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Early-life Health as a Lifelong Precursor of Self-Related Views of Aging in Later Life

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Abstract

Objectives: Age stereotypes and expectations about one's own aging commence in childhood but most research focuses on predictive associations with midlife health behaviors, later-life chronic conditions, biomarkers, and longevity. Surprisingly little is known about the role of poor childhood health in these associations. This study aims to fill this gap.

Methods: Using data from the Health and Retirement Study (HRS: $N = 5,773$, aged 50–98), we investigated whether diagnosed chronic illness before age 16 and self-rated childhood health predict late-life self-perceptions of aging (SPA) and proportional subjective age discrepancy (PSAD). We conducted multivariate multiple regression analysis (MMRA) to determine the joint and partial effects of the two indicators of childhood health. Models included controls for childhood family financial status as well as late-life self-rated health, chronic illnesses, memory status, and demographic covariates (age, gender, race/ethnicity, marital status, socioeconomic status) in 2016.

Results: Over and above all covariates and the covariation of the two views of one's own aging, the MMRA models revealed that the number of childhood chronic illnesses predicted SPA but not for PSAD. Self-rated childhood health predicted both SPA and PSAD in the unadjusted models, but not in the adjusted models.

Discussion: This study provides new insight into potential early-life precursors of self-evaluations of aging. In particular, childhood diagnoses of chronic illness enhance negative SPA up to 50 years later. Non-normative experiences related to poor health in childhood are lifelong foundations for socioeconomic status, health, and for self-related beliefs about age and aging.

Keywords: Childhood health, Health and retirement study, Multivariate multiple regression analysis, Self-perceptions of aging, Subjective age

Since the 1970s, theory and research has examined associations between societal and individual views of aging and midlife health behaviors, later-life chronic conditions, biomarkers of aging, and mortality (Hess, 2006; Kotter-Grühn, Kornadt, & Stephan, 2016; Levy, 2003). This research reports associations with different general and domain-specific indicators of individual views, including subjective age and age identity, self-perceptions and attitudes to own aging, and awareness of own aging. Conceptual reviews suggest that these indicators are inter-related components of individuals perceptions of their own age and aging

(Kornadt, Kessler, Wurm, Bowen, Gabrian, & Klusmann, 2019; Kotter-Grühn, Kleinsphen-Ammerlahn, Gerstorff, & Smith, 2009; Kotter-Grühn et al., 2016). Although previous studies have examined determinants of individual differences in these indicators in midlife and old age, including personality, education, and current health status, surprisingly little is known about their potential long-term associations with poor childhood health. This study aims to fill this gap.

Two theoretical perspectives inform our study. The Stereotype Embodiment Theory of Levy (2003), for

example, describes the ways in which pervasive social attitudes and stereotypes about old age are internalized from childhood onwards and operate below awareness. As individuals reach socially assigned chronological age categories associated with old age, Levy (2003) suggests that the age stereotypes begin to become aging self-stereotypes. Life-course and life-span theories about the development of identity and self-related beliefs highlight the influence of lifelong interactions with age-structured social systems and social role transitions, in addition to psychological processes such as comparisons between distal and proximal physical, psychological, and health-related markers of developmental change (Barrett & Montepare, 2015; Diehl et al., 2014; Kornadt et al., 2019).

Research derived from these two perspectives finds intriguing age-related crossover patterns in subjective age: Whereas adolescents generally feel older than their actual age, after age 25 young adults report feeling younger, and after age 40 individuals generally feel 20% younger than their actual age (Galambos, Turner, & Tilton-Weaver, 2005; Rubin & Berntsen, 2006). In another study, Galambos, Darrah, and Magill-Evans (2007) found that, unlike 25-year-old adults without motor disabilities who typically feel younger than their actual age, those with severe physical limitations due to cerebral palsy and spina bifida felt older. Galambos et al. (2007) speculated that, in addition to experiencing physical challenges, young adults with disabilities also have to deal with the negative reactions of others, and that these experiences may contribute to them feeling more mature (psychologically older) than their peers. This speculation is consistent with a finding from Schafer (2009) that the off-time experience of a mother's death before age 16 was associated with feeling 3 years older than age peers 50 years later.

