

# Longitudinal Benefit of Positive Self-Perceptions of Aging on Functional Health

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**We examined whether those with more positive self-perceptions of aging (older individuals' beliefs about their own aging) report better functional health over an 18-year period than do those with more negative self-perceptions of aging. We found that those with more positive self-perceptions of aging in 1975 reported better functional health from 1977 to 1995, when we controlled for baseline measures of functional health, self-rated health, age, gender, race, and socioeconomic status. We also demonstrated that perceived control partially mediates the relationship between self-perceptions of aging and functioning. The sample consisted of 433 participants in the Ohio Longitudinal Study of Aging and Retirement, a community-based study of individuals aged 50 and older, who were interviewed in 6 waves. Our study suggests that the way in which individuals view their own aging affects their functional health.**

AMONG those aged 70 years or older living in the community, 20% report a problem with functioning (Kramarow, Lentzner, Rooks, Weeks, & Saydah, 1999). Functional limitations significantly predict number of physician and hospital visits (Mor, Wilcox, Rakowski, & Hiris, 1994; Stump, Johnson, & Wolinsky, 1995), nursing home admissions (Branch & Lu, 1989; Severson et al., 1994), and mortality (Inouye et al., 1998; Sauvaget, Tsuhi, Aonuma, & Hisamichi, 1999). Although the disability rate among older persons has recently declined, it is estimated that from 1985 to 2020 the population of elderly individuals with disabilities will triple because of the growing number of older persons and their increased life expectancy (Manton, Stallard, & Corder, 1998).

Much of the research examining factors that predict the course of disability has focused on physical and cognitive measurements, such as lower extremity functional limitations and low scores on the Mini-Mental State Exam (e.g., Gill, Williams, & Tinetti, 1999; Stuck et al., 1999). Relatively few studies have examined psychological and social predictors of disability, which may be more modifiable than other types of factors (Kempen et al., 1999). Moreover, although a number of studies have examined the role of sociodemographic factors, such as gender, race, and age, on the course of disability (Aldwin & Gilmer, 1999; Merrill, Seeman, Kasl, & Berkman, 1997), they have tended to ignore the meaning that individuals assign to being a member of one of these groups. In the present study, we examine a social psychological predictor: self-perceptions of aging, or older individuals' beliefs about their own aging.

This is the first study to examine whether those individuals with more positive self-perceptions of aging experience better functional health over time, controlling for baseline functional health and other relevant variables.

The empirical framework for this study emerges from a series of studies by Levy and her colleagues. We determined that self-stereotypes of aging, or older individuals' beliefs about the elderly population, can effect their cognitive and

physical functioning. Older individuals who were randomly assigned to a positive stereotype of aging subliminal priming intervention demonstrated better memory performance, more controlled handwriting, faster walking, stronger will to live, and a lower cardiovascular response to stress, as compared with those randomly assigned to a negative stereotype of aging group (Hausdorff, Levy, & Wei, 1999; Levy, 1996; Levy, 2000; Levy, Ashman, & Dror, 1999–2000; Levy, Hausdorff, Hencke, & Wei, 2000).

The present study seeks to build on our previous research in three ways. First, although it was assumed in these earlier studies that self-stereotypes of aging were relevant to older individuals' identities, perceptions of their own aging were not measured. The present study uses the elderly participants' self-perceptions of aging as the predictor. Second, the self-stereotypes of aging were induced experimentally in the previous studies. In the present study, the self-perception of aging variable is measured in the context of a longitudinal study (i.e., as the self-perceptions developed naturally in the community). Lastly, in the previous studies we observed the results of the self-stereotypes of aging intervention at the time of the experiment. In the present study, the outcome is examined over an 18-year period.

## *Background to Self-Perceptions of Aging Determining Function*

*Social influence on self-perceptions of aging.*—The theoretical framework for this study is provided, in part, by George Herbert Mead, who conceptualized a social basis for the self. According to Mead (1934), the “self is constituted not only by an organization of these particular individual attitudes [of others], but also by an organization of the social attitudes of the generalized other or the social group as a whole to which he belongs” (p. 158).

Although negative attitudes about aging were not specifically addressed by Mead, they are part of the universe of

attitudes with which he was concerned. When these attitudes are internalized, according to Mead, they become part of the individual's self (Mead, 1934). There is, then, a risk that the resultant negative self-perceptions about aging will become negative expectations, or predictions, about how the individual's process of growing old is likely to be experienced.

