

Measuring Higher Level Physical Function in Well-Functioning Older Adults: Expanding Familiar Approaches in the Health ABC Study

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Background. To evaluate development and progression of functional limitation and retain comparability with established approaches, we raised the measurement ceiling of commonly used self-report and performance-based measures of function. This study evaluated the utility and concurrent validity of these expanded measures.

Methods. The study population consisted of 3075 black and white men and women aged 70 to 79 years, with no reported mobility limitations or disability, participating in the Health, Aging, and Body Composition, or Health ABC study. Self-report measures were expanded by ascertaining ease of performance and including more demanding levels of some tasks. A single foot stand and narrow walk supplemented an established performance battery. For walking endurance, we developed the Long Distance Corridor Walk (LDCW), which includes distance covered in 2 minutes and the time to walk 400 m.

Results. The expanded self-report items identified one half of the men and one third of the women as exceptionally well functioning and 10% to 13% of men and 21% to 36% of women with lower capacity. The supplemented and re-scored performance battery discriminated function over the full range. The LDCW further differentiated walking capacity at the high end and also identified a subgroup with limitations. The self-report and performance measures were significantly, but weakly, correlated (0.13–0.35) and were independent predictors of walking endurance.

Conclusions. Well-functioning persons in their 70s exhibit a broad range of functional capacity readily ascertained by expanded self-report and performance tests. Significant associations among these measures support their concurrent validity, but generally weak correlations indicate they tap different, but important, dimensions of physical function.

INVESTIGATING the disablement process and transitions from vigor to frailty in old age requires measures of physical function that can distinguish meaningful gradations of capacity and change over a wide range of abilities. Although assessment of disability and functional limitation is well developed (1–4), differentiating functional capacity in normal and hardy older adults has received less attention (5–6). To study the dynamics of functional change in a newly established cohort initially free of lower-extremity functional difficulty and disability, we expanded commonly used self-report and performance-based measures of physical function to (i) distinguish gradations of higher level functional capacity, (ii) permit examination of both decline and improvement over several years, and (iii) enable comparisons with other well-characterized populations.

Traditional self-report measures were not designed to distinguish the entire range of function in older adults, as they focus on inability, need for assistance, or difficulty performing a variety of functions (1). Although some self-report measures have been developed to differentiate higher levels of functioning (7–10), they are not comparable to

more established approaches. Ideally, for long-term follow-up of transitions from vigor to frailty, measures of capability should lie on the same continuum as measures of limitation. Therefore, our strategy to distinguish higher levels of function that complement conventional self-report measures of functional limitation was to ascertain ease of performance and include more demanding levels of common activities.

Performance-based measures, although intended to assess a broader range of functional capacity, do not adequately distinguish ability at the higher end of the spectrum (6,11–13). We supplemented an established performance battery (14) with increased test duration, a single foot stand, and a narrow walk test of balance. We also devised a scoring approach that raises the measurement ceiling of a commonly used summary index (14–16). To assess walking endurance, we developed the Long Distance Corridor Walk (LDCW), which captures walking speed over 20 m, distance covered in 2 minutes, and time to walk 400 m.

This report introduces these measures and provides data on their distribution in a biracial cohort of well-functioning

men and women in their 70s, and evaluates the utility and concurrent validity of these expanded measures.

METHODS

Study Population

The study population consisted of 3075 well-functioning black and white men and women aged 70 to 79 years participating in the Health, Aging, and Body Composition (Health ABC) study, a prospective investigation of interrelationships among health conditions, body composition, social and behavioral factors, and functional change. Potential participants were identified from a random sample of white Medicare beneficiaries and all age-eligible community-dwelling black residents in designated zip code areas surrounding the Pittsburgh, Pennsylvania, and Memphis, Tennessee, field centers. Eligibility criteria included the following: (i) no reported difficulty: walking for 1/4 mile, walking up 10 steps, or performing basic activities of daily living; (ii) no known life-threatening cancers; and (iii) no plans to leave the area for 3 years. The baseline home interview and clinic-based examination took place between April 1997 and June 1998. All participants provided written informed consent, and all protocols were approved by the institutional review boards at both study sites.

