

## Childhood environment as a predictor of perceived health status in late life

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### Abstract

Prior studies have shown that perceived health status is a consistent and reliable predictor of morbidity and mortality. Because perceived health status and objective health are not highly correlated, we sought to identify additional factors that shape self-perceptions of health. Research suggests that childhood experience is an important predictor of health in adulthood, but most studies are retrospective. Using data from a 70-year prospective study of psychosocial development, we examined the quality of childhood environment as a predictor of perceived health in late life. This study utilizes questionnaire data from a longitudinal study of adult development to examine predictors of perceived health across seven decades. Participants were members of the Study of Adult Development, a longitudinal study of men followed for seven decades beginning in late adolescence. Childhood environment characteristics were assessed during home visits and interviews with respondents' parents at entry into the study. At ages 63, 73, and 78, current health status was measured by an internist not affiliated with the Study, and perceived health was assessed via self-report questionnaires. Linear regression analyses were conducted to examine childhood environment as a predictor of perceived health status at these 3 time points while controlling for concurrent objective health and young adult neuroticism. Childhood environment predicted perceived health at all 3 time points. This study supports the hypothesis that the quality of childhood environment makes a unique contribution above and beyond personality traits and objective health status to perceptions of health in late life.

### Introduction

Prior studies have shown that perceived health status is a consistent and reliable predictor of morbidity and mortality.<sup>1,2</sup> Understanding the determinants of older adults' perceptions of their health is there-

fore of great significance both psychologically and medically. Surprisingly, perceived health status is not highly correlated with indices of objective health status such as ratings derived from medical records and physical examinations,<sup>3</sup> suggesting that much of the variance in perceived health is explained by other factors. Although childhood experience has been shown to be an important predictor of objective health in adulthood, most studies have relied on retrospective data.<sup>4,5</sup> This study uses data from a 70-year longitudinal study of adult development to examine childhood environment as a predictor of perceived health in late life over and above objective measures of health.

Perceived health has been one of the most frequently employed health indicators in sociological health research since the 1950s,<sup>6</sup> and became the subject of increased research attention as its surprisingly close relation to mortality was revealed.<sup>7</sup> Possible explanations for the predictive power of self-perception over and above objective health status include the idea that perceived health encompasses additional knowledge about the seriousness and trajectory and clinical course of the individual's conditions, and that it reflects the perception of prodromal phases of illness that have not yet become clinically manifest.<sup>8</sup> Moreover, individuals who have been diagnosed with chronic disease are able to make comparisons – both with their past selves and with others. Patients receiving care for their illness can compare relevant aspects of their present state with their own condition in the recent and distant past, and have multiple opportunities for comparisons with physically and socially similar others.<sup>8</sup>

Perceived health in adulthood has been linked in several studies with childhood experiences. Repetti *et al.*<sup>9</sup> found that even mild forms of family dysfunction, including non-nurturant behavior, can exert lifelong effects upon perceived health. Dissension in the family during childhood has been found to be associated with increased self-reported illnesses 13 years later.<sup>10</sup> Elstad found that stressful relations with parents during childhood have direct negative effects on perceived health and degree of activity limitations in adulthood due to longstanding health problems.<sup>5</sup> Conversely, research suggests that warm, nurturant contact during early life (in both animal and human studies) has beneficial effects on the functioning of biological stress regulatory systems across the life span and ultimately on health.<sup>9,11-15</sup>

Retrospective studies have found robust links between childhood experiences and later perceived health. For example, the seminal Adverse Childhood Experiences (ACEs) study reveals associations between the number of categories of ACEs recalled by adult partici-

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pants and many of the diseases that are leading causes of death in the US.<sup>16</sup> However, little work has been done on the predictors of late-life subjective health ratings using longitudinal data collected prospectively over decades, and only a few studies have spanned the entirety of adulthood from adolescence to old age.<sup>17</sup> Because memory may be unreliable and is often biased by current conditions, findings of studies that rely on memories of events that occurred many decades in the past must be viewed with caution.<sup>18</sup>

