Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

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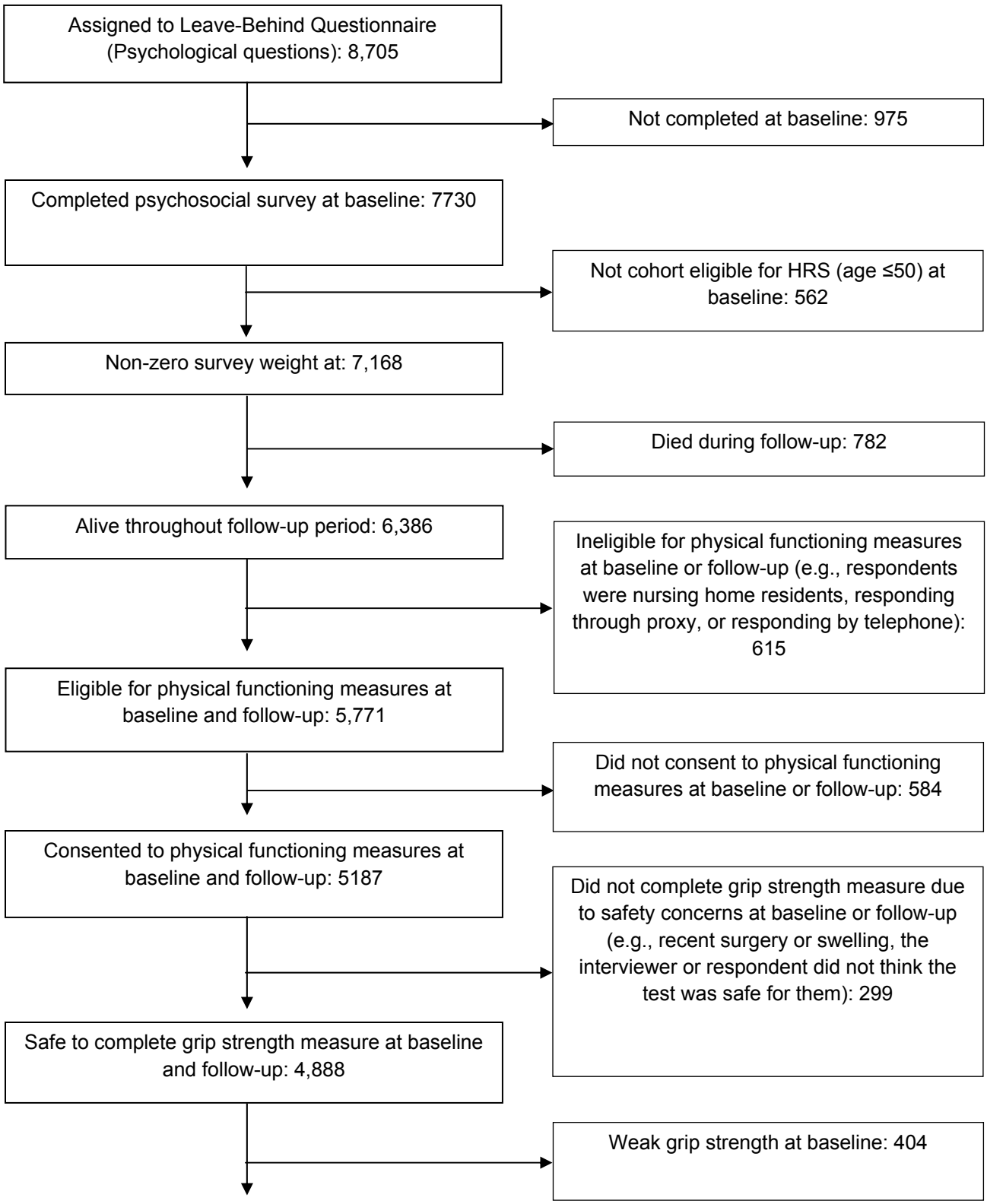
eFigure 1. Sample Inclusion Criteria for Grip Strength Analyses



