that captures daily variations around between-person global assessments of subjective age. However, we do not yet know if daily variations in control are associated with daily fluctuations in subjective age.

The current study is designed to test the hypothesis that on days when older adults experience higher perceptions of control, they also report feeling subjectively younger. Research is only beginning to emerge on the daily predictors of subjective age in younger adults (Bellingtier & Neupert, 2018). Thus, in the current study, we explore the possibility that control may be related to subjective age in younger adults, but with no prediction regarding the direction of the effect.

Method

Participants and Procedure

An extreme age groups design with younger (aged 18-36) and older (aged 60-90) adults was used to collect daily information on the variables of interest. Both age groups were part of the Mindfulness and Anticipatory Coping Everyday (MACE) study (Bellingtier & Neupert, 2018; Neupert & Bellingtier, 2017, 2018) and completed the daily protocol online via Qualtrics, but recruitment differed across the two groups. Older adults (n=116) were recruited via Amazon's Mechanical Turk and younger adults (n=107) were recruited from introductory

psychology courses (see Neupert & Bellingtier, 2018 for full details regarding recruitment, attrition, and compensation). Older adult participants were aged 60-90 ($M = 64.71$, $SD = 4.98$, 61% women) and most identified as White (90%) and married (55%). Education ranged from less than a high school degree to a graduate degree, with Bachelor's degree the most common (30%). Most reported working at least part time (45% retired). Younger adult participants ranged from 18 to 36 years old ($M = 19.44$, $SD = 2.25$, 49% female, 80% White, parents' education averaged a Bachelor's degree). Most of the participants lived on campus (64%), whereas 28% lived off campus and 7% lived at home with their family.

Participants completed online surveys over nine consecutive days. The Day 1 survey collected demographic information (e.g., age, gender, and education). The Day 2-9 surveys contained items assessing daily control, daily physical health symptoms, daily stressors, daily subjective age, and other measures not examined in the current study (items listed in order of appearance in the daily survey). Participants were asked to complete the daily surveys in the evening when they had sufficient time to devote to the survey.

For the purposes of the present study, analyses reflect data from 223 (107 younger, 116 older) participants reporting on 1627 days.

Measures

Daily control. Daily control was assessed via 8 items (Eizenman, Nesselroade, Featherman, & Rowe, 1997) that tapped individuals' daily perceptions that they can influence the events in their lives (e.g., "In the past 24 hours, I had quite a bit of influence on the degree to which I could be involved in activities"). Participants indicated the extent to which they agreed or disagreed with each statement using a scale ranging from 1 (*strongly disagree*) to 6 (*strongly*

agree). The mean of the eight items was calculated and higher scores reflected greater perceptions of daily control. Daily Cronbach's alpha ranged from .78 to .83.

Daily Subjective Age was assessed by asking participants, "How old do you feel today?" (cf. Bellingtier et al., 2017). Participants indicated their response by filling in the appropriate number of years. Proportional discrepancy scores were created by subtracting chronological age from subjective age then dividing by chronological age. These scores represent what percent younger (negative scores) or older (positive scores) an individual subjectively feels.

Covariates. We controlled for variables known to influence perceptions of subjective age. Daily stressors were assessed by a written version (Neupert, Almeida, Mroczek, & Spiro, 2006) of the Daily Inventory of Stressful Events (DISE; Almeida, Wethington, & Kessler, 2002) assessing the occurrence of seven types of stressors within the past 24 hours. Individuals received a summed total stressor score for each day with higher scores indicating more stressors.

Daily physical symptoms were measured based on a modified version of Larsen and Kasimatis's (1991) physical symptom checklist and consisted of 28 different symptoms (e.g., fatigue, cough). A daily composite was created for each day based on the sum of experienced symptoms. Higher scores indicate more reported physical symptoms, or poorer physical health. Additionally, we controlled for age, gender, and education.[1]

Analyses

To control for outliers, daily subjective age scores falling outside the bottom and top 2.5% of responses for each age group were recoded to the nearest score (95% winsorization, occurring for 41 older adult and 36 younger adult daily responses). The original scores for older adults ranged from feeling 46 years younger to 36 years older ($M = -9.12$, $SD = 10. 23$, skewness $= -0.46$, Kurtosis $= 2.22$). The winsorized scores ranged from feeling 32 years younger to 5 years

older $(M = -9.24, SD = 8.88$, skewness $= -0.60$, Kurtosis $= 0.00$). The original scores for younger adults ranged from feeling 16 years younger to 112 years older $(M = 4.07, SD = 12. 31$, skewness $= 4.10$, Kurtosis $= 21.00$). The winsorized scores ranged from feeling 5 years younger to 42 years older $(M = 3.62, SD = 9.34$, skewness $= 2.82$, Kurtosis $= 7.83$).[2]

Data were analyzed using multilevel modeling (MLM; Raudenbush & Bryk, 2002). Daily control, as well as daily covariates were person-mean centered (e.g., average person-level control was included at Level 2) to adjust for individual differences in control, and to focus our analyses on daily fluctuations from individuals' average control. We accounted for time in study by adding study day as a within-person (Level 1) covariate. Age was centered at the minimum age for the group (for older adults = 60, for younger adults = 18).

