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# Executive function is independently associated with performances of balance and mobility in community-dwelling older adults after mild stroke: implications for falls prevention

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## Abstract

**Background—**Stroke survivors have a high incidence of falls. Impaired executive-controlled processes are frequent in stroke survivors and are associated with falls in this population. Better understanding of the independent association between executive-controlled processes and physiological fall risk (i.e. performances of balance and mobility) could enhance future interventions that aim to prevent falls and to promote an independent lifestyle among stroke survivors.

**Methods—**Cross-sectional analysis of 63 adults who suffered a mild stroke >1 year prior to the study, aged > or =50 years.

**Results—**Cognitive flexibility was independently associated with performances of balance and mobility in community-dwelling older adults after mild stroke, after accounting for age, quadriceps strength of the paretic side and current physical activity level.

**Conclusions—**Clinicians may need to consider cognitive function when assessing and treating impaired balance and mobility in community-dwelling older adults after mild stroke.

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Teresa Liu-Ambrose: Study concept, analysis and interpretation of data, preparation of manuscript.
Marco YC Pang: Study concept and design, acquisition of subjects and data, preparation of manuscript.
Janice J Eng: Study concept and design, preparation of manuscript.

**Keywords**

executive function; balance; mobility; older adults; chronic stroke

## INTRODUCTION

Stroke is one of the most common chronic conditions seen in older adults, with the incidence approximately doubling each decade after the age of 55 [1]. Most stroke survivors continue to live with impaired physical function which may promote a sedentary lifestyle and resultant secondary complications [2]. Furthermore, stroke-related impairments in physical function, such as impaired balance and mobility, presumably contribute to the high incidence of falls observed in stroke survivors [3]. Twenty-three percent to 73% of community-dwelling older adults with chronic stroke have been reported to fall over a four- to six-month period, with approximately half falling repeatedly [3,4].

Impaired cognitive function may also contribute to the high incidence of falls observed in stroke survivors as cognitive dysfunction is associated with falls [5,6]. Impaired cognitive function is a common consequence of stroke. Up to thirty percent of stroke survivors have dementia as the result of a stroke event [7,8]; the incidence of dementia in the first year after a stroke is nine times greater than in an age-matched population [9].

Cognition is not a unidimensional construct – it consists of multiple domains, including executive-controlled processes. Executive-controlled processes are those higher order cognitive processes that control, integrate, organize, and maintain other cognitive abilities [10]. Impaired executive-controlled processes are frequent in stroke survivors [11]. Executive-controlled processes comprise numerous subordinate component cognitive operations, including cognitive flexibility and working memory [12]. Cognitive flexibility refers to the ability to look at objects/events from many vantage points, particularly when dealing with a novel context [12]. Cognitive flexibility includes an essential component of self-regulation – response inhibition, which is the ability to suppress automatic reactions in favor of alternative, planned behaviours [12,13]. Working memory incorporates complex attention, strategy formation, and interference control [14].

Current evidence suggests that impaired executive-controlled processes are associated with falls in older adults with [15] and without a history of stroke [13,16,17]. Impaired executive-controlled processes are also associated with increased physiological fall risk (i.e., impaired performances of balance and mobility) [18–24] in older adults without a history of stroke. However, more research is needed to ascertain the independent contribution of impaired executive-controlled processes to falls and physiological fall risk in stroke survivors. To date, the studies that examined the contribution of cognitive function to falls [15] and physiological fall risk (i.e., impaired performances of balance and mobility) [25–27] in stroke survivors have been restricted to those with a recent stroke and clients of rehabilitation facilities. To our knowledge, no studies have examined the independent contribution of executive-controlled processes to physiological fall risk, such as performances of balance and mobility, in stroke survivors who have already integrated back into community living (i.e., individuals with chronic stroke).

Better understanding of the independent association between executive-controlled processes and performances of balance and mobility could enhance future interventions that aim to prevent falls and to promote an independent and active lifestyle among community-dwelling older adults with chronic stroke. Thus, we examined the independent association of executive-controlled processes, after accounting for age, quadriceps strength of the paretic side, and current physical activity level, with performances of balance and mobility in community-dwelling older adults with mild chronic stroke.