The current study employs a unique dataset collected in late adolescence, much closer to childhood in time than most data that are available. In addition, the study employed multiple informants to gather information regarding childhood environmental characteristics, allowing for a more reliable picture than can be gleaned from self reports alone. In order to account for the possible influence of personality on self-assessments of childhood environment,<sup>19</sup> we used ratings of participants' level of neuroticism, a trait associated with more negative reactivity to environmental stress,<sup>20</sup> at roughly the time of their reports about their childhood environments to control for this source of potential bias. As adults, participants supplied perceived health ratings at multiple time points; these repeated measures over several years allow for a more reliable index of subjective health. Lastly, objective health ratings were obtained by an independent research physician who examined participants' medical records.

This study examines two questions: i) Does the quality of one's childhood environment

predict late-life perception of health? ii) If so, does childhood environment make a unique contribution to late-life perceived health ratings over and above objective health status?

## Materials and Methods

### Participants

Between 1939 and 1942, a university health service recruited 268 male college sophomores (ages 18-19) for an intensive multidisciplinary study named the Study of Adult Development. They were selected because college entrance examinations revealed no mental or physical health problems, and their deans perceived them as likely to become successful adults. All were white; 50% were on scholarships or needed to work during college to meet expenses; 64% eventually obtained graduate degrees. In adult life, most worked as physicians, lawyers, university professors, or business executives. The students' parents were interviewed and extensive family, social, and medical histories were obtained. Of the original study group of 268 men, 12 dropped out of the study during college and eight were killed in World War II. On entering the study, the men were assessed by internists, psychiatrists, psychologists, and anthropologists.

Information was solicited from all study participants at each time point. Response rates to each assessment varied, as did rates of response to requests for medical records from participants' primary care physicians. For

these reasons, complete data were available on a subset of participants at each time point, with *N*s for final regression models ranging from 100 to 134 (Table 1). Participants included in analyses did not differ from those with missing data with respect to quality of childhood environment, age 21 neuroticism, age 21 IQ, or childhood health (all two-tailed *t*-tests non-significant).

### Procedures

Participants were asked to rate their perceived health via written questionnaires at ages 61, 63, 65, 71, 73, 75, 77, and 79. Medical records were obtained from participants' physicians at 5-year intervals during the same period of time and were rated by an internist who was unaware of other information about the participants. When participants entered the study at age 19, they and their parents were interviewed by a study staff member about home life and childhood experiences. Participants were also interviewed by a study psychiatrist at age 21 to assess personality traits.

### Measures

#### *Childhood environment, assessed at study entry*

Two research assistants reviewed 10-20 hours of social history gathered from each of the participants and his family. Data used to rate childhood environment included both the psychiatrist's and family worker's notes on the boy's reports of his home life, the family worker's interview with the parents in their home, and a developmental history obtained by the

family worker from the parents. Childhood environment was rated on five dimensions: global impression, family cohesion, and relations with mother, father, and siblings. Each dimension was rated on a scale ranging from 1 (weakest) to 5 (strongest). Inter-rater reliability was  $r=0.71$ . Predictive validity of this composite variable has been supported in several prior studies, including a study by McLaughlin *et al.*,<sup>21</sup> in which childhood environment predicted an elevated risk for developing mood and anxiety disorders in adulthood.