Results

As previous work has found age-related differences in variability in daily subjective age (Bellingtier & Neupert, 2018), we conducted two unconditional models to measure the level of variability within (Level 1) and between (Level 2) younger and older adults in subjective age. Significant variability was found within and between individuals for both age groups. For older adults, 66% of variance was between people ($\tau_{00} = .011, p < .0001$) and 34% was within people ($\sigma^2 = .006, p < .0001$). In comparison, for younger adults, 44% of variance was between people ($\tau_{00} = .11, p < .0001$) and 56% was within people ($\sigma^2 = .14, p < .0001$). Descriptive statistics for the two groups are found in Table 1.

Next, we predicted daily subjective age from daily control beliefs while controlling for gender, age, education, daily stressors (and their person-level average), daily physical symptoms (and their person-level average), time in study, and the interaction of daily control by age. The latter interaction was significant ($\gamma_{11} = 0.11, t = 2.30, p = .02$) suggesting older and younger

adults vary in their relationship between daily control and subjective age. To better understand

this difference, we modeled each age group separately (see Table 2). We included random effects

for the intercept and daily control slope to allow for the possibility that individuals may vary in

their relationship between control and subjective age.

For older adults, daily control beliefs were a significant predictor of daily subjective age

(γ_{10} = -0.04, t = -2.63, p < .01), indicating that on days when older adults' control beliefs were

above their own average, they also felt younger. As we used proportional discrepancy scores,

this corresponds to older adults feeling between 2.4 and 3.6 years younger on days with a 1 scale

point increase in control (Pek & Flora, 2018). There were not significant differences between

older adults in this relationship (τ_{11} = .001, p = 0.14). In other words, all older adult participants

tended to feel younger on days that were higher in control.[3] There were no significant

relationships with any of the covariates, except for study day. As the study progressed, older

adults tended to report older subjective ages (γ_{40} = 0.01, t = 5.19, p < .001). This corresponds to

feeling between 0.6 and 0.9 years older for each day in the study.

For younger adults, daily perceptions of control were not significantly related to their

daily subjective age (γ_{10} = -0.09, t = -1.44, p = 0.15), however there were significant

interindividual differences in this relationship (τ_{11} = .10, p < 0.01).[4] Regarding the covariates, on

days when younger adults experienced more physical health symptoms than usual they also felt

older (γ_{30} = 0.05, t = 4.41, p < .001). For each additional daily health symptom reported beyond

the participant's average, younger adults felt between 0.09 and 1.80 years older. In addition,

younger adults who experienced more stressors on average tended to feel older (γ_{05} = 0.17, t =

2.57, p = .01). Compared to individuals who reported no daily stressors, for each additional

average daily stressor reported young adults felt between 3.06 and 6.12 years older. No other covariates were significant predictors of subjective age.

Discussion

This study is the first to investigate the daily relationship between perceptions of control and daily subjective age. Our findings suggest that this relationship is not consistent between older and younger adults such that daily control was significantly associated with youthful subjective ages in older adults, but not for younger adults. For older adults, believing that your daily efforts can result in desired outcomes appears to co-vary with feeling younger. This relationship held for the entire older adult sample as indicated by a lack of significant interindividual variability around the slope. Importantly, both of these beliefs (i.e., perceptions of control and youth) can fluctuate day to day, indicating that both constructs are malleable, and thus open to possible intervention (Zautra et al., 2012). Interventions that allow older adults to maintain or enhance their control beliefs might also help older adults feel young (Bangerter et al., 2017), but the reverse is likely also true—interventions that lower subjective age might also benefit one's sense of control (Lachman, 2006). Previous research suggests that those with younger subjective ages maintain better memory performance (Stephan, Sutin, Caudroit, & Terracciano, 2016) as they age, and this could contribute to a higher sense of control.

For younger adults, we failed to find a daily relationship between control beliefs and perceptions of youth, but did find that there are significant interindividual differences in this relationship. In contrast to older adults, this finding indicates that some younger adults may feel older on days higher in control, whereas others may feel more youthful on these days. The early adult years are often considered a period of instability (Arnett, 2015), and individuals may vary in how they perceive their subjective age (Bellingtier & Neupert, 2018). Our findings indicate

that younger adults with more stressor exposure are more likely to feel older, and that days with more physical health symptoms are also associated with feeling older, both of which could create a weathering, or aging effect (Foster, Hagan, & Brooks-Gunn, 2008).