Ultimately, when an individual reaches late adulthood, these expectations may become reality. Robert Merton (1957) described this mechanism: "The self-fulfilling prophecy is, in the beginning, a *false* definition of the situation evoking a new behavior which makes the originally false conception *true*" (p. 423). Gordon Allport (1958) expanded Merton's definition when he wrote, "To the countless subtle ways in which expectancy of certain behavior in others evokes that very behavior, Robert Merton has given the term 'self-fulfilling prophecy'" (p. 156). Allport thereby applied the concept to any behavioral expectancy, not just one that is predicated on Merton's "false definition of the situation." Further, whereas all of Merton's examples of the self-fulfilling prophecy had negative consequences, Allport proposed that it "may lead to a benign circle as well as to a vicious circle" (p. 156). These reinterpretations of Merton help to accommodate the range of attitudes about aging that exist in the community. Although positive attitudes about aging are less prevalent (Levy & Banaji, 2002), they may also be internalized, with resultant positive expectations and, in turn, positive self-perceptions.

The process by which individuals develop perceptions about themselves as old persons draws on two stages of expectations. First, there are the expectations internalized during the lifetime that preceded old age. They initially have no direct relevance to those holding them. These aging expectations include trajectories of attributes that will increase or decrease at different points over the life span. Heckhausen and her colleagues found there was a high degree of agreement among their young, middle-aged, and older German participants about the predicted trajectories (Heckhausen, Dixon, & Baltes, 1989). Attributes such as slow and clumsy were perceived as increasing in the 50s and continuing to the late 80s, whereas attributes such as persevering and adaptable were perceived as starting in the late 20s or early 30s and declining in the 60s.

The second stage of expectations occurs through encounters that elderly individuals have in everyday life. Underlying these encounters there are likely to be negative expectations that can have an adverse impact on the targets. This effect was suggested when college students were asked to teach a task by videotape to either a college-aged student or an elderly woman (Harris, Moniz, Sowards, & Krane, 1994). Those who thought they were teaching an older person were judged as less friendly and more nervous than were those who thought they were teaching a college student. In the second part of the study, the researchers showed the videotapes from the first part of the study to another group of college students. Those who watched one of the videotapes created for an older woman identified fewer concepts correctly and disliked the teacher more than did those who watched a videotape created for a college student (Harris et al., 1994).

The impact of negative expectations on older individuals, which is implied by the above study, was made explicit in

studies of conversations. Research has shown that when speaking to older adults, younger people tend to automatically adopt patronizing language, which includes shorter words and sentences, and older individuals may change their language accordingly (Hummert, 1999; Williams & Giles, 1998; for reviews of the literature on ageism, see Levy & Banaji, 2002; Nelson, 2002; Palmore, 1990).

Variations in contact with ageism are likely to cause variations in the extent to which individuals internalize negative aging stereotypes. Subgroups are a source of this variance when they act as a buffer. As an example, the aged deaf may benefit from limited access to television, radio, and everyday conversations. This might help to explain why older deaf individuals were found to report more positive attitudes toward aging and to demonstrate better memory performance than older hearing individuals (Levy & Langer, 1994).

*Effect of expectations on physical functioning.*—The impact of expectations on health has been well documented in the literature on placebo effects. Both positive and negative expectations have had positive and negative outcomes, respectively. In one study, 52% of the colitis patients treated with a placebo reported feeling better, and an examination showed that 50% of the intestines were less inflamed (Meyers & Janowitz, 1989). In another study, harmless leaves were described as "poison ivy" and then rubbed against participants' skin; rashes developed in the same places the participants' skin had been rubbed (Blakeslee, 1998). (A recent review of published placebo studies found that there was a significant effect on pain, but none on several other categories—which did not include those into which our two examples fall, Hrobjartsson & Gotzsche, 2001.)

Research suggests that older individuals may be particularly vulnerable to expectations (Neugarten, 1996, p. 31). Therefore, it is not surprising to find that expectations predict the physical recovery of elderly patients. The most relevant study involved individuals over the age of 65 who had recently experienced a hip fracture. Those participants who reported more positive expectations for recovery were better able to walk 3 months after the hip fracture, controlling for severity of fracture and medical history (Borkan & Quirk, 1992).

In our study, we tried to determine whether self-perceptions of aging is a concept that adds new explanatory variance, and is not just another way to measure the more established predictors of function: self-rated health and affect (Idler & Kasl, 1995; Idler, Russell, & Davis, 2000; Rantanen et al., 2000). Hence, as is described in the Methods and Results sections, we examined whether self-perceptions of aging still predict function when self-rated health and loneliness were included as covariates in the model.