Measures

Self-report.—Participants were asked, “Because of a health or physical problem, do you have any difficulty . . . ?” Those responding “no” were asked, “How easy is it for you to [walk for 1/4 mile; walk up 10 steps; lift or carry 10 lbs; stoop, crouch or kneel; stand up from a chair without using your arms]? Would you say . . . is very easy, somewhat easy, or not so easy?” For the first three activities, when no difficulty was reported, we inquired about difficulty and ease in performing a more demanding level of the

tasks (i.e., walking for 1 mile, walking up 20 steps, and lifting or carrying 20 lbs, respectively). In addition, whether or not difficulty was reported, we asked, “Do you get tired when you [walk for 1/4 mile, walk up 10 steps]?” and “Because of a health or physical problem, do you [walk for 1/4 mile, walk up 10 steps, lift or carry 10 lbs] less often compared to 12 months ago?”

Performance-based.—We modified a brief battery of three lower-extremity performance tests used in the Established Populations for the Epidemiologic Studies of the Elderly (EPESE) (14) consisting of 5 repeated chair stands, standing balance (semi- and full-tandem stands), and a 6-m walk to determine usual gait speed. We increased the holding time of the semi- and full-tandem stands to 30 seconds and added a 30-second single leg stand to the standing balance test. We also added a narrow walk test of balance, administered on the same course as the 6-m walk. Participants were instructed to walk at their usual pace, but to stay between lines of colored tape, 20 cm apart. Stepping on or outside of the tape two or more times constituted a failure. Up to three trials were allowed to obtain two valid times.

To summarize performance for the three EPESE tests, we used published cut points to construct three 0- to 4-point scales and one 0–12-point summary score (14). For these tests, and those added for the Health ABC study, we summarized performance as follows. First, we converted test times to rates for the repeated chair stands (chair stands/s) and the two walks (m/s) and assigned a score of 0 when a test was not done successfully. For standing balance, we summed the time each of the three stands was held for a maximum time of 90 seconds. Next, we divided each performance by the maximal performance possible on that test in older adults as determined from our data and those from other studies (6,14,17–18) to derive a ratio score from 0 to 1. For the chair stands, the divisor was 1 chair stand/second; for both the usual and narrow walks, the divisor was 2

Table 1. Percentage of Distribution of Reported Difficulty and Level of Ease, Getting Tired, and Reduced Frequency Performing Lower-extremity Functions

Lower-extremity Functions	Difficult, %	Not That Easy, %	Somewhat Easy, %	Very Easy, %	Gets Tired, %	Does Less, %
Women (n = 1584)[†]						
Walking 1/4 mile	0.0	6.3	26.4	67.3	13.0	17.3
Walking 1 mile	20.9	13.4	27.7	38.0	—	—
Walking up 10 steps	0.0	6.7	27.8	65.5	12.0	11.5
Walking up 20 steps	22.5	13.1	28.7	35.7	—	—
Lifting/carrying 10 lbs	10.3	3.5	17.0	69.2	—	12.3
Lifting/carrying 20 lbs	36.0	4.4	25.7	33.9	—	—
Stooping, crouching, kneeling	44.1	3.5	19.8	32.7	—	—
Standing up without using arms	13.4	1.4	16.8	68.4	—	—
Men (n = 1491)[†]						
Walking 1/4 mile	0.0	2.9	18.8	78.3	9.1	10.9
Walking 1 mile	12.6	8.3	24.0	55.1	—	—
Walking up 10 steps	0.0	3.7	18.9	77.4	5.9	7.6
Walking up 20 steps	11.9	9.0	27.2	51.9	—	—
Lifting/carrying 10 lbs	1.9	0.9	8.3	88.9	—	4.4
Lifting/carrying 20 lbs	9.6	2.0	18.0	70.5	—	—
Stooping, crouching, kneeling	29.3	2.6	20.7	47.4	—	—
Standing up without using arms	8.9	1.5	14.0	75.6	—	—

[†]Due to lost data collection forms for walking 1/4 mile, 1 mile, up 10 steps, and up 20 steps, the number of women and men with data is 1528 and 1440, respectively.

m/s; and for standing balance, the divisor was 90 seconds. Last, we added the ratio scores from the four tests to get a continuous scale ranging from 0 to 4. This approach was designed to minimize ceiling effects and maximize overall dispersion on each measure.

