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Self-Perception of Aging and Vulnerability to Adverse Outcomes at the Age of 65–70 Years

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Objectives. This study examines the relationship between self-perception of aging and vulnerability to adverse outcomes in adults aged 65–70 years using data from a cohort of 1,422 participants in Lausanne, Switzerland.

Methods. A positive or negative score of perception of aging was established using the Attitudes Toward Own Aging subscale including 5 items of the Philadelphia Geriatric Center Morale Scale. Falls, hospitalizations, and difficulties in basic and instrumental activities of daily living (ADL) collected in the first 3 years of follow-up were considered adverse outcomes. The relationship between perception and outcomes were evaluated using multiple logistic regression models adjusting for chronic medical conditions, depressive feelings, living arrangement, and socioeconomic characteristics.

Results. The strongest associations of self-perception of aging with outcomes were observed for basic and instrumental ADL. Associations with falls and hospitalizations were not constant but could be explained by health characteristics.

Conclusions. A negative self-perception of aging is an indicator of risk for future disability in ADL. Factors such as a low-economic status, living alone, multiple chronic medical conditions, and depressive feelings contribute to a negative self-perception of aging but do not explain the relationship with incident activities of daily living disability.

Key Words: Aged—Frail elderly—Self-perception—Vulnerability.

As the population ages, a better understanding of the aging process is important in order to improve quality of life among older people. With increasing age, older people become frail and vulnerable to a large range of adverse outcomes (Fried, Ferrucci, Darer, Williamson, & Anderson, 2004). In this context, current public health priorities comprise prevention of age-related vulnerabilities, including falls, hospitalizations, and need for assistance with activities of daily living (ADL). All these adverse outcomes can diminish the quality of life of older adults and compromise their autonomy. Therefore, recognition of factors that characterize vulnerable individuals is key to targeting preventive interventions. These factors include physical characteristics, such as low grip strength or slow walking speed, as well as more subjective aspects of health, for example, self-perceived fatigue or health (Fried et al., 2004).

A depreciative self-perception of aging is another less frequently studied factor likely to characterize vulnerable individuals in old age. Levy, Slade, Kunkel, and Kasl (2002) determined that self-stereotypes of aging, or older individuals' beliefs about the elderly population, can affect their cognitive and physical functioning. Older individuals' internalized age stereotypes contribute to the formation of their self-perceptions of aging (Levy, Slade, Kunkel, et al., 2002). Self-perception of aging is defined as a personal evaluation of one's own aging. 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. These aging expectations include trajectories of attributes that will increase or decrease at different points over the life span. The second stage of expectations occurs through encounters that elderly individuals have everyday life (Levy, Slade, & Kasl, 2002). In the Attitudes Toward Own Aging subscale, of the Philadelphia Geriatric Center Morale Scale, the self-perception of aging is measured on five items covering dimensions, such as current perceived energy, happiness, and usefulness in comparison with the past.

Studies about self-stereotypes showed that older individuals assigned to a positive stereotype of aging demonstrate better memory performance, more controlled handwriting, faster walking, stronger will to live, and lower cardiovascular response to stress as compared with those randomly assigned to a negative stereotype of aging group (Levy, Slade, & Kasl, 2002). Some authors found that a positive self-perception of aging among people aged 50 years and older was predictive of greater longevity. People with a favorable self-perception of aging lived, on average, seven years longer (Levy, Slade, Kunkel, et al., 2002). The relationship between self-perception of aging and future functional health has also been studied (Levy, Slade, & Kasl, 2002). Individuals with a positive self-perception of aging reported better functional health in subsequent years. In contrast, negative self-perceptions of health, age, and aging are predictors of worsening health and mortality (Demakakos, Gjonca, & Nazroo, 2007; Gunn et al., 2008; Idler & Kasl, 1991; Kuper & Marmot, 2003; Levy & Meyers, 2004; Uotinen, Rantanen, & Suutama, 2005). It is important to consider that parameters such as a low level of

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intellectual functioning or well-being, loneliness or lack of social contacts, a low level of trust, feelings of unhappiness and uselessness, as well as depressive symptoms, which are associated with mortality risk, may also influence perceptions of health, age, and aging (Barefoot et al., 1998; Blazer & Hybels, 2004; Cheng, Fung, & Chan, 2009; Maier & Smith, 1999). These factors are likely to determine other negative health events as well.