*Perceived control as a potential mediator.*—There are three pathways by which self-perceptions of aging could influence functioning: behavioral, such as acting in a healthier way; biological, such as a heightened immunocompetence; or psychological, which is our focus here. Those with more positive self-perceptions of aging may have different ways of thinking and feeling, which then influence their physical functioning. In the following study, we examined a variable in this third category: perceived control, defined as the "belief

that one has a choice among responses that are differentially effective in achieving the desired outcome” (Langer, 1983, p. 20). In previous research, self-stereotypes of aging have been found to influence memory self-efficacy and math self-efficacy, domain-specific areas of perceived control (Levy, 1996; Levy et al., 2000). Others have found that perceived control is associated with greater cognitive function and mobility (Soederberg & Lachman, 1999; Tennstedt et al., 1998).

Overview

The data set we used to explore whether self-perceptions of aging can influence functional health over time is the Ohio Longitudinal Study of Aging and Retirement (OLSAR). The OLSAR is well suited for our current research aim because it includes (a) items at baseline that measured self-perceptions of aging, (b) items in the 1979 wave of data collection that seemed to tap perceived control, (c) functional health measured over an 18-year period, and (d) individuals who are 50 years old or older.

The hypotheses that we explored are as follows:

1. Those with more positive self-perceptions of aging will have better functional health over time than those with more negative self-perceptions of aging, controlling for baseline measures of functional health, self-rated health, age, gender, loneliness, race, and socioeconomic status.
2. Perceived control partially mediates the relationship between self-perceptions of aging and functional health over time.

METHODS

Study Population

The OLSAR was initiated in 1975 by the Scripps Gerontology Center at Miami University of Ohio, under the direction of Robert Atchley. The participants recruited for the OLSAR lived in Oxford, Ohio. As a result of Oxford’s small population, approximately 15,000, the investigators were able to contact virtually all individuals who met the participation criteria of being (a) cognitively intact, (b) aged 50 or older by July 1, 1975, and (c) a community resident. The investigators compiled the list of potential participants through voter registration records, a postcard census of all mailing addresses in the community, a review of welfare rolls, and the use of community informants. The homogeneity of the population is indicated by our study cohort being over 95% White. Although this limits our ability to extend the findings beyond White participants, we believed self-perceptions of aging would be sufficiently diverse within the homogeneity to predict differences in functional health.

The OLSAR researchers collected data at six time points: 1975, 1977, 1979, 1981, 1991, and 1995. They identified a total of 1,461 eligible individuals, of whom 1,157 participated. We used two criteria for inclusion in the present study. Participants had to provide (a) responses for the variables analyzed in the study at baseline and (b) functional health data for at least three waves. Among the 1,157 individuals who took

part in the study at baseline, 299 did not meet the first criterion and 425 of those remaining did not meet the second criterion. Thus, a total of 433 participants met the inclusion criteria. In the final sample, 85% exceeded the inclusion criteria by having relevant data for more than two waves following the baseline. All of the participants remained in the study for at least 4 years, 92% remained in the study for at least 6 years, 59% remained in the study for at least 16 years, and 43% remained for the entire 20 years.

The OLSAR participants who met our inclusion criteria were significantly younger than those who were excluded; the latter had an average age at baseline of 65.24 (*SD* = 10.24). Those who were excluded also had a lower functional health score of 4.05 (*SD* = 1.19). The score differentials may be explained, in part, by the fact that the younger and healthier individuals were more likely to participate in at least three waves of the 20-year study. The number of participants in each wave was 433 (1975), 407 (1977), 391 (1979), 372 (1981), 247 (1991), and 181 (1995).

Descriptive statistics for the baseline sample are presented in Table 1. All of the variables that show significant differences between those with more positive self-perceptions of aging (above the baseline *M* of 15) and those with more negative self-perceptions of aging are included as covariates in the individual growth model analyses.

Measures

*Independent variable: Self-perceptions of aging.*— We used the five-item Attitude Toward Own Aging subscale of the Philadelphia Geriatric Center Morale Scale (PGCMS; Lawton, 1975; Liang & Bollen, 1983) as our measure of self-perceptions of aging. This subscale consists of the following items: (a) “Things keep getting worse as I get older,” (b) “I have as much pep as I did last year,” (c) “As you get older, you are less useful,” (d) “I am as happy now as I was when I was younger,” and (e) “As I get older, things are (better, worse, or the same) as [*sic*] I thought they would be.”