Walking endurance.—To measure walking endurance, we developed the LDCW, a two-part, self-paced walking test. The first part consisted of a 2-minute walk in which participants were instructed to “cover as much ground as possible,” which served as a warm-up and provided data for those unable to walk for a longer period. The second part consisted of a 400-m walk “done as quickly as possible.” The course was 20 m long and marked by cones at both ends. The time and number of steps needed to complete the first 20 m of the 2-minute walk were also recorded. Heart rate was monitored continuously using the Polar Pacer (model no. 61190, Polar Electro, Inc., Oula, Finland). Exclusions from testing and stopping criteria are discussed below.

Data Analysis

To evaluate the relationship between different types of measures, we compared mean performances across response categories of the self-report items using least square means and computed Pearson correlation coefficients, and plotted the distributions of the Health ABC performance score and time to walk 400 m by category of reported ease in walking 1 mile. To determine the independence of the expanded self-report items and performance tests as measures of functional capacity, we conducted linear regression analyses using the 400-m walk time as the dependent variable. All analyses were performed using the SAS version 6.12 software (SAS, Inc, Cary, NC).

RESULTS

The mean age of the Health ABC cohort was 73.6 years. 48% of the participants were men, 42% were black, 75% had completed high school, and 24% had finished 4 years of college. Table 1 gives the response distribution on the self-report items. No one reported difficulty walking 1/4 mile or up 10 steps as required for study participation, and a large majority found performing common functions to be “very easy.” Reports of tiredness and reduced frequency were relatively rare, as was endorsement of “not that easy.” Increas-

Table 2. Performance on the Narrow Walk and Expanded Standing Balance Test

Task Performance	Men (n = 1491)	Women (n = 1584)
6-m Narrow (20-cm) Walk		
Unable to stay within tape, %	13.1	16.7
>15% slower than usual, [†] %	19.5	28.4
5%–15% slower than usual, %	24.8	22.7
±5% of usual, %	25.7	20.7
>5% faster than usual, %	17.0	11.5
Expanded Standing Balance		
Held semi-tandem for 30 s, %	96.0	90.4
Held full-tandem for 30 s, %	82.3	69.4
Held one leg for 30 s, %	38.1	21.3

[†]Usual walking speed over 6 m.

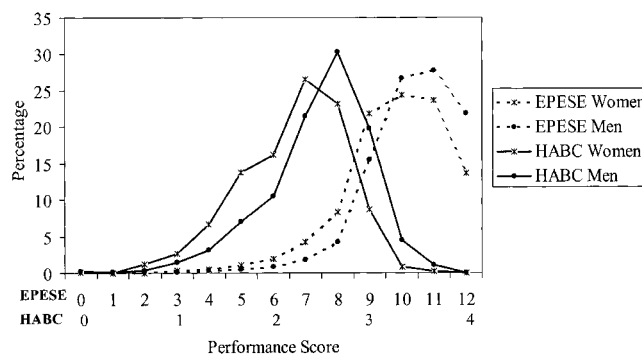


Figure 1. Score distribution on the Established Populations for the Epidemiologic Studies of the Elderly (EPESE) and Health ABC (HABC) performance scales for men and women participating in the Health ABC study.

ing the functional demand specifically reduced the proportion responding “very easy” by about one third in men and one half in women and identified difficulty in 10% to 13% of men and 21% to 36% of women.

The distribution of performance on the narrow walk and expanded standing balance tests is given in Table 2. Even after three attempts, 15% of the participants could not successfully complete the narrow walk, and 24% walked at least 15% slower than their usual pace. Similarly, on the standing balance test, although most held the semi- and full-tandem stands for 30 seconds, less than 30% could stand on one leg for 30 seconds.