The primary purpose of this study was to evaluate prospectively the hypothesis of a relationship between self-perception of aging and vulnerability to adverse outcomes (falls, hospitalizations, and need of assistance for ADL) in adults aged 65–70 years, controlling for sex and age. The second hypothesis was that associations between self-perception of aging and adverse outcomes would be independent from chronic medical conditions, depressive feelings, and living arrangement and could not be entirely explained by socioeconomic characteristics.

Methods

Participants

We used data collected in the Lausanne Cohort Lc65+ (Santos-Eggimann et al., 2008). In 2004, a simple random sample of the population living in Lausanne born between 1934 and 1938 was selected for participation in a prospective study designed to identify determinants, manifestations, and outcomes of frailty. Individuals living in institutions or cognitively unable to participate were excluded. Of 3,054 initially selected individuals, 1,564 were enrolled in 2004; of these, 1,422 completed baseline examinations in 2005. Baseline data included information from a self-administered questionnaire completed at enrollment and additional data collected through questionnaire, interview, and examination in 2004–2005. Follow-up data were collected each year by self-completed questionnaires in 2006 and 2007 and by questionnaire, interview, and examination in 2008. Questions included items about health, well-being, physical activity and mobility, ADL, stressful events, and utilization of care. Interview and examination included tests of walking, balance, grip strength, as well as tests of cognitive performance. In the current study, we included 1,152 participants with complete data for assessment of self-perception of aging at baseline.

Score of Self-Perception of Aging

Self-perception of aging was assessed by self-administered questionnaire at baseline using the Attitude Toward Own Aging subscale of the Philadelphia Geriatric Center Morale Scale (Lawton, 1975). This includes four sentences on which participants *agree* (scored 0) or *disagree* (scored 1): "Things keep getting worse as I get older," "I have as much pep as I did last year," "As you get older, you are less useful," "I am as happy now as I was when I was younger," and one sentence to complete as follows": As I get older, things are (better, worse, or the same) as I thought they would be." Based on previous studies demonstrating that respondents often referred to their economic situation, we added "concerning health" to this last item in order to focus the answers on this topic. To measure a negative perception of aging, we reversed scores for the first and the third items. The last item was regarded as a dichotomous variable: *better* was scored 0 and the *same* or *worse* was scored 1, according to rules used by Levy, Slade, Kunkel, and colleagues (2002). The total score ranged from 0 to 5, with a higher score reflecting a more negative perception. Finally, we dichotomized the total score of self-perception of aging into positive (Values 0–2) or negative (Values 3–5).

Adverse Outcomes

We considered three adverse outcomes based on self-reported information collected in the three first years of follow-up: 1+ falls over the last twelve months (falls during sporting activities were not included), 1+ hospitalizations over the last twelve months, and current difficulties in performing ADL. We distinguished basic activities of daily living (BADL: feeding, bathing, dressing, using the toilet, walking across a room, and getting up from bed or lying on a bed) and instrumental activities of daily living (IADL: housework, shopping, preparing meals, using a phone, preparing drugs, managing money, and using a map). Disability was defined at difficulty in at least one BADL or at least one IADL, respectively.

Adjustment Variables

All adjustment variables were assessed at baseline. They included the following: sex and age; depressive feelings defined as present in case of positive response to either of two questions during the previous four weeks: "Have you often been bothered by feeling down, depressed, or hopeless? (yes/no)" and "Have you often been bothered by little interest or pleasure in doing things? (yes/no)" (Arroll, Khin, & Kerse, 2003; Whooley, Avins, Miranda, & Browner, 1997); the number of reported medical diagnoses out of a list of 12 chronic conditions; living arrangement defined as a dichotomous variable (living alone/with others); income dichotomized into low (defined by means tested government benefits)/not low; education classified into three categories based on reported highest degree completed: compulsory education/apprenticeship/post-compulsory schooling.