In the 1975 baseline survey, participants responded to the first four items with no scored as 1 or yes scored as 2. Items 1 and 3 were reverse-scored to make all the items measure positive aging self-perceptions. Participants responded to the fifth item by selecting either worse, the same, or better, with these responses scored as 1, 2, and 3, respectively. Thus, participants originally received a total score ranging

Table 1. Descriptive Characteristics of the Sample

Characteristic	Total Sample ( <i>N</i> = 433) <i>M</i> ( <i>SD</i> ) or %	Negative SPA ( <i>n</i> = 248) <i>M</i> ( <i>SD</i> ) or %	Positive SPA ( <i>n</i> = 185) <i>M</i> ( <i>SD</i> ) or %
Women	48.27%	47.58%	49.19%
Caucasian	97.92%	98.39%	97.30%
Functional Health	5.17 (1.21)	4.90 (1.32)	5.34 (.91)***
Self-Rated Health	1.90 (.39)	1.82 (.44)	1.99 (.29)***
Age	61.77 (8.35)	63.11 (8.94)	59.99 (7.11)***
Social Status	29.75 (16.66)	32.28 (17.72)	26.36 (14.48)**

Note: SPA = self-perception of aging.  
\*\**p* < .01; \*\*\**p* < .001.

from 5 to 11, with a higher score indicating a more positive-aging self perception.

In 1977, the OLSAR investigators changed the choices available for responding to the first four items from yes or no to a scale including strongly disagree as 1, disagree as 2, agree as 3, and strongly agree as 4. The investigators retained this change in all of the remaining survey waves. As in the 1975 version, items 1 and 3 were reverse-scored. The investigators did not change the scoring for the fifth item. Participants could thus receive a score ranging from 5 to 19, with a midpoint of 12.

To make the 1975 self-perception of aging total score match the range and midpoint of later waves of self-perception of aging total scores, we converted a 1975 response of no from 1 to 1.5 and converted a 1975 response of yes from 2 to 3.5. We then used the following equation:  $12 + [(converted\ 1975\ score - 12) \times 7/5]$ . All of the analyses that used the converted baseline self-perception of aging score yielded the same pattern of results as the unconverted baseline measure.

Liang and Bollen (1983) found that the five self-perception of aging items loaded highly on a single factor in a different data set. When we conducted a factor analysis using the OLSAR, we also found that the five items load highly on a single factor, with factor loadings above .8.

*Mediating variable: Perceived control.*—We measured perceived control with three survey items included in the 1979 wave of data collection. The items consisted of (a) “I can do just about anything that I set my mind to,” (b) “If I want something, I go out and get it,” and (c) “I am a go-getter.” Each item was scored on a scale that ranged from 1, strongly agree, to 5, strongly disagree. Responses to these three items were combined. The three items were selected from a six-item confidence measure (Atchley, 1999). The first two items closely resemble items in Pearlin and Schooler’s (1978) Mastery Scale, which has been used to measure sense of control in other studies (e.g., Lachman & Weaver, 1998).

This variable appears to be reliable over time. We found that the 1979 perceived-control score significantly correlated with the perceived-control scores of the 1977 wave ( $r = .68, p < .0001$ ) and the 1981 wave ( $r = .57, p < .0001$ ). The Cronbach’s coefficient alpha of the 1979 perceived-control score items was .64.

*Outcome: Functional health.*—Our outcome variable, functional health, is the six-item Health Scale for the Aged (HSA; Rosow & Breslau, 1966). In the HSA, participants are asked, “Which of the following things are you physically able to do? (Place a check by each of the things you can do.): (1) heavy work around the house (shoveling snow, washing, etc.); (2) work at a full-time job; (3) ordinary work around the house; (4) walk half a mile; (5) go out to a movie, to church, to a meeting or to visit friends or relatives; (6) walk up and down stairs.” Each check is scored as 1. Thus, the HSA scores range from 0 to 6, with a higher score indicating better functioning. This measure was included in all waves of the OLSAR. In the prospective analyses that use functional health over time as the outcome, we used the HSA scores measured in 1977, 1979, 1981, 1991, and 1995.

The HSA has been used in a number of studies with older individuals, including the Yale Health and Aging Study and The MacArthur Successful Aging Study. Others have found that the HSA significantly correlates with observed physical performance measures. For example, Alexander and colleagues (2000) found that among their self-reported function items, the HSA items have the strongest relationship with their three performance domains of walking, standing, and chair rising, with an eta squared ranging from .21 to .44.

*Covariates.*—Other covariates included the following measures assessed at baseline: age, gender, and race (as categorized by White, Black, or “other”). Socioeconomic status was also measured at baseline by the Two-Factor Index of Social Position, which is composed of participants’ years of education and the status of their occupation (Hollingshead, 1965).

Additional covariates included baseline functional health, measured by the 1975 HSA scores (Rosow & Breslau, 1966), and self-rated health, measured by the 1975 question, “Is your health improving, declining or remaining about the same?” We analyzed the latter measure as an ordinal variable. To assess the covariate loneliness, we used the PGCMS item, “How much do you feel lonely?” with not much scored as 1 and a lot scored as 2 (Lawton, 1975).