Figure 1 plots the distributions for men and women of the EPESE and Health ABC summary performance scores. We converted the continuous Health ABC score to an ordinal scale for comparison (scores 0–0.33 were coded as 0.33,

Table 3. Eligibility, Completion Status, and Performance on the Long Distance Corridor Walk (LDCW)

LDCW Completion Status	Men (n = 1491)	Women (n = 1584)
Total Number Excluded (%)		
Met clinical criteria	73	80
Self-reported exclusion	107	135
2-min Walk		
No. eligible (%)	1311 (87.5)	1364 (86.1)
No. completing (%)	1290 (86.5)	1343 (84.8)
Median distance, m (Q1–Q3)	160 (141–179)	145 (128–161)
Median speed, m/s (Q1–Q3)	1.33 (1.18–1.49)	1.21 (1.07–1.34)
400-m Walk		
No. eligible (%)	1265 (84.8)	1310 (82.7)
No. completing (%)	1189 (79.7)	1135 (71.7)
Median time, min:s (Q1–Q3)	5:09 (4:39–5:48)	5:36 (5:06–6:16)
Median speed, m/s (Q1–Q3)	1.30 (1.15–1.43)	1.19 (1.06–1.31)
No. Eligible Who Stopped	122	234
Reason for Stopping		
Heart rate ≥135 bpm (%)	47 (38.5)	94 (40.2)
Chest pain (%)	3 (2.5)	3 (1.3)
Shortness of breath (%)	4 (3.3)	21 (9.0)
Feeling faint (%)	0 (0.0)	1 (0.4)
Leg pain (%)	29 (23.8)	53 (22.7)
Other (%)	21 (17.2)	46 (19.7)
Unknown (%)	18 (14.8)	16 (6.8)

scores 0.33–0.67 were coded as 0.67, and so on). Among these well-functioning older adults, only 3% scored below 7 and over 80% scored 9 or better on the EPESE scale (primarily because 94% and 86%, respectively, received the highest score for usual gait speed and the basic standing balance test); whereas, on the Health ABC scale, 38% scored in the bottom half and only 18% were in the upper quartile of the scoring range.

Data on eligibility, completion, and performance on the LDCW are presented in Table 3. Participants with a major electrocardiographic abnormality, systolic blood pressure greater than 200 mm Hg, and a resting heart rate over 120 beats per minute (bpm), and those reporting cardiac surgery or worsening of symptoms, such as chest pain and shortness of breath in the past 3 months, were excluded from testing, leaving only 87% eligible for the LDCW. During testing, if heart rate exceeded 135 bpm or the participant experienced symptoms such as chest or leg pain, the participant was instructed to stop. Thus, 1.6% of participants did not complete the 2-minute walk, an additional 2.2% did not begin the 400-m walk, and 9.3% did not complete the full distance.

Table 4 gives the distribution of selected performance measures for each category of a sample of self-report items. The mean performance scores, walking speed, and percentage of participants completing the 400-m walk all increased

and the time to walk 400 m decreased with increasing walking ease ($p < .01$). However, when difficulty was a response option, the usual walking speed and performance scores of those responding “not so easy” were not different from those who reported difficulty, with one exception. With regard to walking 1 mile and walking up 20 steps, although a higher percentage of those responding “not so easy” completed the 400-m walk than those expressing difficulty ($p < .01$), they took longer to do so ($p < .05$). For stooping, crouching, and kneeling, the “not so easy” group performed most similarly to those reporting a lot of difficulty. Persons reporting tiredness or reduced frequency had performance values between those for the “not so easy” and “somewhat easy” groups.

Correlations among the self-report and performance measures (see Table 5) were all significant ($p < .0001$), but generally weak, ranging from 0.13 to 0.35 for women and 0.16 to 0.28 for men. Correlations were slightly higher with components of the LDCW (0.25–0.40 for women and 0.19–0.32 for men), largely due to the walking items. The Health ABC performance score showed higher correlations than the EPESE score with every measure examined.

