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## The Role of Internal Health Locus of Control in Relation to Self-Rated Health in Older Adults

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### ABSTRACT

The present study examined how internal health locus of control is associated with older adults' self-rated health. Multivariate analyses with older participants (aged  $\geq 60$ ) in the MIDUS II ( $n = 1,533$ ) showed that internal health locus of control was not only directly associated with positive ratings of health but also interacted with gender and race. The positive impact of internal health locus of control on self-rated health was particularly greater in females and Whites than their counterparts. Findings highlight the important role of internal health locus of control in the psychological mechanism of health and call attention to group-specific strategies for health promotion.

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Gender; Internal health locus of control; moderator; race; self-rated health

## Introduction

Self-rated health, a single item asking, “How would you rate your overall health?” has been well-established as an important health indicator in gerontological research (Miller & Wolinsky, 2007; Pinquart, 2001). For the past few decades, self-rated health has been widely studied, and its significance in predicting older individuals' general health and well-being and even mortality has been well established (DeSalvo, Bloser, Reynolds, He, & Muntner, 2005; Miller & Wolinsky, 2007). It is notable that the predictive power of self-rated health is equal to or exceeds that of objective measures such as diagnosis of disease and laboratory parameters (French et al., 2012; Giltay, Vollaard, & Kromhout, 2012).

Based on the notion of the social determinant of health (Marmot & Wilkinson, 2005) and the multifaceted nature of health (World Health Organization [WHO], 1948), there has been an influx of empirical literature examining a wide array of predictors of self-rated health. As anticipated, physical health-related variables such as chronic disease and functional disability serve as a fundamental basis of older individuals' subjective assessment of their own health (Mavaddat, Valderas, van der Linde, Khaw, & Kinmonth, 2014). Moving beyond, studies have also demonstrated the

contribution of psychosocial factors to predicting self-ratings of health. For example, personality traits, optimism, perceived social status, social network and support, and social capital have shown to influence self-rated health after controlling for the effect of physical health indicators (Amstadter et al., 2010; Giordano & Lindstrom, 2010; Sargent-Cox, Anstey, & Luszcz, 2008; Wolff, Subramanian, Acevedo-Garcia, Weber, & Kawachi, 2010)

One potential factor that may serve as an important determinant of self-rating of health is internal health locus of control. Referring to the extent to which individuals believe that their own behaviors and lifestyles influence their health conditions (Hinote, 2007; Wallston, 2013), internal health locus of control has been an integral part of social learning theory and received considerable attention in health promotion research (He, 2014; Reitzel et al., 2013). Although internal health locus of control is widely known as an important promoter of various health behaviors, limited attention has been paid to its link to perceptual aspects of health (Milte, Luszcz, Ratcliffe, Masters, & Crotty, 2015; Pudrovskaya, 2015). Building upon a recent study (Sargent-Cox & Anstey, 2015) demonstrating a positive link between health locus of control and health perceptions, we anticipated that older individuals with a high level of internal health locus of control would have a favorable rating of their own health regardless of their physical health conditions.

Another focus of the current investigation is whether the effect of internal health locus of control on self-rating of health would be modified by age, gender, and race. Given the underlying differences posed by age, gender, and race in internal health locus of control (Pudrovskaya, 2015; Sargent-Cox & Anstey, 2015) and self-rated health (Chemaitelly et al., 2013; Hudson, Puterman, Bibbins-Domingo, Matthews, & Adler, 2013; Shippee, Rowan, Sivagnanam, & Oakes, 2015), there might be subgroup differences in the relationship between internal health locus of control and self-rated health. The exploration of the within-group variations would not only help better understand the psychological mechanisms associated with self-ratings of health but also suggest group-specific strategies for health promotion.

Based on the above review, the present study aimed to examine (1) the direct effect of internal health locus of control on self-rated health and (2) the moderating effect of age, gender, and race in the relationship between internal health locus of control and self-rated health. The assessment was conducted after controlling for the effect of demographic variables (age, gender, race, marital status, and educational attainment) and physical health indicators (chronic conditions and functional disability).