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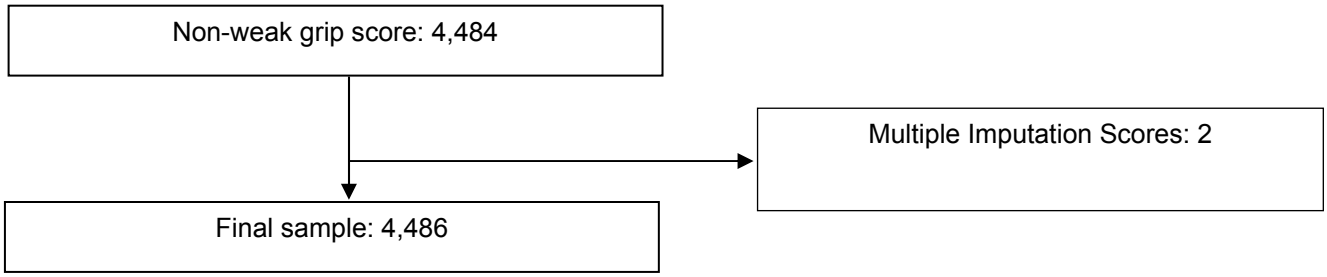

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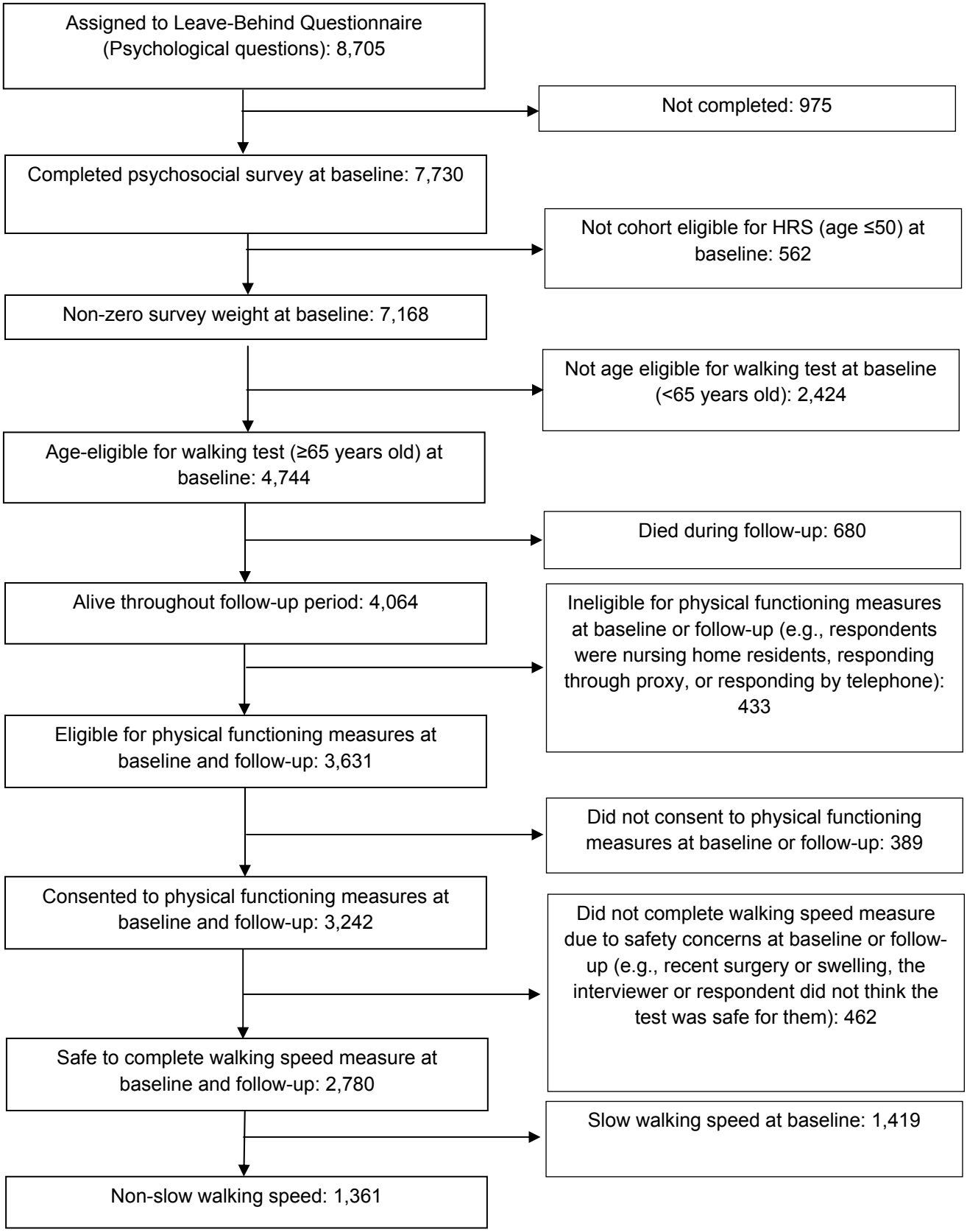
eFigure 2. Sample Inclusion Criteria for Walking Speed Analyses