Figure 2 shows the distribution of the Health ABC performance score by category of difficulty or ease in walking 1 mile. The “very easy” group had the lowest percentage of

Table 4. Mean Performance by Category of Reported Functional Capacity

Task Performance	<i>n</i> [†]	6-m Usual Walk, m/s	EPESE Summary Score	Health ABC Summary Score	20-m Fast Walk, m/s	Finished 400 m, %	400-m time, m:s
Walk 1/4 Mile							
Not so easy	139	0.94	8.69	1.64	1.09	41.7	6:55.6
Somewhat easy	674	1.09	9.48	1.94	1.21	62.5	6:04.0
Very easy	2155	1.21	10.28	2.27	1.37	81.9	5:23.1
Gets tired	327	1.03	9.21	1.84	1.18	55.0	6:15.7
Does not get tired	2628	1.19	10.13	2.21	1.35	77.4	5:29.4
Does less often	419	1.07	9.39	1.93	1.22	64.2	6:03.8
Does not do less often	2533	1.19	10.13	2.21	1.35	77.4	5:28.8
Walk 1 Mile							
Difficult	501	1.06	9.30	1.88	1.20	57.1	6:05.9
Not so easy	323	1.07	9.42	1.92	1.19	68.1	6:18.8
Somewhat easy	770	1.15	9.93	2.11	1.29	74.9	5:42.9
Very easy	1374	1.25	10.48	2.36	1.42	84.4	5:11.5
Walk up 20 Steps							
Difficult	514	1.07	9.37	1.92	1.22	61.5	6:03.5
Not so easy	329	1.05	9.39	1.91	1.20	69.9	6:14.0
Somewhat easy	831	1.15	9.94	2.11	1.30	75.0	5:39.8
Very easy	1293	1.25	10.49	2.36	1.42	83.1	5:11.5
Lift/Carry 20 lbs							
Difficult	713	1.07	9.47	1.92	1.22	64.1	6:04.1
Not so easy	98	1.09	9.39	1.94	1.27	67.0	5:51.5
Somewhat easy	674	1.15	9.80	2.08	1.29	75.2	5:40.2
Very easy	1586	1.24	10.43	2.34	1.40	81.5	5:15.5
Stoop, Crouch, Kneel							
Unable	58	0.97	8.19	1.62	1.18	46.6	6:31.0
A lot of difficulty	212	1.07	9.39	1.89	1.20	65.1	6:13.0
Some difficulty	391	1.12	9.43	1.97	1.27	67.0	5:53.0
A little difficulty	473	1.15	9.88	2.09	1.30	73.2	5:42.9
Not so easy	94	1.09	9.35	1.93	1.23	61.7	5:48.5
Somewhat easy	622	1.17	10.13	2.19	1.33	78.1	5:32.1
Very easy	1223	1.24	10.48	2.36	1.40	82.2	5:14.4

Notes: EPESE = Established Populations for Epidemiologic Studies of the Elderly.

[†]Numbers do not always add up to 3075 due to missing data (<1%) or forms ($n = 107$).

Table 5. Pearson Correlation Coefficients for Measures of Higher Level Physical Functioning