## METHODS

### Participants

The sample for this cross-sectional analysis consisted of 63 men and women with mild chronic stroke, aged 50 years and older, who participated in our randomized, controlled trial that examined the effects of a community-based group exercise program on cardiorespiratory fitness, strength, balance, mobility, and bone health [28]. This cohort has been detailed elsewhere [28]. Briefly, for our randomized, controlled trial, we included those who: 1) had a single stroke greater > 1 year onset; 2) were aged ≥ 50 years; 3) were able to walk > 10 meters independently (with or without walking aids); and 4) lived in their own home. We excluded those who: 1) had a history of serious cardiac disease (e.g., myocardial infarction); 2) uncontrolled blood pressure (i.e., systolic blood pressure > 140, diastolic blood pressure > 90); 3) had neurological conditions in addition to stroke; or 4) obtained a score less than 22 on the Mini-Mental State Examination (MMSE) [29]. All 63 individuals who qualified for our prospective study were included in this cross-sectional study.

The study was approved by the relevant University and Hospital ethics boards. All participants gave written informed consent prior to participating in the study.

### Descriptive Variables

Age was measured in years, standing height in centimetres, and mass in kilograms in all participants. Global cognitive state was assessed using MMSE [29]. We used the Geriatric Depression Scale (GDS) [30,31] to screen for depression.

### Dependent Variables: Measures of Balance and Mobility

For all performances of balance and mobility, participants wore their usual footwear and used their assistive devices. However, no physical assistance was provided during any of the performance-based tasks.

**Berg Balance Scale—**The Berg Balance Scale [32] is a 14-item test (maximum 56 points) of functional balance using a five-point (0 to 4) scale per item, with 0 indicating an inability or need of maximal assistance to complete the task or performs task with safety concerns and 4 indicating independent and safe ability to perform task. This scale consists of tasks such as reaching, balancing on one limb, and transferring. Concurrent validity of data for the Berg Balance Scale has been examined in individuals with stroke. Performance on the Berg Balance Scale is correlated with the Barthel Index (r = 0.80), the Fugl-Meyer Motor Impairment Scale (r = 0.62 to 0.94), measures of postural sway (r = 0.55), and gait speed (r = 0.60) [32–34]. Initial studies by Berg and coworkers [32,35] reported intraclass correlation coefficients (ICCs) of 0.98 for inter-rater reliability and 0.71 to 0.99 for intra-rater reliability in older adults.

**Timed Up and Go Test—**For this test of functional mobility [36], participants were instructed to rise from a standard chair with arms (seat height of 45 cm, arm height 62 cm), walk a distance of three meters, turn, walk back to the chair and sit down again. A stopwatch was used and the mean of two trials was calculated and used for statistical analysis.

**Six Minute Walk Test (6-Minute Walk Test)—**Participants were instructed to “walk as far as possible” around a 42-meter rectangular path in six minutes. The total distance walked in six minutes was recorded. The 6-Minute Walk Test is a reliable method to assess walking performance in individuals with stroke [37].

**Stair Climbing Time—**Participants were instructed to walk up a four-step staircase and they had the option of using the railing. A stopwatch was used to record the time for both feet to reach the top of the staircase and the mean of two trials was calculated and used for statistical analysis.

**Gait Velocity—**A 10-meter walkway was marked on the floor with clear lines as to the start and end of the pathway. Participants were asked to walk at their normal pace starting two meters prior to the start line and ending two meters after the end line to accommodate acceleration and deceleration. A stopwatch was started when the first foot crossed the start line and stopped when the first foot crossed the end line. One practice trial was performed and then one trial was recorded.

### Independent Variables

To ascertain the independent association of executive-controlled processes with performances of balance and mobility in community-dwelling older adults with mild chronic stroke, we assessed the specific executive-controlled processes of cognitive flexibility and working memory. We also assessed age, quadriceps strength, and current physical activity level as these factors are associated with performances of balance and mobility in older adults [38–41].

**Executive-Controlled Processes—**We used the Stroop Test [42] to assess cognitive flexibility and the Verbal Digit Span Backward Test [43] to assess working memory. There is some overlap in the components of executive-controlled processes assessed by each test (i.e., both neuropsychological instruments assess selective attention) [12].

**Cognitive Flexibility: Stroop Test:** We used the Golden and Freshwater [44] version of the Stroop test [42]. In part one of this standardized test of cognitive flexibility, specifically response inhibition, participants were given a page with color words (e.g., red, blue) printed in black ink and were asked to read the words out loud as quickly and as accurately as possible. In part two, participants were given a page with XXXs printed in various ink colors and were asked to name out loud the ink color of the XXXs as quickly and as accurately as possible. Finally, in part three, the interference condition, participants were given a page with color words printed in incongruent colored inks (e.g., the word blue printed in red ink). Participants were asked to name the ink color in which the words are printed. We recorded the number of correct responses in 45 seconds for each part of the test. The test-retest reliability of this version of the Stroop test is 0.86, 0.82, and 0.73 (reliability coefficients) for the respective three parts of the test [44]. Higher scores in part three (i.e., interference condition) are assumed to indicate less difficulties with response inhibition.