#### *Neuroticism at age 21*

Neuroticism was indexed using ratings of 25 personality traits made by study staff (including a study psychiatrist and psychologist) when participants were young adults.<sup>22</sup> These 25 personality traits were later scored by independent coders for their degree of correspondence to each of the Big Five personality factors, Neuroticism, Extraversion, Agreeableness, Conscientiousness and Openness to Experience,<sup>23</sup> in order to construct scales that approximated these overarching factors. Principal components analysis yielded five orthogonal factors that were correlated highly with the original scales with which they were identified. Neuroticism is thought to capture the dimension of personality that taps individual differences in the inclination to construct, perceive, and feel reality as problematic, threatening, and difficult; and to feel negative emotions such as fear, shame, and anger.<sup>24</sup> Neuroticism scores based on early adult person-

**Table 1. Hierarchical regression analysis predicting subjective health status at ages 63 (n=133), 73 (n=134), and 78 (n=100).**

Variable	B	SE	Standardized $\beta$	$\Delta R$ square
<b>Step 1</b>				
Neuroticism, age 21	-0.02	0.01	-0.16*	0.08
Objective health at age 63	0.22	0.08	0.23*	
<b>Step 2</b>				
Neuroticism, age 21	-0.01	0.01	-0.14*	0.03
Objective health at age 63	0.21	0.08	0.22*	
Childhood environment	0.03	0.01	0.19**	
<b>Step 1</b>				
Neuroticism, age 21	-0.02	0.01	-0.17**	0.15
Objective health at age 73	0.36	0.08	0.34****	
<b>Step 2</b>				
Neuroticism, age 21	-0.02	0.01	-0.14*	0.03
Objective health at age 73	0.34	0.08	0.33****	
Childhood environment	0.03	0.01	0.19**	
<b>Step 1</b>				
Neuroticism, age 21	-0.03	0.01	-0.23**	0.18
Objective health at age 78	0.42	0.11	0.35****	
<b>Step 2</b>				
Neuroticism, age 21	-0.03	0.01	-0.22**	0.04
Objective health at age 78	0.41	0.11	0.34****	
Childhood environment	0.04	0.02	0.20**	

SE, standard error.

\* $P<0.10$ ; \*\* $P<0.05$ ; \*\*\* $P<0.01$ ; \*\*\*\* $P<0.001$

ality ratings were significantly correlated with neuroticism as measured by the NEO-PI when participants were age 60,<sup>22</sup> supporting the validity of these early adult factor scores.

### Objective health, assessed every 5 years

Medical records were rated by an internist who was unaware of other information about the participants. A rating of 5 indicated excellent physical health; a rating of 4 indicated minor irreversible problems (*e.g.*, glaucoma, gout, well-controlled hypertension); a rating of 3 indicated life-shortening irreversible illness (*e.g.*, diabetes, myocardial infarction); a rating of 2 indicated chronic illness with substantial disability (*e.g.*, advanced emphysema or multiple sclerosis); and a rating of 1 indicated that the subject was confined to a nursing home and needed help with self care. Predictive validity of these ratings is evidenced by their association in the expected directions with pack-years of smoking, alcohol abuse, and body-mass index.<sup>25</sup>

### Perceived health status, assessed at age 63, 73, and 78

Perceived health status was measured every two years with a single question assessing the

respondent's global perception of his state of health. This single question was taken from the SF-36 questionnaire.<sup>26</sup> Responses were scored 0=poor, 1=fair, 2=good, 3=very good, 4=excellent. There is general agreement as noted by Fayers and Sprangers,<sup>27</sup> Ware *et al.*,<sup>28</sup> and Barsky *et al.*,<sup>29</sup> that a single global rating of overall health is a valid measure of perceived health status. To improve the reliability of the ratings, and to correspond to the time intervals of objective health measures, the mean of consecutive perceived health ratings was used to calculate a composite perceived health rating for each of the ages studied (age 63, 73 and 78). Thus the mean of ratings at ages 61, 63, and 65 questionnaires was used as an index of perceived health at age 63. The mean of ratings at ages 71, 73, and 75 was used as an index of perceived health at age 73; and the mean of ratings at ages 77 and 79 for perceived health at age 78.

### Statistical analyses

Correlations were conducted among the variables of interest. Linear regression analyses were conducted to examine childhood environment as a predictor of late-life perceived health status at ages 63, 73, and 78 respectively, after controlling for concurrent objective health status and age 21 neuroticism.