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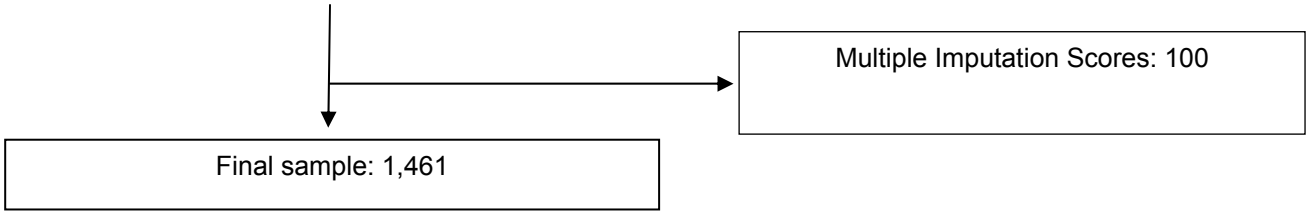

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eMethods. Additional Methods Information

Measures

Purpose in life

Following HRS protocol, if respondents completed at least 4 of 7 items, a purpose in life score was derived by taking the mean of the completed items. Among respondents for whom a score was calculated, 96.64% completed all seven items. To facilitate comparison of effect size across studies using different purpose in life measures, we standardized scores derived for the current study (M=0, SD=1). On a six-point Likert scale, respondents rated the degree to which they endorsed each item such as, “I have a sense of direction and purpose in my life.”

Grip Strength

Respondents were asked to stand (or sit, if unable to stand) and position their arm at their side in a 90-degree angle. They were then asked to squeeze the meter as hard as they could and provided a chance to practice. After the practice measurement, two measurements were taken with each hand, alternating hands. To reduce measurement error, the mean value of all hand grip measurements was used.

Walking Speed

After measuring and marking a 2.5 meter distance, interviewers asked respondents to walk that distance at their normal walking pace, using canes or walkers if needed. Walking speed was calculated by dividing distance walked (in

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meters) by recorded time (in seconds). Participants performed the walking test twice. To reduce measurement error, the mean of both measurements was used.

Cognitive impairment

Cognitive impairment (yes/no) was assessed only in people aged ≥65 and the assessment procedure is described in extensive detail elsewhere.[1–3]

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eTable 1. Risk Ratios for the Association Between Tertiles of Baseline Purpose in Life and Risk of Developing Weak Grip Strength[a] or Slow Walking Speed[b] Four Years Later

Grip Strength (n=4,486)		
Models	**Adjusted risk ratios (95% CI)**	***P* Value**
Unadjusted		
Low (Reference Group)	1.00	
Medium	0.67 (0.53-0.85)	.002
High	0.53 (0.40-0.72)	<.001
Age, gender, race/ethnicity		
Low (Reference Group)	1.00	
Medium	0.81 (0.64-1.03)	.08
High	0.71 (0.53-0.94)	.02
Demographic[c]		
Low (Reference Group)	1.00	
Medium	0.83 (0.66-1.05)	.12
High	0.76 (0.57-1.00)	.05
Demographic[c] + baseline health[d] + depressive symptoms		
Low (Reference Group)	1.00	
Medium	0.86 (0.66-1.09)	.20
High	0.81 (0.60-1.09)	.16
Demographic[c] + baseline health[d] + depressive symptoms + health behaviors[e]		
Low (Reference Group)	1.00	
Medium	0.86 (0.68-1.09)	.21
High	0.83 (0.62-1.11)	.20
Walking Speed (n=1,461)		
Models	**Adjusted risk ratios (95% CI)**	***P* Value**
Unadjusted		
Low (Reference Group)	1.00	
Medium	0.69 (0.61-0.79)	<.001
High	0.58 (0.50-0.68)	<.001