Despite extensive research documenting the long-lasting impact of childhood chronic illnesses and family socioeconomic disadvantage on late-life socioeconomic status, chronic morbidity and longevity (e.g., Ben-Shlomo, Cooper, & Kuh, 2016), it remains unclear if poor childhood health also influences late-life perceptions of age and aging. In addition, to the best of our knowledge, little evidence exists about the multivariate relationship between late-life perceptions of age and aging and childhood health after controls for childhood adversity, adult health, and sociodemographic covariates. We use retrospective reports of childhood chronic illness and ratings of childhood health status collected in the Health and Retirement Study (HRS) to examine these open questions. Previous studies report that the HRS retrospective childhood health measures are reliable and associated with late-life comorbidity (Haas, 2007; Smith, 2009).

In accord with the proposals of Levy (2003) and life-span/life-course theories, we hypothesized that poor childhood health would be related to negative self-perceptions of aging and attenuate the extent that people felt younger than their actual age. In addition, we expected that these

effects would remain after controls for childhood family financial status together with known late-life correlates including late-life comorbidity, memory status, and sociodemographic factors (Kotter-Grühn et al., 2016).

Method

Sample

We drew a subsample of age-eligible non-proxy HRS participants from the 2016 biennial wave ($N = 6,187$) who completed a self-administered psychosocial questionnaire and provided retrospective reports about their childhood health and family history (Zhang, Hassan, Larkina, Lee, & Smith, 2020). After excluding 414 people (6.69%) with missing covariates, the final analytic sample consisted of 5,773 midlife and older adults. Compared with participants with missing data, the final analytic sample was younger (Cohen's $d = 0.27$), and more likely to be Non-Hispanic White ($\phi = .05$), married ($\phi = .05$), have more years of education ($d = 0.37$), better memory ($d = 0.31$), fewer adult diagnosed chronic illnesses ($d = 0.17$), less negative self-perceptions of aging ($d = 0.10$), and to report better self-rated childhood ($d = 0.12$) and current health ($d = 0.24$).

Measures

Table 1 provides details and descriptive information for the two childhood health predictors, the two outcome measures and all covariates. Diagnoses of childhood illnesses prior to age 16 were obtained from 58% of the sample in the 2008 biennial interview and collected from later-born cohorts when they entered the study (27% in 2010; 15% in 2016). We summed reports coded in 15 categories (asthma, diabetes, respiratory disorder, speech impairment, allergy, heart trouble, ear problems, epilepsy, migraines, stomach problems, high blood pressure, depression, other psychological problems, disability, and other). The "other" category included reports of specific cancers, musculoskeletal, endocrine, reproductive, and neurological illnesses. Self-rated health in childhood was collected prior and in 2008 for 58% of the sample (in either 1998 or 2004) and at study entry in 2010 and 2016.

In 2016, HRS collected an 8-item measure Self-Perception of Aging (SPA) derived from the Philadelphia Morale Scale and the Berlin Aging Study (Smith, Ryan, Fisher, Sonnega, & Weir, 2017). Five items describe negative evaluations (e.g., "Things keep getting worse as I get older") and three are positive (e.g., "So far, I am satisfied with the way that I am aging"). The Subjective Age item asks: "What age do you feel" (2016 response in years). Consistent with the literature (Kotter-Grühn et al., 2016), we created Proportion Subjective Age Discrepancy (PSAD). Most participants felt younger than their age (75.30%, negative value), 13.86% felt the same age as their chronological age, and 10.84% felt older.