Statistical Analyses

Associations between self-perception of aging and each adverse outcome were tested using multivariate logistic regression models. In the analyses of functional status, we excluded participants who initially reported any difficulty or help in BADL (for outcome BADL) and either in IADL or in BADL (for outcome IADL). The effect of self-perception

Table 1. Bivariate Analysis of Associations Between Self-Perception of Aging and Individual Characteristics

Characteristics	Total sample (%) N = 1,152, 100.0	Negative self-perception of aging (%) n = 436, 37.8	Positive self-perception of aging (%) n = 716, 62.2	p Value
Sex				ns
Male	42.6	39.9	44.3	
Female	57.4	60.1	55.7	
Age, M (SD)	69.0 (1.5)	69.1 (1.5)	69.0 (1.4)	ns
Education				ns
Post-compulsory schooling	35.7	33.8	36.9	
Apprenticeship	40.5	40.9	40.3	
Compulsory schooling at most	23.7	25.3	22.8	
Income				**
Low	18.5	23.0	15.7	
Not low	81.5	77.0	84.3	
Living arrangement				*
Living alone	34.1	38.1	31.6	
Living with other persons	65.9	61.9	68.4	
Number of chronic conditions, M (SD)	2.1 (1.5)	2.5 (1.5)	1.9 (1.5)	***
Depressive feelings				***
Yes	24.1	40.5	14.0	
No	75.9	59.5	86.0	
Hospitalizations				***
2006	17.8	22.7	15.0	
2007	16.4	17.8	15.6	
2008	15.3	15.9	15.0	
Falls				*
2006	17.1	20.3	15.2	
2007	15.7	19.1	13.8	
2008	16.6	17.8	15.9	
BADL				***
2006	9.6	14.3	7.1	
2007	11.2	17.4	7.8	
2008	12.6	17.3	10.1	
IADL				***
2006	38.7	49.1	33.7	
2007	40.0	52.2	33.9	
2008	43.7	53.4	39.1	

Notes: BADL = basic activities of daily living; IADL = instrumental activities of daily living; ns = not significant.
*p < .05; **p < .01; ***p < .001.

of aging on each outcome was separately analyzed for each year (2006, 2007, and 2008) with adjustment for sex and age (Model 1). Significant associations (p < .05) between self-perception of aging and outcome were further tested adjusting for demographics, depressive feelings, number of health problems, and living arrangement (Model 2). Finally, education and income were added as potential confounders in models showing a persistently significant effect of the self-perception of aging (Model 3). Concerning falls, no relationship between income, education, or living arrangement with this outcome was expected on theoretical grounds. Consequently, we only considered the first two models, and the second did not include living arrangement. Finally, we added the baseline history of falls and of hospitalizations in the past twelve months to the adjustment variables included in Model 3 of the falls and hospitalizations analyses, respectively.

Results

Table 1 shows baseline characteristics of the analytical sample and bivariate relationships with self-perception of aging. Bivariate analyses included 1,152 participants (661 women [57.4%] and 491 men [42.6%]) who responded to the initial questionnaire and participated in the first interview. A negative perception of one's own aging was observed in 436 participants (37.8%). There was no discrepancy in age between participants with a positive or a negative self-perception of aging. Education level was not associated with self-perception of aging. However, low income, living alone, chronic medical conditions, and depressive feelings were all significantly associated with a negative self-perception of aging. Tables 2 and 3 report results of multivariate models for each outcome over three-year follow-up.

Falls

Regarding falls, two models were considered (Table 2). In Model 1, adjusted for demographics, a negative perception of aging was associated with an increased risk of falls in all three years of follow-up. Although odds ratios (ORs) were close in Years 1 (OR 1.38, 95% confidence interval [CI] 0.99–1.91)–and 2 (OR 1.48, 95% CI 1.03–2.02), statistical

Table 2. Multivariate Logistic Regression Analyses of Associations Between Negative Self-Perception of Aging and Falls After 1, 2, and 3 Years of Follow-up