## Results

The mean rating of *objective* health from medical records varied with age in the expected direction: mean objective health was 3.75 (SD=0.77) at age 63, 3.06 (SD=0.71) at age 73, and 2.75 (SD=0.68) at age 78. The mean *perceived* health rating was 3.32 (SD=0.85) at age 63, 2.97 (SD=0.85) at age 73, and 3.73 (SD=0.90) at age 78. Most men rated their health as excellent (*n*=62) or very good (*n*=43) at age 63. With one exception, no one rated his health as poor at any age, and perceived health ratings improved on average between age 73 and age 78.

Ratings of the quality of men's childhood environment ranged from 2 (poor) to 19 (very good) with a mean of 9.56 (SD=4.17).

Correlations among the variables of interest were performed (Table 2). Childhood environment exhibited a significant positive correlation with perceived health at ages 63 and 73 and was correlated with perceived health at age 78 at a level approaching significance. Neuroticism at age 21 was negatively linked with perceived health at ages 73 and 78, and with perceived health at age 63 at a level approaching significance. Correlations between objective health and perceived health ranged from 0.30 to 0.34.

Table 2. Pearson correlations among predictors and perceived health at ages 63, 73, and 78.

		Childhood environment	Neuroticism, age 21	Objective health, age 63	Objective health, age 73	Objective health, age 78	Perceived health, age 63	Perceived health, age 73	Perceived health, age 78
Childhood environment	<i>r</i>								
Mean=9.560	<i>P</i>								
SD=4.172	<i>N</i>								
Neuroticism, age 21	<i>r</i>	-0.16*							
Mean=68.33	<i>P</i>	0.04							
SD=21.062	<i>N</i>	168							
Objective health, age 63	<i>r</i>	0.05	-0.4						
Mean=3.75	<i>P</i>	0.45	0.64						
SD=0.766	<i>N</i>	212	168						
Objective health, age 73	<i>r</i>	0.07	-0.056	-0.37**					
Mean=3.062	<i>P</i>	0.36	0.50	0					
SD=0.708	<i>N</i>	177	150	177					
Objective health, age 78	<i>r</i>	0.05	0.03	0.20*	0.48**				
Mean=2.750	<i>P</i>	0.56	0.77	0.02	0				
SD=0.685	<i>N</i>	144	125	144	144				
Perceived health, age 63	<i>r</i>	0.18*	-0.31**	0.34**	0.21*	0.04			
Mean=3.290	<i>P</i>	0.02	0	0	0.01	0.67			
SD=0.786	<i>N</i>	171	141	165	134	113			
Perceived health, age 73	<i>r</i>	0.21**	-0.29**	0.31**	0.30**	0.19*	0.49**		
Mean=2.953	<i>P</i>	0.01	0	0	0	0.03	0		
SD=0.832	<i>N</i>	173	159	172	156	132	143		
Perceived health, age 78	<i>r</i>	0.17	-0.32**	0.20*	0.28**	0.30**	0.47**	0.65**	
Mean=3.270	<i>P</i>	0.05	0	0.02	0	0	0	0	
SD=0.928	<i>N</i>	135	122	134	134	118	107	130	

\**P*<0.05; \*\**P*<0.01.

Childhood environment was associated at the trend level with age 21 neuroticism ( $r=-1.3, P=0.098$ ), reflecting the possible influence of personality on participants' assessments of their childhoods. Because participants' assessments of childhood environment were one component of the composite childhood environment ratings (along with ratings by psychiatrists, family workers, and parents), controlling for participant neuroticism was done to eliminate this potential source of bias in self-rated childhood environment.