Table 1. Summary of Variables and Descriptive Information

Variable	Description	%, M (SD)
Child illnesses	Sum of 15 health conditions before age 16	0.85 (1.24)
S-R child health	Self-rated health before age 16; 1 = poor, 5 = excellent	4.24 (0.99)
SPA	Self-perception of Aging; coded in negative direction; 1 = strongly disagree to 6 = strongly agree. Cronbach's alpha = .81	3.11 (1.05)
SA	Subjective Age: "What age do you feel?" (Years)	57.08 (14.83)
PSAD	(SA - CA)/ CA; negative values = felt younger	-0.15 (0.18)
Age	Chronological Age (CA) in years; range = 50-98	67.22 (10.71)
Gender	1 = women; 0 = men	59.66%
Race/Ethnicity	African American; Hispanic; white (% reported here)	64.73%
Marital Status	1 = married (reported); 0 = not married (e.g., widowed, divorced, or single)	56.65%
Education	In years; range = 0 - 17	13.12 (2.99)
Family SES ^a	Childhood family financial status; 1 = Good/average; 0 = Poor	70.03%
Adult illnesses	Sum of 8 self-reported diagnoses	2.23 (1.49)
S-R adult health	Self-rated health adult; 1 = poor, 5 = excellent	3.14 (1.02)
Memory	Sum of immediate and delayed word recall; range = 0-20	9.66 (3.23)
Child-to-adult	Interval between reports of child and adult health; coded as 1 = 2008 or earlier (% reported here); 2 = 2010; 3 = 2016	58%

Notes: Analytic sample $N = 5,773$.

SES = socioeconomic status; PSAD = proportional subjective age discrepancy.

^aWealth quintiles (Adult 2016 SES) are described in text.

Details for covariates are described in Table 1, but we expand a few here. Age was entered as a continuous variable [distributed as follows: 46.32% ($n = 2,674$) were between 50 and 64, 38.07% ($n = 2,198$) were between 65 and 79, and 15.61% ($n = 901$) were 80 and older]. For analyses, we coded four racial/ethnicity subgroups: non-Hispanic White (64.72%), African American (17.94%), Hispanic (13.04%), and other (4.30%). As an indicator of current financial status, we created quintiles of the RAND HRS imputed composite for total household wealth. Adult diagnosed illnesses included reports of high blood pressure, diabetes, cancer, lung, heart conditions, stroke, arthritis, and emotional/psychiatric diagnoses (including depression). HRS assesses memory using immediate and delayed recall of a list of 10 words presented orally.

Analytic Strategy

Preliminary descriptive analyses were computed on SPA and PSAD, the childhood health indicators, and 10 covariates (Table 1). Following Elo (1998), we also evaluated the internal validity of the two childhood health measures by determining their relationship with responses to another question included in the HRS childhood measures, namely "Before age 16 year, did you miss a month or more of school because of a health problem?" using a subsample of 4,663 participants. Multivariate multiple linear regression analysis (MMRA) of SPA and PSAD regressed on the childhood health indicators and 10 covariates listed in Table 1. We also included two contrast indicators for race/

ethnicity (African American, Hispanic) and four for the wealth quintile gradient. All analyses were performed using SAS version 9.4. All p -values were reported as 2-sided and statistical significance was defined as p -values $< .05$.

Results

In 2016, SPA and PSAD were significantly correlated $r = .37$ ($p < .001$; see Supplementary Table S1). Interestingly, this correlation was highest in midlife (age 50-64), $r = .41$ and reduced to $r = .22$ ($ps < .001$) in participants over age 80. Reports of childhood illnesses were negatively correlated with self-ratings of childhood health ($r = -.38$; $p < .001$). Consistent with the literature, respondents with more chronic health conditions in 2016, perceived their aging more negatively and felt older, $r = .34$ and $r = .17$ ($ps < .001$), respectively. In addition, they reported more childhood illnesses, rated their childhood health as poor, and rated their adult health as poor, $r = .13$, $r = -.13$, and $r = -.44$ ($ps < .001$), respectively. Furthermore, consistent with Elo (1998), we found that participants who reported having more childhood illnesses were more likely to report having missed months of school compared to those with no childhood health conditions, $\chi^2(1, N = 4,663) = 269.54$, $p < .0001$ ($\varphi = .24$). In addition, whereas only 5.44% of participants reported missing school if they rated their childhood health as excellent, 57.33% of those who rated their childhood health as poor indicated that they had missed a month or more of school, $\chi^2(1, N = 4,663) = 469.42$, $p < .0001$ ($\varphi = .32$).