Interestingly, stressors and physical health symptoms were not related to daily subjective age in older adults in the multilevel model. This may indicate that it is not as important that stressors or health problems occur, but that older adults feel like they can control and manage them. It may also be the case that previous experiences older adults have had in dealing with stressors may allow them to better cope and adapt to daily events (Bellingtier et al., 2017). On the other hand, younger adults may have less experience managing stressors and health problems, and thus may be less resilient when they occur. Additionally, we found a small, but significant effect of day in study for the older adults, suggesting that study participation was associated with feeling older. As this was an unexpected finding it should be interpreted cautiously, but it is possible that daily prompts to think about one's age also create an aging effect in older adults.

Although we are able to examine patterns of co-variation we are not able to determine causality from these findings. It is likely that the relationship between control and subjective age is bidirectional. Furthermore, age-group differences should be confirmed with longitudinal measurement burst designs, and future research would benefit from the inclusion of a middle-age sample.

In conclusion, our results indicate that when older adults perceive increased control over their daily lives they also feel younger. Fostering control beliefs in the individual (Zautra et al., 2012), as well as shaping the daily environment in ways that allow older adults to exercise more control, could be helpful strategies for maintaining a youthful spirit (Bangerter et al., 2017).

Future work should consider possible differences between individuals to elucidate the

relationship between control and subjective age in younger adults.

Funding

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Footnotes

1. We also considered models controlling for daily study start time. Start time was unrelated to

daily subjective age, and its inclusion did not alter the pattern of findings.

2. Winsorization was used to reduce the impact of outliers without removing the data from the

analyses. We also considered models that retained all data points in their original form and that

trimmed the most extreme scores. The pattern of results remains the same in each approach.

3. We re-ran the older adult model with the control slope constrained. Model fit statistics

indicated a better model fit (constrained AIC = -1228.3, -2LL = -1232.3; unconstrained AIC = -

1246.6, -2LL = -1254.5) and the pattern of results remained the same.

4. For sake of comparison, we re-ran the younger adult model with the control slope constrained.

Model fit statistics indicated that the original unconstrained model was a better fit (constrained

AIC = 805.4, -2LL = 801.4; unconstrained AIC = 781.6, -2LL = 773.6) and the pattern of results

remained the same except there was a main effect of daily control. When younger adults are

forced to conform to the same slope, days high in daily control are associated with younger

subjective ages (γ_{10} = -0.13, t = -2.50, p = 0.01).

Table 1.

Descriptive Statistics and Correlations for Study Variables

Variable	*M (SD) OA*	*M (SD) YA*	1	2	3	4	5
1. Avg. Daily Subjective Age	-8.53 (7.48)	3.82 (6.89)		-.20*	.29*	.42*	-.06
2. Avg. Daily Control Beliefs	3.17 (0.47)	2.88 (0.35)	-.30*		-.07	-.23*	.27*
3. Avg. Daily Stressors	0.42 (0.59)	0.52 (0.57)	.11	-.17		.32*	.19*
4. Avg. Daily Physical Health	1.97 (1.92)	1.62 (1.79)	.23*	-.17	.22*		-.05
5. Chronological Age	64.37 (5.43)	18.96 (1.99)	-.04	.09	-.02	-.02	

Note. OA = older adults (correlations below the diagonal), YA = younger adults (correlations above the diagonal). Avg. daily subjective age is a discrepancy score.

*p < .05.

Table 2

Unstandardized Coefficients (and Standard Errors) of Multilevel Models predicting Daily

Subjective Age

Fixed Effects	Older Adults	Younger Adults
Subjective Age, β_0		
Intercept, γ_{00}	0.09 (0.09)	-0.08 (0.47)
Gender, γ_{01}	-0.03 (0.02)	-0.12 (0.06)
Age, γ_{02}	0.002 (0.002)	-0.04 (0.02)
Education, γ_{03}	-0.01 (0.01)	0.07 (0.06)
Avg. Control, γ_{04}	-0.02 (0.03)	0.03 (0.11)
Avg. Stressors, γ_{05}	0.01 (0.02)	0.17 (0.07)*
Avg. Physical Symptoms, γ_{06}	0.01 (0.01)	0.02 (0.02)
Daily Control slope, β_1		
Intercept, γ_{10}	-0.04 (0.01)*	-0.09 (0.06)
Daily Stressors slope, β_2		
Intercept, γ_{20}	0.01 (0.01)	0.03 (0.02)
Daily Physical Symptoms slope, β_3		
Intercept, γ_{30}	0.01 (0.01)	0.05 (0.01)*
Day in Study slope, β_4		
Intercept, γ_{40}	0.01 (0.001)*	0.01 (0.01)
Random Effects		
Control slope (τ_{11})	0.001 (0.001)	0.10 (0.04)*
Between-person (τ_{00})	0.02 (0.01)*	1.21 (0.37)*
Within-person (σ^2)	0.01 (0.0003)*	0.12 (0.01)*

Note. Subjective age is a winsorized proportional discrepancy score.

*p < .05.