## Methods

### Sample

The data were from the Midlife Development in the United States (MIDUS II) 2004–2006. MIDUS II is the second wave of the MIDUS survey which used national representative sampling with random digit dialing procedures to recruit English-speaking and non-institutionalized adults aged from 25 to 74 across 48 states (Ryff et al., 2007). Of the 7108 participants in the original MIDUS study, 4963 individuals were successfully contacted (75% retention rate after adjusting for mortality) to participate in a 30-minute follow-up interview and leave-behind questionnaire. More detailed information on MIDUS project can be found elsewhere (e.g., Kessler, Mickelson, & Williams, 1999; Ryff et al., 2007). Given the specific interest in older adults, the present analysis is based on participants aged 60 or older ( $n = 1533$ ). Preliminary assessment of the data did not detect any issues related to normality, outliers, and missing, resulting in the use of all 1533 participants for analysis.

### Measures

#### Self-rated health

Self-rated health was measured with a single question: “In general, would you say your physical health is excellent (5), very good (4), good (3), fair (2), or poor (1)?”

#### Demographic variables

Demographic information included age (in years), gender (1 = male, 2 = female), race (1 = Non-Hispanic White, 2 = Non-White), marital status (1 = married, 2 = not married), and educational attainment (0 = < high school graduation, 1 =  $\geq$  high school graduation).

#### Physical health indicators

Chronic condition and functional disability were used as indicators of physical health. Using a 30-item checklist of chronic conditions (e.g., diabetes, stroke, hypertension, heart condition, cancer), participants were asked to self-report on a yes or no format. Total counts were recoded into “none” (0), “one or two conditions” (1), and “three or more conditions” (3).

Functional disability was measured with the 7-item instrumental activity of daily living (IADL) scale (Lawton & Brody, 1969). Participants were asked to report the extent of difficulty in performing each activity in the list (e.g., lifting or carrying groceries, walking more than a mile) on a scale ranging from “no difficulty at all” (0) to “a lot of difficulty” (3). Total scores were averaged and could range from 0 to 21, with higher scores indicating a

greater level of functional disability. Internal consistency of the measure in the present sample was high ( $\alpha = .93$ ).

### ***Internal health locus of control***

Internal health locus of control was assessed with the four items in the health locus of control scale (Wallston & Wallston, 1981). Participants were asked to indicate the level of agreement to the following statements: “Keeping healthy depends on things that I can do,” “There are certain things I can do for myself to reduce the risk of a heart attack,” “There are certain things I can do for myself to reduce the risk of getting cancer,” and “I work hard at trying to stay healthy.” Each statement was rated on a 7-point scale ranging from “strongly disagree” (1) to “strongly agree” (7). Total scores could range from 4 to 28, higher scores indicating a greater level of internal health locus of control. Principle component analysis of the four items extracted a single dominant factor that accounts for 61% of the variance. Internal consistency of the scale in the present sample was high ( $\alpha = .77$ ).

### ***Analytic strategy***

After reviewing descriptive statistics and bivariate correlations among study variables, a multivariate linear regression model of self-rated health was tested. The set of predictors included: (1) demographic variables (age, gender, race, marital status, and educational attainment), (2) physical health indicators (chronic condition and functional disability), and (3) internal health locus of control. Subsequent to the direct effect model, interaction terms of internal health locus of control with age, gender, and race were added. If any interaction term was found to be significant, further analysis was conducted by stratifying the total sample by the identified moderating factor. Then, the correlation coefficients between internal health locus of control and self-rated health in the subgroups were compared using Fisher’s *r*-to-*z* transformation, a statistical method to determine the difference between independent correlation coefficients. All analyses were conducted using SPSS 23.0.

## **Results**

### ***Descriptive characteristics of the sample***

Table 1 presents the descriptive statistics for study variables. The average age of the sample was about 70 with a range between 60 and 84. The sample had almost equal distribution in gender and was predominantly White. About 68% of the participants were married, and almost 90% had at least high school education. About 13% of the sample were free from any chronic disease, and nearly half reported having three or more chronic conditions.

**Table 1.** Descriptive characteristics of the sample (N = 1533).

	%	<i>M</i> ± <i>SD</i>	Range
Age		69.2 ± 6.43	60–84
Male	44.9		
Non-Hispanic White	92.7		
Married	67.6		
≥High school graduation	89.0		
Chronic condition			
None	13.4		
One or two	38.3		
Three or more	48.3		
Functional disability		1.09 ± 0.93	0–3
Internal health locus of control		24.4 ± 3.41	4–28
Self-rated Health		3.40 ± 1.05	1–5

Functional disability scores averaged 1.09 (*SD* = .93). The average scores for internal health locus of control and self-rated health were 24.4 (*SD* = 3.41) and 3.40 (*SD* = 1.05), respectively.