The initial overall MMRA model that examined the association of the multivariate set of the SPA and PSAD outcomes with each childhood health predictor revealed statistically significant effects for self-rated childhood health [Pillai's Trace = .01, $F(2, 5769) = 39.62, p < .0001$] and for childhood health conditions [Pillai's Trace = .002, $F(2, 5769) = 4.97, p < .01$]. This MMRA model also provides separate multiple regression estimates for each outcome controlling for their covariation. Both childhood measures were significant predictors ($ps < .01$) for SPA and accounted for 2% of the residual variance independent of the covariation with PSAD [Multiple $R^2 = .02$; childhood illnesses ($\beta = 0.03, SE = 0.012, \eta_p^2 = .001$) and self-rated childhood health ($\beta = -0.13, SE = 0.015, \eta_p^2 = .014$)]. Similarly, estimates for both childhood measures were significant for PSAD, ($ps < .05$) and accounted for 1% of the variance independent of the covariation with SPA [Multiple $R^2 = .01$; childhood illnesses ($\beta = 0.01, SE = 0.002, \eta_p^2 = .001$) and self-rated childhood health ($\beta = -0.01, SE = 0.003, \eta_p^2 = .002$)].

The fully adjusted overall MMRA model included controls for current chronic illnesses, self-rated adult health, memory status, all sociodemographic covariates, and the interval between childhood and adult measures (Table 2). In this model, the effect for childhood illnesses remained significant, Pillai's Trace = .001, $F(2, 5752) = 3.49, p = .03$. However, the overall effect for self-rated childhood health was no longer significant, Pillai's Trace = .0003, $F(2, 5752) = 0.84, p = .43$. The separate multiple regression

estimates within this fully adjusted MMRA model revealed that the partial effect of childhood illnesses was significant for SPA ($p < .01; \eta_p^2 = .0012$) but not for PSAD ($p = .86; \eta_p^2 = .0000$). Together, the two predictors and 10 covariates accounted for 28% of SPA variance, and for 10% of PSAD variance. The partial effect for self-rated adult health was strongest overall. A follow-up analysis added a variable to indicate whether or not the childhood illness remained present in adulthood. Of the 2,689 participants who reported a childhood illness, 32.63% reported still having the condition. The addition of this variable did not change the findings reported above.

Discussion

To the best of our knowledge, this is the first study to examine the role of childhood health on late-life perceptions of age and aging in a large, nationally representative sample of older adults.

Furthermore, we asked if two indicators of childhood health showed similar relationships with two conceptually- and statistically related measures of age-related perceptions, SPA and PSAD. Consistent with conceptual reviews and earlier studies that included both SPA and PSAD (Kotter-Grühn et al., 2009; Spuling, Klusmann, Bowen, Kornadt, & Kessler, 2019), we found that SPA and PSAD are inter-related and associated with concurrent health and life contexts. Whereas Kotter-Grühn et al. (2009) reported differences in the processes underlying changes in SPA and