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Reported ease walking 1 mile		0.541	0.328	0.293	0.354	0.316	0.286	0.247	0.232	0.372	0.402	-0.377
2. Reported ease walking up 20 steps	0.556		0.318	0.267	0.307	0.268	0.241	0.237	0.200	0.304	0.338	-0.332
3. Reported ease lifting/carrying 20 lbs	0.304	0.359		0.208	0.256	0.255	0.225	0.204	0.129	0.245	0.252	-0.265
4. EPESE performance score	0.227	0.236	0.205		0.777	0.510	0.448	0.744	0.624	0.500	0.516	-0.461
5. Health ABC performance score	0.256	0.271	0.248	0.741		0.675	0.805	0.539	0.787	0.635	0.649	-0.614
6. Usual walk score	0.255	0.277	0.190	0.499	0.713		0.549	0.419	0.292	0.685	0.668	-0.650
7. Narrow walk score	0.193	0.190	0.201	0.419	0.820	0.567		0.312	0.400	0.528	0.531	-0.531
8. Repeated chair stands score	0.227	0.232	0.177	0.787	0.615	0.415	0.339		0.206	0.413	0.434	-0.376
9. Standing balance score	0.181	0.161	0.165	0.597	0.761	0.319	0.396	0.322		0.348	0.368	-0.307
10. 20-m walking speed	0.283	0.293	0.193	0.413	0.565	0.621	0.429	0.403	0.290		0.896	-0.770
11. 2-min walk distance	0.300	0.314	0.199	0.422	0.570	0.608	0.441	0.407	0.293	0.889		-0.838
12. 400-m walk time	-0.316	-0.320	-0.238	-0.450	-0.603	-0.589	-0.476	-0.416	-0.329	-0.764	-0.828	

Note: Correlations for men are below the diagonal and for women, above the diagonal. All correlations are significant at $p = .0001$. EPESE = Established Populations for Epidemiologic Studies of the Elderly.

persons who scored ≤ 2 (20.0%) and the highest percentage of those who scored ≥ 3 (26.3%; $p < .001$). Comparable percentages for the “somewhat easy” and “difficulty” groups were 35.0 and 11.6, and 50.4 and 5.9, respectively. The “not so easy” and “difficulty” groups had similar distributions ($p = .440$). Figure 3 plots the cumulative percentage of participants who walked 400 m in under 4 through 6 minutes by category of difficulty or ease in walking 1 mile. Among the “very easy” group, 85% walked 400 m in less than 6 minutes in comparison with 70% of the “somewhat easy,” 44% of the “not so easy,” and 51% of the “difficulty” groups.

Table 6 gives results for two linear regression models of time to complete the 400-m walk. Model 1 includes the 0- to 4-point Health ABC performance score; model 2 uses the four-component 0- to 1-point scales separately. Age, sex, race, and site are covariates in both models. This analysis was restricted to the 2213 participants who completed the 400-m walk and had no other missing data. The “not so easy” and “difficulty” groups were combined for these analyses, with 0 representing difficulty/not so easy, 1 as somewhat easy, and 2 as very easy. Model 1 explained 48.4% of the variance in 400-m time, with self-reported ease in walking 1 mile contributing 4.5% and the summed performance measures contributing 39.3%. In model 2, which disaggregated individual test performances, the total explained variance in 400-m time increased to 54.4%.

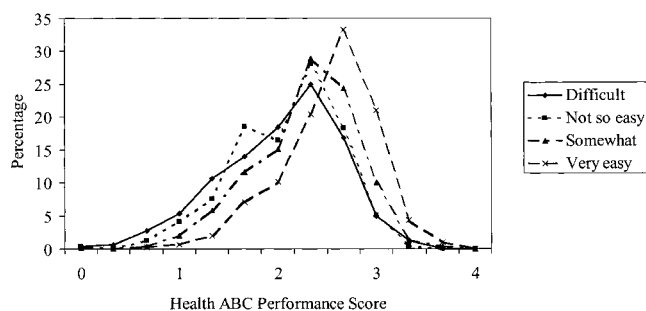


Figure 2. Score distribution on the Health ABC performance scale by self-reported difficulty or ease in walking 1 mile.

DISCUSSION

This study demonstrated that the expanded self-report and performance measures developed for the Health ABC study differentiate gradations of functional capacity in well-functioning 70-year-old men and women. Asking participants about ease of performing common functional tasks modestly improved discrimination of functional capacity; the inclusion of more demanding levels of these tasks was necessary for more adequate differentiation. Adding more challenging tests—the single leg stand and narrow walk—to an established performance battery helped identify persons with less optimal function. The ratio scoring approach increased the discrimination of all performance tests by eliminating the measurement ceiling associated with quartile cut points (6). In addition, using standard denominators for the ratios, based on maximal performances observed in older cohorts (6,14–16), should facilitate cross-study comparisons. The LDCW further distinguished capability at the higher end of the spectrum and identified persons with potential mobility limitations.