**Working Memory: Verbal Digit Span Backward Test:** For this standardized test of working memory [43] participants heard a sequence of numbers and were asked to recall it in reverse order. The number of digits in the sequence began with two and increased by one digit at a time up to a length of eight numbers. The test included two sequences of each length and testing ceased when the participant failed to recollect any two with the same length. The score recorded was the longest span length in which the participant gave at least one (out of two) correct answer. Possible scores range from 0 to 9, with higher scores indicating better working memory. The average reliability coefficient for this test is 0.88 [12].

**Quadriceps Strength—**Hand-held dynamometry (Nicholas MMT, Lafayette Instruments, Lafayette, IN, USA) was used to evaluate isometric knee extension strength. Participants were seated upright in a chair with back support. The knee was positioned in 90° flexion and participants were asked to perform a maximal isometric contraction of the knee extensors (i.e., quadriceps). Three trials were performed on each side (i.e., paretic and non-paretic) and the mean force (Newtons (N)) was calculated and then normalized for body size using the formula: strength scores (N)/ [weight (kg) x height (m) / 2] [45]. Hand-held dynamometry is a reliable method for assessing muscle strength in individuals with stroke [46].

**Current Physical Activity Level—**Current physical activity level was measured by the Physical Activity Scale for Individuals with Physical Disabilities (PASIPD) [47]. This 13-item questionnaire quantifies participation in recreational, household, and occupational activities for the past seven days. Each activity is assigned a specific metabolic equivalent (MET) value and the maximal score is 199.5 MET hour/day. The validity of the PASIPD is established [47].

## Data Analyses

Data were analyzed using SPSS (Windows Version 13.0). Descriptive data are reported for variables of interest. Variables that were not normally distributed (i.e., Berg Balance Scale, Timed-Up and Go Test, stair-climbing time, gait velocity, and PASIPD score) were transformed using natural logarithm.

The level of association between the five performances of balance and mobility dependent variable and the independent variables of interest (i.e., age, normalized quadriceps strength, PASIPD score, and executive-controlled processes) were determined using the Pearson product moment coefficient of correlation. Alpha was set at $P \leq 0.05$.

The five performances of balance and mobility (i.e., Berg Balance Scale, Timed-Up and Go Test, 6-Minute Walk Test, stair-climbing time, and gait velocity) were then entered into a principal component analysis (PCA). We set the eigenvalues to be greater than 1 in the analysis. PCA is a statistical technique used to summarize relationships among variables in a concise manner [48].

One hierarchical linear regression model was constructed to determine the independent association of executive-controlled processes with the first principal component extracted from the PCA. In this model, age, normalized quadriceps strength of the paretic side, and the PASIPD score were statistically controlled by forcing these three variables into the regression model first. Executive-controlled processes, specifically, performance on the interference condition of the Stroop Test, was then entered into the regression model. These independent variables were determined from the results of the Pearson product moment coefficient of correlation analyses (i.e., normalized quadriceps strength of the paretic side, the PASIPD score, and performance on the interference condition of the Stroop Tests) and based on biological relevance (i.e., age).

## RESULTS

### Characteristics of the Participants

Table 1 reports descriptive statistics for relevant descriptor variables and the outcome measures of interest. All results are mean ± SD unless noted otherwise.

Overall, our cohort of mild chronic survivors demonstrated no global cognitive impairment (i.e., a mean MMSE score of 28) but did demonstrate impaired executive-controlled processes (i.e., a mean Stroop Test, Interference Condition score of 26 and a mean Verbal Digit Span Backward score of 4). Also, based on the mean Berg Balance Scale score and the mean Timed Up and Go Test time, this cohort of mild chronic survivors was borderline for high risk of falling [49,50].

### Correlation Coefficients

The correlation coefficients between variables of interest are reported in Table 2. The PASIPD score was significantly associated with all five performances of balance and mobility. Both the performance on the interference condition of the Stroop Test (i.e., response inhibition) and normalized quadriceps strength of the paretic side were significantly associated with four of the five performances of balance and mobility. Performance on the digit span backward test (i.e., working memory) was not significantly associated with any of the performances of balance and mobility.