	Model I, sex and age adjusted			Model II, sex, age, depressive feelings, and number of chronic conditions adjusted		
Year of follow-up	*n*	OR	95% CI	*n*	OR	95% CI
Falls (1+)						
Year 1	1,077	1.38	0.99–1.91			
Year 2	1,053	1.44	1.03–2.02	1037	1.18	0.82–1.70
Year 3	1,027	1.11	0.78–1.56			

Notes: CI = confidence interval; OR = odds ratio.

significance was reached in the second year only. The estimated OR declined to 1.10 in Year 3 of follow-up and was not statistically significant. When other covariates, such as depressive feelings and the number of chronic medical conditions, were added (Model 2), the association between the perception of aging and falls observed in Year 2 was no longer statistically significant. Hence, adding the history of falls to the adjustment variables did not change the outcome.

Hospitalizations

A significant association between negative self-perception of aging and the risk of at least one hospital admission within twelve months was observed in the first year of follow-up only (OR 1.63, 95% CI 1.19–2.24) in Model 1 (Table 3). The association was weaker but remained significant both in Model 2 (OR 1.25, 95% CI 1.03–2.03) and in Model 3 (OR 1.15, 95% CI 1.03–2.04). However, it was not observed beyond the first year of follow-up. Adding history of hospitalizations in Model 2 caused the disappearance of the relationship between self-perception of aging and risk of hospitalization.

Activities of Daily Living

As shown in Table 3, the strongest associations of the perception of aging with outcomes were observed for ADL. In participants who initially performed ADL without any difficulty, a negative perception of aging predicted difficulties in both BADL and IADL at Years 1, 2, and 3 of follow-up after adjusting for demographics (Model 1) and other covariates (Models 2 and 3). For both types of ADL, ORs close to 2 were observed in Model 1 in Years 1 and 2 of follow-up, with associations significant at the $p < .01$ level. The estimated OR declined slightly to 1.87 (BADL) and 1.82 (IADL) in the third year of follow-up, with associations still significant at the $p < .05$ level. Adjustments for additional covariates in Models 2 and 3 did not change the level of estimated ORs and the statistical significance of associations for BADL. However, they slightly reduced the estimated OR for IADL in all three years of follow-up, which remained significantly larger than 1 ($p < .01$ in Years 1 and 2, $p < .05$ in Year 3).

Discussion

This study investigated the relationship between self-perception of aging and adverse outcomes including falls, hospitalizations, and disability in persons aged 65–70 years. The principal finding was a strong association between a negative perception of aging with difficulties in BADL and IADL in participants who were not disabled at baseline.

Sex, age, and education level were not associated with self-perception of aging. In contrast, low income, living alone, the presence of chronic medical conditions, and depressive feelings were associated with a negative self-perception of aging. Among those factors, a few are known to be associated to the development of disability. Factors

Table 3. Multivariate Logistic Regression Analyses of Associations Between Negative Self-Perception of Aging and Hospitalizations, Basic Activities of Daily Living (BADL), and Instrumental Activities of Daily Living (IADL) After 1, 2, and 3 Years of Follow-up

Outcomes	Model I, sex and age adjusted			Model II, sex, age, depressive feelings, number of chronic conditions, and living arrangement adjusted			Model III, sex, age, depressive feelings, number of chronic conditions, living arrangement, income, and education adjusted		
Year of follow-up	*n*	OR	95% CI	*n*	OR	95% CI	*n*	OR	95% CI
Hospitalizations (1+)									
Year 1	1,085	1.63	1.19–2.24	1,067	1.45	1.03–2.03	1,053	1.45	1.03–2.04
Year 2	1,041	1.17	0.83–1.63						
Year 3	928	0.08	0.74–1.57						
Difficulties in BADL[a]									
Year 1	989	2.19	1.43–3.36	977	1.94	1.24–3.04	966	1.96	1.25–3.09
Year 2	977	2.47	1.65–3.70	965	2.01	1.31–3.08	954	2.00	1.30–3.10
Year 3	960	1.87	1.27–2.75	949	1.60	1.06–2.42	939	1.62	1.07–2.46
Difficulties in IADL[b]									
Year 1	888	1.93	1.44–2.59	876	1.56	1.14–2.13	866	1.63	1.18–2.24
Year 2	906	2.20	1.64–2.93	893	1.83	1.35–2.48	883	1.93	1.42–2.64
Year 3	903	1.83	1.37–2.45	892	1.62	1.19–2.21	883	1.66	1.21–2.27

Notes: CI = confidence interval; OR = odds ratio.