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Age, gender, race/ethnicity		
Low (Reference Group)	1.00	
Medium	0.73 (0.64-0.83)	<.001
High	0.64 (0.54-0.75)	<.001
Demographic[c]		
Low (Reference Group)	1.00	
Medium	0.75 (0.66-0.86)	<.001
High	0.68 (0.59-0.80)	<.001
Demographic[c] + baseline health + depressive symptoms		
Low (Reference Group)	1.00	
Medium	0.79 (0.69-0.89)	.001
High	0.73 (0.62-0.86)	.001
Demographic[c] + baseline health[d] + depressive symptoms + health behaviors[e]		
Low (Reference Group)	1.00	
Medium	0.80 (0.71-0.91)	.001
High	0.74 (0.63-0.87)	<.001

[a]Grip strength cutoff = 26 kg for men and 16 kg for women

[b]Walking speed cutoff = 0.8 m/s

[c]Demographic factors: age, gender, race/ethnicity, marital status, education level, total wealth

[d]Baseline health: heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems, stroke, cancer or malignant tumor of any kind (excluding minor skin cancer), high blood pressure, diabetes, lung disease, and arthritis or rheumatism.

[e]Health behaviors: smoking, exercise, alcohol frequency

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eTable 2. Linear Regressions Modeling Mean Changes in Physical Functioning (Assessed in Waves 2006 And 2010) as a Function of Tertiles of Baseline Purpose in Life

Grip Strength (n=4,486)		
Models	**Adjusted regression coefficients (95% CI)**	***P* Value**
Unadjusted		
Low (Reference Group)	1.00	
Medium	0.36 (-0.11-0.83)	.13
High	0.83 (0.37-1.29)	.001
Age, gender, race/ethnicity		
Low (Reference Group)	1.00	
Medium	0.27 (-0.19-0.73)	.25
High	0.66 (0.21-1.12)	.005
Demographic[a]		
Low (Reference Group)	1.00	
Medium	0.23 (-0.23-0.69)	.32
High	0.56 (0.14-0.98)	.01
Demographic[a] + baseline health[b] + depressive symptoms		
Low (Reference Group)	1.00	
Medium	0.20 (-0.25-0.65)	.37
High	0.52 (0.10-0.93)	.02
Demographic[a] + baseline health[b] + depressive symptoms + health behaviors[c]		
Low (Reference Group)	1.00	
Medium	0.19 (-0.26-0.63)	.41
High	0.48 (0.07-0.90)	.02
Walking Speed (n=1,461)		
Models	**Adjusted regression coefficients (95% CI)**	***P* Value**
Unadjusted		
Low (Reference Group)	1.00	
Medium	0.05 (0.01-0.08)	.008
High	0.08 (0.05-0.12)	<.001

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Age, gender, race/ethnicity		
Low (Reference Group)	1.00	
Medium	0.04 (0.00-0.07)	.03
High	0.07 (0.03-0.10)	<.001
Demographic[a]		
Low (Reference Group)	1.00	
Medium	0.03 (0.00-0.06)	.08
High	0.05 (0.02-0.09)	.001
Demographic[a] + baseline health + depressive symptoms		
Low (Reference Group)	1.00	
Medium	0.03 (-0.01-0.06)	.14
High	0.05 (0.01-0.08)	.009
Demographic[a] + baseline health[b] + depressive symptoms + health behaviors[c]		
Low (Reference Group)	1.00	
Medium	0.02 (-0.01-0.06)	.18
High	0.05 (0.02-0.09)	.006

[a]Demographic factors: age, gender, race/ethnicity, marital status, education level, total wealth

[b]Baseline health: heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems, stroke, cancer or malignant tumor of any kind (excluding minor skin cancer), high blood pressure, diabetes, lung disease, and arthritis or rheumatism.