### Statistical Analyses

To examine our first hypothesis, that self-perceptions of aging predict functional health over time, we used individual growth modeling, a statistical technique based on the trajectory of individual change (Willett, Singer, & Martin, 1998). This technique is appropriate for our data set because it (a) takes advantage of the multiple waves of data collection, (b) allows for time points that are not uniformly spaced, as occurred in the OLSAR, and (c) adjusts for participants who skip waves of data collection, as also occurred in the OLSAR. To conduct individual growth modeling, we first generated a slope for each participant’s functioning pattern by regressing functional health scores on time. The individual slopes were then related to other variables of interest in the analyses. Next, we conducted a series of regression analyses, with the slopes serving as the outcome variable.

We examined our second hypothesis, that perceived control partially mediates the relationship between self-perceptions of aging and functional health, by conducting a series of path analyses with baseline self-perceptions of aging acting as our independent variable, perceived control (measured in 1979) acting as our presumed mediator, and functional health (measured in 1981, 1991, and 1995) acting as our outcome variable. We followed the procedure for identifying a mediator suggested by Kenny, Kashy, and Bolger (1998).

## RESULTS

### *Hypothesis 1: Self-Perceptions of Aging Predict Functional Health*

As predicted by our first hypothesis, we found that those with more positive self-perceptions of aging at baseline have better functional health over time than those with more negative self-perceptions of aging (before adding covariates).

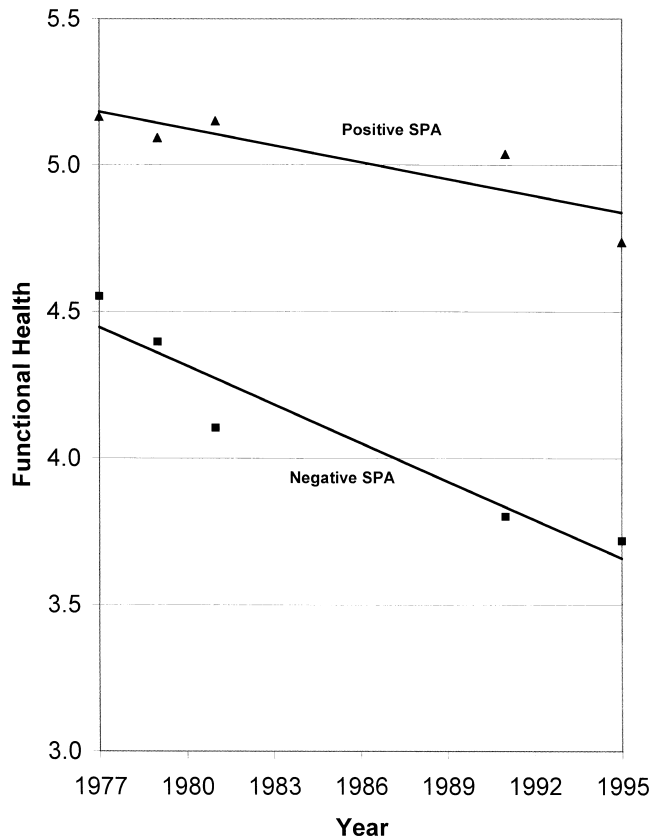


Figure 1. Self-perceptions of aging (SPA) and function at five time points.

Those in the more positive self-perception of aging group have a higher 1997 intercept compared with those in the more negative self-perception of aging group, and at each wave those in the more positive self-perception of aging group have a higher average functional health score than do those in the more negative self-perception of aging group (see Figure 1). For each wave, we dichotomized self-perceptions of aging by splitting the scores into those above and those below or equal to the mean of the self-perception of aging scores over the five waves from 1977 to 1995 ( $M = 14$ ).

The mean difference between the groups increases with subsequent waves, as shown in Figure 1. The equation for the line representing the more positive self-perception of aging group is functional health =  $-.2862 \times \text{years} + 5.1648$ , whereas the line representing the more negative self-perception of aging group is functional health =  $-.7843 \times \text{years} + 4.4769$ . These equations indicate that the decline in functional health for the more positive self-perception of aging group is slightly less than half that of those in the more negative self-perception of aging group (see Figure 1). A linear regression analysis revealed that the two slopes are significantly different,  $p < .0001$ .