Questions about tiredness and reduced frequency did not provide much additional information compared with inquiring about performance ease. In fact, over 60% of those reporting “not so easy” also reported getting tired when they

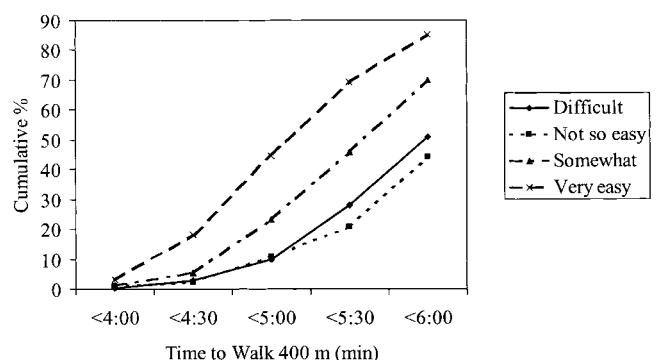


Figure 3. Cumulative percentage of participants walking faster than 4:00 through 6:00 min on the 400-m component of the Long Distance Corridor Walk by self-reported difficulty or ease in walking 1 mile.

Table 6. Predictors of Time (s) to Walk 400 m for 2213 Health ABC Participants Who Completed the Long Distance Corridor Walk, Controlling for Age, Sex, Race, and Site

Variable	Parameter Estimate	Standard Error	Partial R^2
Model 1			
Intercept	370.24*	27.11	
Reported ease walking 1 mile [†]	-10.44*	1.39	0.045
Reported ease lifting/carrying 20 lbs [†]	-6.48*	1.32	0.011
Reported ease walking up 20 steps [†]	-5.42*	1.42	0.004
Health ABC performance score [‡]	-56.63*	2.10	0.393
Model $R^2 = 0.484^§$			
Model 2			
Intercept	429.81*	26.15	
Reported ease walking 1 mile [†]	-9.54*	1.31	0.052
Reported ease lifting/carrying 20 lbs [†]	-5.31*	1.25	0.007
Reported ease walking up 20 steps [†]	-4.41*	1.34	0.002
Usual walk score	-195.04*	10.27	0.404
Narrow walk score	-42.95*	4.93	0.036
Repeat chair stands score	-74.60*	8.55	0.020
Standing balance score	-19.13*	3.96	0.007
Model $R^2 = 0.544^¶$			

[†]Score range = 0 (difficult or not very easy) to 2 (very easy).

[‡]Score range = 0 (poor performance) to 4 (excellent performance) on a continuous scale.

[§]Age, sex, race, and site have a combined partial R^2 of 0.032.

^{||}Score range = 0 (poor performance) to 1 (excellent performance) on a continuous scale.

[¶]Age, sex, race, and site have a combined partial R^2 of 0.016.

* $p < .0001$.

walk 1/4 mile, versus 24% and 4% of those reporting "somewhat easy" and "very easy," respectively. Although rarely endorsed, the "not so easy" response may identify persons resistant to admitting difficulty, but who nonetheless have functional deficits. Those reporting "not so easy" had uniformly similar function as those reporting difficulty. Thus, for most analyses, it may be best to treat these groups as equivalent. For longitudinal prediction of functional limitation, however, distinguishing between those expressing difficulty and those who deny it, but report an activity as "not so easy," may be meaningful and warrants further investigation.

Self-described well-functioning 70-year-old men and women exhibited a broad range of functional capacity, readily ascertained by expanded self-report and performance-based measures of function and a test of walking endurance. The significant associations between these expanded measures support their concurrent validity, but the generally weak correlations, overlapping distributions, and independence in predicting walking endurance indicate that these measures tap different, but important, dimensions of physical function. In future studies, data from the longitudinal component of the Health ABC study will allow us to test the hypothesis that these gradients of function meaningfully predict decline and are therefore valuable indicators of persons at risk.

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