[c]Health behaviors: smoking, exercise, alcohol frequency

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eTable 3. Risk Ratios for the Association Between 1 Standard Deviation Increase in Baseline Purpose in Life and Risk of Developing Weak Grip Strength (Alternate Cutoff Score)[a] or Slow Walking Speed (Alternate Cutoff Score)[b] Four Years Later

Grip Strength (n=2,626)		
Models	**Adjusted risk ratios (95% CI)**	***P* Value**
Unadjusted	0.88 (0.83-0.95)	.001
Age, gender, race/ethnicity	0.90 (0.84-0.97)	.006
Demographic[c]	0.92 (0.86-0.99)	.03
Demographic[c] + baseline health[d] + depressive symptoms	0.95 (0.88-1.02)	.13
Demographic[c] + baseline health[d] + depressive symptoms + health behaviors[e]	0.95 (0.89-1.03)	.20
Walking Speed (n=2,275)		
Models	**Adjusted risk ratios (95% CI)**	***P* Value**
Unadjusted	0.69 (0.63-0.75)	<.001
Age, gender, race/ethnicity	0.75 (0.68-0.82)	<.001
Demographic[c]	0.79 (0.72-0.87)	<.001
Demographic[c] + baseline health[d] + depressive symptoms	0.82 (0.74-0.90)	<.001
Demographic[c] + baseline health[d] + depressive symptoms + health behaviors[e]	0.82 (0.74-0.90)	<.001

[a]Alternate grip strength cutoff = 32 kg for men and 20 kg for women

[b]Alternate walking speed cutoff = 0.6 m/s

[c]Demographic factors: age, gender, race/ethnicity, marital status, education level, total wealth

[d]Baseline health: heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems, stroke, cancer or malignant tumor of any kind (excluding minor skin cancer), high blood pressure, diabetes, lung disease, and arthritis or rheumatism.

[e]Health behaviors: smoking, exercise, alcohol frequency

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eTable 4. Linear Regressions Modeling Mean Changes in Physical Function (Assessed in Waves 2006 And 2010) as a Function of a 1-SD Increase in Baseline Purpose in Life

Grip Strength (n=2,626)		
Models	**Adjusted regression coefficients (95% CI)**	***P* Value**
Unadjusted	0.39 (0.15-0.62)	.002
Age, gender, race/ethnicity	0.39 (0.15-0.62)	.002
Demographic[a]	0.33 (0.01-0.57)	.006
Demographic[a] + baseline health[b] + depressive symptoms	0.26 (0.01-0.52)	.05
Demographic[a] + baseline health[b] + depressive symptoms + health behaviors[c]	0.23 (-0.02-0.49)	.08
Walking Speed (n=2,275)		
Models	**Adjusted regression coefficients (95% CI)**	***P* Value**
Unadjusted	0.02 (0.00-0.03)	.02
Age, gender, race/ethnicity	0.02 (0.00-0.03)	.02
Demographic[a]	0.01 (0.00-0.03)	.07
Demographic[a] + baseline health + depressive symptoms	0.01 (0.00-0.02)	.18
Demographic[a] + baseline health[b] + depressive symptoms + health behaviors[c]	0.01 (-0.04-0.02)	.19

[a]Demographic factors: age, gender, race/ethnicity, marital status, education level, total wealth

[b]Baseline health: heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems, stroke, cancer or malignant tumor of any kind (excluding minor skin cancer), high blood pressure, diabetes, lung disease, and arthritis or rheumatism.

[c]Health behaviors: smoking, exercise, alcohol frequency

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eTable 5. Risk Ratios for the Association Between Tertiles of Baseline Purpose in Life and Risk of Developing Weak Grip Strength (Alternate Cutoff Score)[a] or Slow Walking Speed (Alternate Cutoff Score)[b] Four Years Later

Grip Strength (n=2,626)		
Models	**Adjusted risk ratios (95% CI)**	***P* Value**
Unadjusted		
Low (Reference Group)	1.00	
Medium	0.84 (0.71-1.00)	.05
High	0.77 (0.65-0.90)	.002
Age, gender, race/ethnicity		
Low (Reference Group)	1.00	
Medium	0.90 (0.75-1.07)	.23
High	0.83 (0.69-0.99)	.04
Demographic[c]		
Low (Reference Group)	1.00	
Medium	0.92 (0.78-1.10)	.35
High	0.88 (0.74-1.04)	.13
Demographic[c] + baseline health[d] + depressive symptoms		
Low (Reference Group)	1.00	
Medium	0.95 (0.79-1.14)	.57
High	0.92 (0.77-1.10)	.38
Demographic[c] + baseline health[d] + depressive symptoms + health behaviors[e]		
Low (Reference Group)	1.00	
Medium	0.96 (0.80-1.15)	.66
High	0.94 (0.79-1.12)	.50
Walking Speed (n=2,275)		
Models	**Adjusted risk ratios (95% CI)**	***P* Value**
Unadjusted		
Low (Reference Group)	1.00	
Medium	0.67 (0.55-0.81)	<.001
High	0.43 (0.35-0.53)	<.001