We used hierarchical linear regression analysis to examine the contributions of childhood environment and concurrent objective health in predicting perceived health at ages 63, 73, and 78 respectively, while controlling for age 21 neuroticism. Table 1 presents the results of three linear regression models in which childhood environment, age 21 neuroticism, and concurrent objective health were entered as independent variables and perceived health as the dependent variable. Controlling for age 21 neuroticism and concurrent objective health, childhood environment was a significant predictor of perceived health at all 3 time points. We found that these models predicted 11, 18, and 22 percent of the variance at ages 63, 73, and 78, respectively. Even when we controlled in all 3 models for midlife SES as indexed by income at age 55, findings were essentially unchanged.

## Discussion and Conclusions

This study examined predictors of perceived health in late life. By utilizing unique longitudinal data spanning seven decades of life, it helps shed light on childhood environment as a predictor of health perception in late life after accounting for concurrent objective health status and early life personality. Childhood environment ratings were derived from reports by multiple observers when participants were teenagers.

The association of early adult neuroticism with poorer perceived health ratings later in life is not surprising. Neuroticism has been previously linked by Williams *et al.*<sup>20</sup> and Okun *et al.*<sup>30</sup> with somatic complaints and poorer ratings of one's own health.

Of particular interest is the finding that childhood environment predicts ratings of perceived health 45, 55, and 60 years later. Given that the quality of childhood experience is associated with neuroticism in adulthood and with objective health in later life,<sup>5</sup> the fact that childhood environment made a contribution to perceived health ratings independent of these other two factors is remarkable and raises the question of the mechanisms by which this influence across many decades might occur.

Several possible mechanisms suggest themselves. It is possible that a secure and stable childhood environment enhances and fosters the development of positive psychological characteristics in the children that predispose them to view themselves and their health in a more positive and favorable light as adults. Enduring traits developed in childhood, such as optimism, satisfaction, hardiness, mastery and self-control, even vitality and a general sense of subjective well-being, may well predispose the adult to view him/herself in a generally more positive fashion. Taylor has reviewed recent research that links childhood environment with development of such psychological resources.<sup>31</sup> Recent work on attachment and attachment styles offers another possible mechanism whereby childhood environment predisposes to an improved perception of one's health. It has been found by Stuart and Noyes and Ciechanowski *et al.*,<sup>32,33</sup> that a secure attachment style (as opposed to fearful, preoccupied and dismissive styles) is related to symptom reporting and medical care utilization in later life, both of which are based on perceived health.

The strengths of this study are worth noting. First, the data come from one of the longest prospective studies of adult development ever conducted – providing over seven decades of information relevant to the study of healthy aging. Childhood environment ratings, obtained retrospectively from older adults in most similar studies, were in this study made during late adolescence by multiple informants using a variety of questions to form a composite score. And objective ratings of physical health were made by an independent physician from medical records, while blind to other data about participants.

This study has several limitations. First, it includes only men, all of whom were Caucasian and from a particular historical cohort. Therefore, any attempt to generalize these findings to other populations must be supported by further research. Research indicates that SES is associated with one's objective health status. Whether defined according to educational attainment, income, or occupational status, numerous studies have found that lower SES is associated with poorer health and with premature mortality.<sup>34</sup> Conversely, higher socioeconomic status is related to more favorable health outcomes.<sup>35,36</sup> Participants in this study were all from middle- and upper-middle class families, eliminating one potential confounding factor but suggesting another possible limitation to the generalizability of study findings. The age 21 neuroticism variable was constructed using ratings of personality traits done by study staff. These ratings were subsequently factor analyzed. There may be discrepancies between neuroticism as commonly assessed via self-administered scale

and this composite of clinician ratings. It should be noted that no formal assessments of neuroticism existed 60 years ago when participants were examined as young adults. Finally, although it has been shown that a single, global question asking patients to rate their overall health is a useful and reliable indicator of perceived health, this single question may not have fully captured participants' perception of their states of health.

Further research exploring the association between the quality of one's childhood environment and later perceived health status may help address potential mediators of this link. Such research would be helpful in identifying potential areas of intervention in a medical setting with individuals who have suffered significant childhood adversity, particularly given that perceived health status is a consistent and reliable predictor of morbidity and mortality.

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