In further support of our first hypothesis, an individual growth modeling analysis showed that those with more positive self-perceptions of aging at baseline had better functional health over time (collected in 1977, 1979, 1991, and 1995) than those with more negative self-perceptions of aging,

Table 2. Influence of Baseline Positive Self-Perceptions of Aging (PSPA) on Functioning over Time

Characteristic	Coefficient	SE	t	p
PSPA	.0419	.0102	4.12	<.0001
Functional Health	.3649	.0343	10.65	<.0001
Time (All Waves)	-1.1962	.1024	-11.68	<.0001
Age	-.05581	.0047	-11.80	<.0001
Social Status	-.0072	.0023	-3.14	.0018
Self-Rated Health	.1271	.0922	1.38	.0080
Race	-.5274	.2506	-2.10	.0360
Gender	-.0933	.0695	-1.34	ns

Note: Predictor variable (PSPA) and all covariates (except for time) are measured at baseline.

after controlling for baseline measures of functional health, self-rated health, age, gender, race, and socioeconomic status ( $\beta = .0419$ ,  $SE = .0102$ ,  $p < .0001$ ,  $\eta = .20$ ,  $\eta^2 = .04$ ; see Table 2). In addition, when we added loneliness to the model, self-perceptions of aging continued to significantly predict functional health over time ( $\beta = .0484$ ,  $SE = .0115$ ,  $p < .0001$ ,  $\eta = .20$ ,  $\eta^2 = .04$ ).

The impact of self-perceptions of aging appears greater than that of self-rated health, gender, race, and socioeconomic status on functional health over time. When the baseline variables included in the model were ordered from the greatest to the least impact on functional health over time, they were in the following sequence: age, functional health, self-perceptions of aging, socioeconomic status, race, self-rated health, and gender. The sequence was determined by multiplying each of the variable coefficients from the model by the mean of the variable, and then taking the absolute value of these outcomes.

Further, we found self-perceptions of aging continue to predict functional health over time, even when we include multiple measures of the independent variable. When we conducted the individual growth model, we found that self-perceptions of aging over time still significantly predicted functional health over time, after controlling for baseline measures of functional health, self-rated health, age, gender, race, and socioeconomic status ( $\beta = .1276$ ,  $SE = .0124$ ,  $p < .0001$ ,  $\eta = .30$ ,  $\eta^2 = .09$ ). In this prospective analysis, we included self-perceptions of aging measured in 1975, 1977, 1979, 1981, and 1991 and functional health measured in 1977, 1979, 1981, 1991, and 1995. In addition, when we added loneliness to the model, the effect of self-perceptions of aging on function remained significant ( $\beta = .1282$ ,  $SE = .0126$ ,  $p < .0001$ ,  $\eta = .29$ ,  $\eta^2 = .09$ ).

In two additional analyses, we found that the impact of self-perceptions of aging on functional health does not appear to be due to the reverse effect of functional health influencing self-perceptions of aging. In the first analysis, we conducted an individual growth model with baseline functional health as the predictor and self-perceptions of aging over time (1977 to 1995) as the outcome, controlling for baseline measures of self-rated health, age, gender, race, self-perceptions of aging, loneliness, and socioeconomic status. In this analysis, we found that functional health does not significantly predict self-perceptions of aging over time ( $\beta = .0872$ ,  $SE = .0723$ ,  $t = 1.21$ ,  $p > .2$ ).

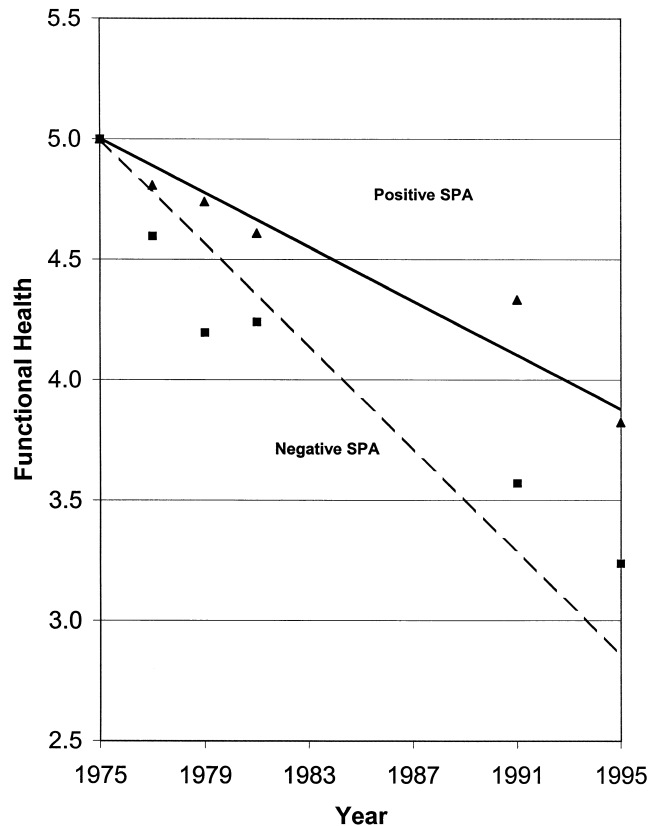


Figure 2. Self-perceptions of aging (SPA) and function at five time points among individuals with same baseline function score.