### Principal Component Analysis

Only one principal component was extracted from the PCA, indicating that all five performances of balance and mobility represent the same theoretical construct [48]. The extracted principal component explained 87% of the total variance. Factor loadings for each of the five performances of balance and mobility are reported in Table 3.

### Hierarchical Linear Regression Model

Cognitive flexibility, specifically response inhibition, was independently associated with the balance and mobility principal component in the final model (Table 4), even after adjusting for age, normalized quadriceps strength of the paretic side, and the PASIPD score (i.e., current physical activity). Age, normalized quadriceps strength of the paretic side, and the PASIPD score together accounted for 21.5% of the total variance. Adding cognitive flexibility resulted in an R-square change of 6.3% and significantly improved the model (*F* Change (1, 53) = 4.59, ***P*** = 0.04). The total variance accounted by the final model was 27.8%.

## DISCUSSION

This study demonstrated that cognitive flexibility, specifically response inhibition, is independently associated with performances of balance and mobility in older adults with mild chronic stroke. To our knowledge, this is the first study that has examined the independent association of executive-controlled processes to balance and mobility in community-dwelling older adults with mild chronic stroke. The results of this study also highlight that impaired executive-controlled processes exist in older adults with mild chronic stroke who demonstrate “normal” global cognitive function.

The results of our study extends those in older adults with a recent first stroke [25]. Fong and coworkers [25] found cognitive function was associated with functional performance (r = 0.35 to 0.62), as assessed by the Functional Independence Measure (motor subscale). Our results also concur with those from the MacArthur Research Network on Successful Aging Community Study [51]. This longitudinal three-site, cohort study of high-functioning, disability-free Americans aged 70 to 79 found that declines in cognitive performance were associated with declines in performance-based measures of physical functioning (i.e., balance and mobility) over a seven-year period after controlling for baseline cognitive function, demographic factors, health status, and behavioural characteristics (i.e., smoking status and alcohol use).

Our finding suggests that impaired cognitive flexibility, specifically response inhibition, may exert an influence on falls through impaired balance and mobility. A widely-accepted theory of locomotion [52] suggests that performing a challenging or complex locomotor task requires integrity and functionality of the neurological structures that are responsible for executive-controlled processes. Impaired executive-controlled processes may increase the propensity to fall via reduced attentional capacity, impaired central processing and integration, and impaired execution of postural responses, resulting in impaired balance [18,19], gait [20–24], anticipatory postural adjustments [53,54], and reactive postural responses [55].

Impaired executive-controlled processes may also directly increase fall risk via impaired judgment and impaired self-regulation. Previous work by Rapport and coworkers [13,15] demonstrated that impaired executive-controlled processes predict falls among individuals with right-hemisphere stroke [15] and among those in a rehabilitation hospital [15]. Specifically, both these studies found that response inhibition, and not working memory, was an independent predictor of falls. Rapport and coworkers [13,15] concluded that individuals who had impaired executive-controlled processes may be at greater risk for falls due to their reduced ability to self-regulate (e.g., they may be impulsive).

A clinical implication of our results is that health professionals, such as physicians and physical therapists, may need to consider executive-controlled processes when assessing balance and mobility in older adults with mild chronic stroke. Our data suggest these individuals may exhibit impaired balance and mobility secondary to both impaired physiological function (i.e., lower extremity strength) and impaired executive-controlled processes. Thus, successful rehabilitation of impaired balance and mobility in older adults with mild chronic stroke may require strategies that target both physiological functions and executive-controlled processes. Optimizing balance and mobility in those with mild chronic stroke may not only reduce the incidence of falls in this population, but may also promote a more active and independent lifestyle. Current evidence suggest that exercise, specifically cardiovascular training, has robust but selective benefits for cognition, with the largest benefits occurring for executive-controlled processes in older adults aged 55 years and older [56]. Further research is needed to ascertain whether exercise, such as cardiovascular training, may ameliorate executive-controlled processes in older adults with mild chronic stroke and whether exercise-induced changes in executive-controlled processes are associated with: 1) reduced physiological fall risk, such as improved performances of balance and mobility; and 2) reduced incidence of falls.