### **Correlations among study variables**

At the bivariate level, presented in Table 2, positive ratings of health were associated with younger age, being White, and higher levels of education. Both indicators of chronic condition and functional disability were associated with negative ratings of health. As anticipated, individuals with higher levels of internal health locus of control were more likely to have favorable ratings of health. The highest correlation coefficient was observed between functional disability and self-rating of health ( $r = -.53$ ,  $p < .001$ ), and no sign of collinearity was identified.

### **Regression models of self-rated health**

The absence of multicollinearity was further confirmed by checking the variation inflation factors (VIFs ≤ 1.30) in the regression models. Table 3 presents the results of a series of regression models on self-rated health. The

**Table 2.** Bivariate correlations among study variables.

	1	2	3	4	5	6	7	8	9
1. Age		-.01	-.04	.20***	-.05	.10***	.24***	-.06*	-.14***
2. Gender			.00	.27***	-.01	.09***	.17***	.14***	.01
3. Race				.11***	-.12***	-.02	.01	.04	-.08***
4. Marital Status					-.09***	.04	.13***	.00	-.04
5. Education						-.07**	-.11***	.05	.18***
6. Chronic condition							.41***	-.09***	-.33***
7. Functional disability								-.20***	-.53***
8. Internal health locus of control									.27***
9. Self-rated health									

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

**Table 3.** Regression models of self-rated health.

Predictor	Model 1			Model 2			Model 3			Model 4		
	B (SE)	$\beta$	t	B (SE)	$\beta$	t	B (SE)	$\beta$	t	B (SE)	$\beta$	t
Age	-.02 (.00)	-.14	-5.37***	-.00 (.00)	-.01	-.43	-.00 (.00)	-.01	-.49	-.00 (.00)	-.01	-.65
Gender	.00 (.06)	.00	.06	.20 (.05)	.10	4.21***	.14 (.050)	.06	2.87**	.13 (.05)	.06	2.68**
Race	-.29 (.10)	-.07	-2.87**	-.30 (.09)	-.08	-3.48***	-.33 (.09)	-.08	-3.91***	-.30 (.09)	-.07	-3.48***
Marital status	.01 (.04)	.00	.15	.02 (.03)	.02	.73	.03 (.030)	.02	.98	.03 (.03)	.02	1.07
Education	.55 (.09)	.16	6.45***	.37 (.07)	.11	5.08***	.35 (.07)	.11	4.99***	.36 (.07)	.11	5.04***
Chronic conditions				-.19 (.04)	-.13	-5.41***	-.18 (.03)	-.12	-5.42***	-.18 (.03)	-.12	-5.26***
Functional disability				-.55 (.03)	-.48	-19.9***	-.51 (.03)	-.45	-18.4***	-.50 (.03)	-.44	-18.1***
Internal health locus of control (IHLC)							.050 (.01)	.16	7.44***	.05 (.01)	.18	7.83***
IHLC × Age										-.00 (.00)	-.02	-1.03
IHLC × Gender										.04 (.01)	.06	2.67**
IHLC × Race										-.07 (.03)	-.06	-2.65**
$\Delta R^2$	.055***			.270***			.024***			.006**		
Total $R^2$	.055***			.325***			.349***			.356***		

\*\*\*p < .001. \*\*p < .01.

**Table 4.** Correlation coefficient ( $r$ ) between IHLC and self-rated health in gender and race subgroups.

		$r$	$z$
Gender	Male (n = 682)	.21***	-3.16**
	Female (n = 833)	.36***	
Race	Non-Hispanic White (n = 1404)	.30***	2.87**
	Non-White (n = 111)	.02	

\*\* $p < .01$ . \*\*\* $p < .001$ .

initial model with demographic variables explained 5.5% of the variance of self-rated health, and age, race, and education were found to be significant. In the subsequent model, chronic condition and functional disability were introduced as physical health indicators, and both of them reached statistical significance. The addition of physical health indicators to the model increased the amount of the explained variance by 27%. The third model included internal health locus of control, and it was shown to be a significant predictor of self-rating of health, accounting an additional 2.4% of the variance to the model. The direct effect model with the three sets of predictors explained a total variance of 34.9%.