Table 2. MMRA-Adjusted Model Predicting Two Views of Aging

	Self-Perception of Aging			Proportional Subjective Age			
	β	SE	η_p^2	β	SE	η_p^2	η_p^2
Intercept	3.948**	.158		.107**	.031		
S-R child health	-.017	.014	.0003	-.001	.003	.0000	.0000
Child illnesses	.028**	.011	.0012	.0004	.002	.0000	.0000
Age	.009**	.043	.0043	-.001**	.001	.0002	.0002
Race							
AA	-.356**	.035	.0207	-.049**	.007	.0123	.0123
Hispanic	-.265**	.040		-.048**	.008		
Education	-.008	.005	.0005	-.001	.001	.0004	.0004
Wealth							
Q1	.207**	.045	.0059	-.006	.009	.0028	.0028
Q2	.215**	.041		-.009	.008		
Q3	.076	.039		-.015*	.008		
Q4	.072	.037		-.012	.007		
Family SES Poor	.026	.027	.0002	-.007	.005	.0019	.0019
Adult illnesses	.075**	.009	.0104	.009**	.002	.0076	.0076
S-R adult health	-.414**	.014	.1341	-.046**	.003	.0578	.0578
Memory	-.016**	.004	.0024	-.001	.001	.0015	.0015
Multiple R^2	.28			.10			

Notes: * $p < .05$; ** $p < .001$.

β = standardized regression coefficient; SE = standard error; η_p^2 = effect size (partial eta-square). Model also includes gender, marital status, and child-adult measure time interval (all not significant). Race ref = non-Hispanic White; Wealth ref = Q5 highest wealth; Family SES ref = Good/average.

PSAD after age 70, the present study revealed differential links to indicators of childhood health.

One intriguing insight from the present study is the finding that chronic illnesses in childhood play a long-lasting, small role in enhancing negative SPA but have no direct effect on PSAD after controls for known strong proximal associations between these views of aging and current comorbidity. In line with Levy's (2003) proposals, this SPA finding suggests that non-normative potentially stigmatizing health-related experiences that have implications for long and potentially recurring absences from school may contribute to individuals dissociating from the healthy age stereotype linked to adolescence and young adulthood. Perhaps these young adults begin to self-stereotype with negative age characteristics usually associated with older adults. This interpretation is consistent with a life-course/ life-span perspective and suggestions by Galambos et al. (2007) and Schafer (2009). The self-stereotyping process may be enhanced after individuals reach midlife and encounter new illnesses and additional body reminders of aging (Barrett & Gumber, 2020; Barrett & Montepare, 2015).

New questions about underlying explanatory processes are also opened by the finding that self-rated poor childhood health was not significant after adjusting for 10 indicators of known late-life correlates of SPA and PSAD. Of note, is the relatively stronger partial effect of the associations of current self-rated adult health with PSAD compared with those for current diagnosed illnesses. In part, this may reflect shared method variance and the limitations of interpreting residual variance in MMRA models (Fritz, Morris, & Richler, 2012; Lynam, Hoyle, & Newman, 2006). In addition, previous research suggests that retrospective subjective ratings are less reliable than recall of autobiographical factual information (Smith, Hu, & Lee, in press; Vuolo, Ferraro, Morton & Yang, 2014) and that late-life subjective age fluctuates day-to-day and in response to pain and illness (Kotter-Grühn et al., 2016). Replication and resolution of these findings and interpretation await future research.

Interpretations of the study findings are limited by the lack of early-life measures of perceptions of aging. Future studies could model changes in SPA and PSAD after 2008 when most of the retrospective childhood were collected. It would also be interesting to examine the effects of childhood health on age-cohort and racial/ethnic group differences in the intertwining of late-life changes in SPA and PSAD. Alternatively, future studies could examine age-cohort and racial/ethnic group differences in childhood health and their subsequent links with SPA, PSAD, and other self-related views of age and aging and health (including biological markers of aging). We included only one indicator of childhood disadvantage but others are available in HRS. The findings are of course also limited by selective mortality: HRS participants who reported histories of poor

childhood health in 2008 may not have survived to complete the 2016 wave. Despite these limitations, this study points to the benefits of extending research on self-perceptions of age and aging to consider developmental precursors not only in early life but throughout the life of individuals.

Supplementary Material

Supplementary data are available at *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences* online.

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