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Age, gender, race/ethnicity		
Low (Reference Group)	1.00	
Medium	0.76 (0.62-0.92)	.006
High	0.51 (0.41-0.64)	<.001
Demographic[c]		
Low (Reference Group)	1.00	
Medium	0.82 (0.67-0.99)	.04
High	0.58 (0.47-0.73)	<.001
Demographic[c] + baseline health[d] + depressive symptoms		
Low (Reference Group)	1.00	
Medium	0.84 (0.69-1.02)	.08
High	0.61 (0.48-0.77)	<.001
Demographic[c] + baseline health[d] + depressive symptoms + health behaviors[e]		
Low (Reference Group)	1.00	
Medium	0.84 (0.69-1.02)	.07
High	0.61 (0.49-0.77)	<.001

[a]Alternate grip strength cutoff = 32 kg for men and 20 kg for women

[b]Alternate walking speed cutoff = 0.6 m/s

[c]Demographic factors: age, gender, race/ethnicity, marital status, education level, total wealth

[d]Baseline health: heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems, stroke, cancer or malignant tumor of any kind (excluding minor skin cancer), high blood pressure, diabetes, lung disease, and arthritis or rheumatism.

[e]Health behaviors: smoking, exercise, alcohol frequency

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eTable 6. Linear Regressions Modeling Mean Changes in Physical Functioning (Assessed in Waves 2006 And 2010) as a Function of Tertiles of Baseline Purpose in Life

Grip Strength (n=2,626)		
Models	**Adjusted regression coefficients (95% CI)**	***P* Value**
Unadjusted		
Low (Reference Group)	1.00	
Medium	0.66 (0.10-1.22)	.02
High	1.02 (0.46-1.58)	.001
Age, gender, race/ethnicity		
Low (Reference Group)	1.00	
Medium	0.61 (0.07-1.16)	.03
High	0.91 (0.34-1.47)	.002
Demographic[a]		
Low (Reference Group)	1.00	
Medium	0.57 (0.03-1.11)	.04
High	0.81 (0.26-1.37)	.005
Demographic[a] + baseline health[b] + depressive symptoms		
Low (Reference Group)	1.00	
Medium	0.49 (-0.06-1.05)	.08
High	0.68 (0.08-1.28)	.03
Demographic[a] + baseline health[b] + depressive symptoms + health behaviors[c]		
Low (Reference Group)	1.00	
Medium	0.45 (-0.10-1.01)	.11
High	0.61 (0.02-1.20)	.04
Walking Speed (n=2,275)		
Models	**Adjusted regression coefficients (95% CI)**	***P* Value**
Unadjusted		
Low (Reference Group)	1.00	
Medium	0.02 (0.00-0.05)	.06
High	0.05 (0.02-0.08)	.001

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Age, gender, race/ethnicity		
Low (Reference Group)	1.00	
Medium	0.02 (-0.01-0.04)	.19
High	0.04 (0.01-0.07)	.008
Demographic[a]		
Low (Reference Group)	1.00	
Medium	0.01 (-0.01-0.04)	.38
High	0.03 (0.00-0.06)	.03
Demographic[a] + baseline health + depressive symptoms		
Low (Reference Group)	1.00	
Medium	0.01 (-0.02-0.03)	.58
High	0.03 (0.00-0.06)	.08
Demographic[a] + baseline health[b] + depressive symptoms + health behaviors[c]		
Low (Reference Group)	1.00	
Medium	0.01 (-0.02-0.03)	.63
High	0.03 (0.00-0.06)	.08

[a]Demographic factors: age, gender, race/ethnicity, marital status, education level, total wealth

[b]Baseline health: heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems, stroke, cancer or malignant tumor of any kind (excluding minor skin cancer), high blood pressure, diabetes, lung disease, and arthritis or rheumatism.

[c]Health behaviors: smoking, exercise, alcohol frequency

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