The final model included interaction terms of internal health locus of control with age, gender, and race. Two terms (Internal health locus of control  $\times$  Gender and Internal health locus of control  $\times$  Race) reached statistical significance. In order to further examine the interaction effect, the sample was divided by each of the identified moderating factors (gender and race), and the correlation between internal health locus of control and self-rated health was compared between the subgroups. As summarized in Table 4, the correlation between internal health locus of control and self-rated health in female ( $r = .36$ ,  $p = .00$ ) was stronger than that in male ( $r = .21$ ,  $p = .00$ ), and the difference was statistically significant ( $z = -3.16$ ,  $p = .00$ ). When the sample was divided by race, Whites had a strong correlation between internal health locus of control and self-rated health ( $r = .30$ ,  $p = .00$ ), whereas non-Whites presented nonsignificant correlation ( $r = .02$ ,  $p = .83$ ). The difference in correlation coefficients was statistically significant ( $z = 2.87$ ,  $p = .00$ ).

## Discussion

Building upon the notion of the social determinants of health (Marmot & Wilkinson, 2005; WHO, 1948), the present study examined factors associated with older individuals' self-ratings of health. Focus was given to the role of internal health locus of control because individuals' subjective evaluations of the extent to which they feel in control over their own health may shape not only behavioral but also perceptual aspects of health (Milte et al., 2015; Pudrovska, 2015). Supporting the direct and moderating effect models, the



overall findings shed light on internal health locus of control as an important factor in understanding individuals' self-ratings of health and provide implications for geriatric social work practices.

Consistent with previous studies, positive ratings of health were observed among older adults with younger age, White race, and a higher level of education (Brenowitz et al., 2014; Hudson et al., 2013). As anticipated, physical health indicators served as a critical base of older individuals' self-assessment health (Mavaddat et al., 2014). The presence of chronic condition and functional disability seems to make older individuals prone to negative perceptions of health.

Controlling for the effect of demographic and physical health-related characteristics, internal health locus of control was shown to play an important role in self-assessment of health. Inherent to the existing literature on the promotive effect of internal health locus of control on lifestyles and health behaviors (e.g., He, 2014; Reitzel et al., 2013), findings from this study, further lend support to its contribution to accounting for the perceptions of health. The feelings of control that older adults hold for their own health seem to determine how they perceive and evaluate their health status. The finding that internal health locus of control promotes positive perceptions and attitudes toward health suggests that it could serve as a target agent for health promotions and interventions for the geriatric population.

In addition to the direct effect, internal health locus of control was found to have significant interactions with gender and race. No moderating effect of age was observed. Further analyses demonstrated that the positive impact of internal health locus of control on self-ratings of health was greater in females and Whites compared to their counterparts. Moving beyond gender and racial differences in simple means of internal health locus of control and self-rated health (Pudrovskaya, 2015; Sargent-Cox & Anstey, 2015), our findings demonstrated that the magnitude of the impact that internal health locus of control exerts on self-ratings of health differed by gender and race as well. This finding elucidates potential gender and racial differences in the psychological mechanisms of health.

Some limitations to the present study should be noted. Foremost concern is the use of cross-sectional design, which limits the inference of causal directionality. Although racial variation was one of the major findings in the present study, racial/ethnic minorities are underrepresented in the dataset. While the overall retention rate of the MIDUS II dataset was reported, specific information on retention rate in subgroups was not available. It should also be noted that functional status of the sample was skewed, reflecting the nature of volunteer sample of community-dwelling older adults. Future studies should consider using more representative samples and longitudinal designs.

Despite the limitations, the present study not only expands our knowledge base on older adults' perceptions of health but also provides implications for geriatric social work practices. Given its significance in older individuals' health, more attention should be paid to internal health locus of control as a focus of intervention efforts. Unlike personality traits, internal health locus of control is a psychological characteristic that is amenable to change (Hinote, 2007; Wolinsky et al., 2009). Interventions geared toward control enhancement and self-empowerment would bring benefits to older individuals. Our findings on interaction effects offer further implications to geriatric social work practices by calling for group-specific intervention strategies. According to the systematic review by Cattan and colleagues (2005), subgroup differences have rarely been considered in the existing health promotion interventions for older populations. Incorporation of differences by race and gender in developing and implementing intervention programs would help identify target groups to be prioritized and improve efficacy of the programs.

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