As further evidence that the impact of self-perceptions of aging on functional health is not due to the reverse effect of functional health influencing self-perceptions of aging, we found that self-perceptions of aging still predicted functional health when we considered only those with the same functional health score at baseline. We selected those with the score of 5, because this is the only integer value that falls between the more positive and more negative self-perceptions of aging groups, and for each group it is the value with the largest number of individuals (55 in the positive group; 77 in the negative group). This analysis revealed that the effect still occurs, after we controlled for baseline measures of self-rated health, age, gender, race, loneliness, and socioeconomic status ( $\beta = .1139, t = 2.33, p = .0222, \eta = .24, \eta^2 = .06$ ).

In Figure 2, we show at five time points the relationship between self-perceptions of aging and functional health among those who started with the same functional health score of 5 at baseline in 1975. Each of the best fit lines was anchored at the baseline score of 5 in the figure. The divergence between those in the more positive and more negative self-perception of aging groups still appears. This suggests that the effect of self-perceptions of aging on functional health over time is not due to baseline differences in functional health.

In a supplementary analysis, we compared the impact of self-perceptions of aging on functional health over time to the impact of the total PGCMS, from which the self-perceptions

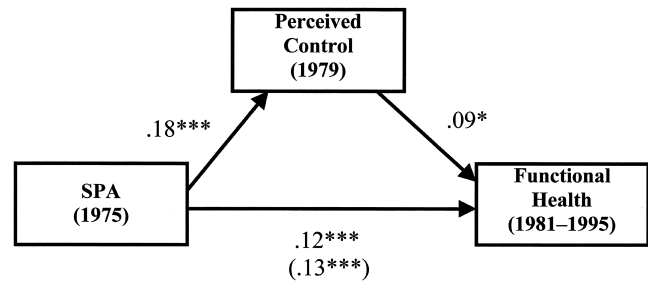


Figure 3. Perceived control as a partial mediator of self-perceptions of aging (SPA) on function. Path coefficient in parentheses indicates relationship between predictor and outcome, before mediator included. \* $p < .05$ ; \*\*\* $p < .001$ .

of aging items were taken. In the first individual growth model, we found that the total baseline PGCMS did not predict functional health over time, after controlling for baseline measures of self-rated health, age, gender, race, and socioeconomic status ( $\beta = .0259, t = 1.61, p > .10$ ). The PGCMS, with the self-perception of items removed, also did not significantly predict functional health over time, when we controlled for baseline measures of self-rated health, age, gender, race, and socioeconomic status ( $\beta = .0051, t = 0.23, p > .80$ ). These findings suggest that the self-perceptions of aging items, unlike the rest of the scale, predict functional health over time.

#### Hypothesis 2: Perceived Control as a Mediator

As predicted by our second hypothesis, we found that perceived control (measured in 1979) partially mediated the relationship between baseline aging self-perceptions and functional health (measured in 1981, 1991, and 1995; see Figure 3).

That is, perceived control met the three criteria for a partial mediator as described by Kenny, Kashy, and Bolger (1998). Fulfilling the first criterion, the independent variable (self-perceptions of aging) predicted the outcome of functional health over time ( $\beta = .1234, t = 8.46, p < .0001, \eta = .35, \eta^2 = .12$ ). Fulfilling the second criterion for a partial mediator, when we regressed the presumed mediator perceived control on the independent variable self-perceptions of aging, we found that self-perceptions of aging significantly predicted perceived control ( $\beta = .1775, t = 5.47, p < .0001, \eta = .31, \eta^2 = .10$ ). Fulfilling the third criterion for a partial mediator, the influence of the presumed mediator on the outcome remained significant, even when we included the path between the predictor variable and the outcome, which was also significant. The coefficient associated with the path between perceived control and functional health was ( $\beta = .0903, t = 2.47, p = .014, \eta = .16, \eta^2 = .02$ ). Thus, perceived control meets the three criteria for a partial mediator. The Baron and Kenny (1986) modification of the Sobel test also confirmed that perceived control acts as a partial mediator in the model ( $Z = 2.22, p = .01$ ).

#### DISCUSSION

This study demonstrated for the first time that self-perceptions of aging predict functional health over time. In a

data set that covers 18 years, we found that those older individuals with more positive perceptions of aging report better functional health than those with more negative self-perceptions of aging, after controlling for baseline measures of functional health, self-rated health, age, gender, loneliness, race, and socioeconomic status.

The impact of self-perceptions of aging on functional health appears robust. In the analyses, self-perceptions of aging had a greater impact on functional health over time than self-rated health, gender, race, and socioeconomic status. Further, the predicted effect remained significant even when we added the four follow-up measures of self-perceptions of aging to the model. On average, the OLSAR participants experienced a decline in functional health over the 18 years studied (see Figure 1). Yet, despite the increase in salience of disability that is likely to accompany the participants' decline in functional health, the effect of self-perceptions of aging on functional health remained.