[a]Restricted to persons who did not report difficulties in BADL at enrollment.

[b]Restricted to persons who did not report difficulties in BADL or IADL at enrollment.

recognized to predispose to a greater risk of disability include lack of social contacts, lower socioeconomic status, and poor self-rated health (Jang, Poon, Kim, & Shin, 2004; Seidel, Jagger, Brayne, & Matthews, 2009). Many diseases were also identified as having an impact on disability, for example, heart disease (Rubio Aranda, Lazaro Alquezar, Martinez Terer, & Magallon Botaya, 2009), diabetes, hypertension, and Parkinson's disease (Seidel et al., 2009). Finally, mental illness (Rubio Aranda et al., 2009) and depression are associated with difficulties in ADL. However, some authors found that while depression was related to current difficulties in IADL, it did not independently predict future IADL disability (Yochim, Lequerica, MacNeill, & Lichtenberg, 2008). In our study, controlling for such factors did not alter the relationship between a negative self-perception of aging and the emergence of difficulties in BADL and IADL. A negative perception of aging should thus be considered as an independent predictor of incident disability in the youngest old.

Falls and Hospitalizations

Results did not show a consistent association between self-perception of aging and falls during the three years of follow-up. The significant association between self-perception of aging and falls recorded in the second year of follow-up in models adjusted for age and sex only was mainly explained by confounding effects of chronic medical conditions, depressive feelings, and recent history of falls. No association between self-perception of aging and falls was observed in the third year of follow-up. This suggests a weak but significant relationship between self-perception and falls, observed only for the second year of follow-up, was fortuitous.

Concerning hospitalizations, we could observe a temporary association. Self-perception of aging was significantly related to hospitalization only in the first year of follow-up. This temporary relationship may be explained by measurements of the perception of aging limited to the baseline. Some individuals with a negative perception of aging may have suffered from temporary health conditions that influenced both their perception of aging and their short-term risk of hospital admission. This would explain the absence of relationship with the outcome when we considered factors influencing health.

Strengths and Limitations

The specific strengths of data from the Lc65+ cohort result from a large and representative population-based sample with a good retention rate for each year of follow-up. Furthermore, the study design provides prospective information on many outcomes and controls for factors such as health factors.

Our aim was to study self-perception of aging with various questions of the Attitude Toward Own Aging, a subscale of the Philadelphia Geriatric Center Morale Scale. Although assessing the perception of aging through only five questions is an oversimplification of a complex reality, this subscale was validated and successfully used in previous work to predict mortality and functional health (Levy, Slade, & Kasl 2002; Levy, Slade, Kunkel, et al., 2002). We slightly modified the last question of this instrument to concentrate on health, which was not a validated modification. This may have reinforced the link between the self-perception of aging and later health-related outcomes.

Another factor that may influence this relationship is self-reporting of outcomes such as falls or hospital admissions. Individuals with a negative perception of aging may differ in their recall of negative events. However, the recall period, limited to twelve months, is standard for these events. In the youngest subgroup of the elderly population, it is not likely that individuals with a positive appreciation of their aging underreported episodes of hospital care in the last twelve months. Moreover, no difference in reported falls and hospital admissions was observed between groups in the third year of follow-up; a recall bias is thus unlikely.

Overall, results of this study suggest that a negative self-perception of aging is an indicator of vulnerability in the youngest old, pointing to a risk of developing unfavorable outcomes, particularly disability. Recognizing a negative self-perception of aging as a factor predicting future disability in ADL could allow the targeting of individuals for further assessment and interventions aimed at slowing an adverse evolution and at delaying needs for assistance. Furthermore, how individuals feel about aging presently and the evolution over time of perceived energy, happiness, and usefulness should be further investigated in relation to depressive feelings or psychosocial factors, such as living arrangement and socioeconomic status, in order to integrate this dimension in the design of preventive actions.

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