We found that the effect of self-perceptions of aging increased with age (see Figures 1 and 2). The growing discrepancy between the two groups, from baseline to the sixth wave, is consistent with what we would expect from the increasing age of the participants (e.g., a 50-year-old at the start of the project would be 68 at the end). It is likely that as the participants—especially the younger ones—aged, there was a growing recognition of themselves as old, which, in turn, strengthened the influence of self-perceptions of aging.

Two analyses provide further support for our first hypothesis that self-perceptions of aging influence functional health over time. Although we assumed that the baseline differences in functional health between the self-perception of aging groups were due to pre-existing differences in self-perceptions of aging, the opposite could have been true: Functional health may have led to differences in self-perceptions of aging. In one analysis, we found that functional health at baseline does not significantly predict self-perceptions of aging over time. In a second analysis, when we examined those participants with the same functional health score at baseline, the impact of self-perceptions of aging on functional health over time remained (see Figure 2).

Further, it appears that self-perceptions of the aging variable are not a proxy for the more established variables of self-rated health and loneliness, which have been demonstrated to influence the course of disability (Idler & Kasl, 1995; Idler et al., 2000; Rantanen et al., 2000). In our analyses, we controlled for self-rated health and loneliness and still found that self-perceptions of aging significantly predicted participants' functioning over time. In addition, we found that the PGCMS, both with and without the self-perceptions of aging subset included, did not predict functional health over time. This suggests that it is not morale in general that affects functional health, but rather the subset specifically.

It is interesting to note that although over a quarter of the participants had baseline self-perceptions of aging scores that were at or below the midpoint of 12, the participants' mean baseline self-perception of aging value was fairly high. This may reflect a general self-enhancement bias that has been found in numerous studies (e.g., Taylor & Brown, 1988). There was enough diversity among the overall elevated scores to predict functioning over time. This suggests

that subtle differences in self-perceptions of aging are powerful enough to affect functioning over time.

Although self-perceptions of aging account for a small amount of the variance of functional health over time, after relevant variables are controlled for, the effect is statistically significant. Further, the effect is important because, unlike many of the other predictors of functional health, such as age, gender, and number of illnesses, self-perceptions may be open to improvement through appropriate intervention.

In the second part of this study, we demonstrated that the effect appears to be partially mediated by perceived control. This extends our prior findings concerning domain-specific aspects of perceived control as an outcome in the self-stereotypes of aging experimental studies. For example, we previously found that positive self-stereotypes of aging increased memory self-efficacy, whereas negative self-stereotypes of aging decreased it (Levy, 1996). In the present study, it appears that the more general perceived control is both an outcome and a pathway by which self-perceptions of aging influence functional health.

Our finding that self-perceptions of aging continue to affect functional health over time, even when perceived control is included as a mediator, suggests that in addition to perceived control, one or more pathways are involved in mediating the relationship between self-perceptions of aging and functional health. A useful direction for future research would be to explore other possible pathways.

The limitations of this study include the racial homogeneity of Oxford, Ohio. Future studies could benefit from examining whether the dynamic we found in an overwhelmingly White community would apply to minority groups, who may hold alternative views of aging. An additional limitation is inherent to a 20-year longitudinal study with older individuals. Participants were lost over the course of the project and, as might be expected, the ones who were available for three or more waves were significantly healthier and younger than were those who were unavailable. Older and less healthy participants could be more effectively studied in future research by using waves that are closer together than in the OLSAR.

A potential limitation of this study is that our outcome variable of functional health is a self-report measure, not a performance measure. However, the functional health measure we used has been found to correspond to performance measures (Alexander et al., 2000; Merrill et al., 1997). In addition, several studies have found that lower self-reported function predicts a number of adverse outcomes, including increased hospitalization, nursing home placement, greater use of formal and informal services, and mortality (Coughlin, McBride, Perozek, & Liu, 1992; Kemper, 1992; Manton, 1988; Spector, Katz, Murphy, & Fulton, 1987). It could be argued that self-report measures of function are preferable to performance measures because the latter may be vulnerable to differences in effort and influenced by testing situations. In future studies, it would be interesting to compare the impact of self-perceptions of aging on a range of function measures, both performance and self-report.

In conclusion, this study suggests that there is a benefit to conceptualizing age as more than a risk factor, covariate, or as a way to categorize individuals by the number of years that they have been alive. Instead, researchers and health care

professionals, as well as the aged, may benefit from thinking about old age as a stage of life during which individuals hold self-perceptions of aging that have important consequences.

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