We acknowledge the limitations of our study. First, we do not have information regarding the specific lesion site for each of our participant. Thus, in terms of lesion site, our study cohort of mild stroke survivors is a heterogeneous sample. However, different parts of the brain support different cognitive functions. For example, the left dorsolateral pre-frontal cortex supports verbal working memory [57]. Therefore, we may have underestimated the magnitude of association between impaired executive-controlled processes and performances of balance and mobility in older adults with mild chronic stroke. Second, our small study sample of older adults with mild chronic stroke limits the generalizability of our results to those with more severe stroke-related impairments; our sample size also limited the number of independent variables that we could enter into the regression model. Third, the cross-sectional design of this study prevents our ascertaining the temporal relationship between executive-controlled processes and performances of balance and function in older adults with mild chronic stroke. We can only speculate whether stroke-related physical impairments promote cognitive impairment in those with mild chronic stroke. Certainly, current evidence suggests that an active lifestyle is neuroprotective [58–61]. Alternatively, we can speculate that stroke-related cognitive impairment precipitates impaired balance and mobility in older adults with mild chronic stroke. The widely accepted conceptual models of functioning describe people moving through a single causal pathway from cellular pathology/disease to a state of functional limitation [62] or disability [63]. These models would suggest that cognitive impairment precedes impaired balance and mobility. Last, we did not assess all executive-controlled processes. Based on the findings of Burgess and coworkers [64], one needs to administer a variety of neuropsychological tests to comprehensively assess executive-controlled processes.

This cross-sectional analysis highlights that, in community-dwelling older adults with mild chronic stroke, cognitive flexibility, specifically response inhibition, is independently associated with performances of balance and mobility. The results of this study also highlight that impaired executive-controlled processes exist in older adults with mild chronic stroke who demonstrate "normal" global cognitive function. The clinical implication is that clinicians may need to consider cognitive function when assessing for and treating impaired balance and mobility in older adults with mild chronic stroke.

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## Table 1

Descriptive statistics for descriptors and measures of interest (N = 63).

| Variable * | Mean (SD) | Range |
|---|---|---|
| Age (yr) | 65 (9) | 52 to 87 |
| Height (cm) | 169.1 (10.7) | 145.6 to 192.5 |
| Weight (kg) | 76.8 (15.9) | 42.2 to 128.8 |
| BMI ($kg/m^2$) | 26.7 (4.3) | 18.4 to 44.0 |
| MMSE Score (max. 30 pts) § | 28 (2) | 23 to 30 |
| GDS Score (max. 30 pts) § | 6 (6) | 0 to 25 |
| Education (yr) | 14 (3) | 6 to 24 |
| Time Since Stroke (yr) | 6 (5) | 1 to 28 |
| Paretic Side, Left † | 41(65) | n/a |
| Female † | 26 (41) | n/a |
| PASIPD Score (max. 199 MET hr/d) | 9.24 (8.84) | 0.65 to 40.33 |
| Berg Balance Scale (max. 56 pts) § | 47 (6) | 25 to 56 |
| Timed Up and Go Test (s) § | 14.3 (9.9) | 5.0 to 70.0 |
| 6-Minute Walk Test (m) | 316 (134) | 34 to 615 |
| Stair Climbing Time (s) | 4.9 (2.4) | 2.4 to 15.5 |
| Gait Velocity (m/s) | 0.8 (0.4) | 0.1 to 2.1 |
| Quadriceps Strength (N); Non- Paretic | 116.8 (39.3) | 47.6 to 229.4 |
| Quadriceps Strength (N), Paretic | 85.8 (32.4) | 16.6 to 186.8 |
| Stroop Test, Word Condition § | 78 (22) | 18 to 122 |
| Stroop Test, Colour Condition § | 53 (15) | 12 to 86 |
| Stroop Test, Interference Condition § | 26 (10) | 8 to 54 |
| Verbal Digit Span Backward § | 4 (1) | 2 to 8 |

[*] yr = year; cm = centimetre; kg = kilogram; GDS = Geriatric Depression Scale; MMSE = Mini-Mental State Examination; PASIPD = Physical Activity for Individuals with Physical Disabilities; MET = metabolic equivalent; hr/d = hour per day; s = second; m = meter; m/s = meters per second; N = Newton; Stroop Test results in number of correct responses in 45 seconds; Verbal Digit Span Backward in longest span length in which each participant gave at least one (out of two) correct answer.

[†] Count (%). Count = number of "yes" cases within each group. % = percent of "yes" cases within each group.

[§] MMSE Scores from 24 to 30 = no cognitive impairment; 18 to 23 = mild cognitive impairment; and 0 to 17 = severe cognitive impairment [65]. GDS Scores from 0 to 9 = no depression; 10 to 19 = mild depression; and 20 to 30 = severe depression [30,31]. Berg Balance Scale score less than 45 is predictive of multiple falls [49]; from 0 to 20 = wheelchair bound; 21 to 24 = walking with assistance; and 41 to 56 = independent [32,33]. Timed Up and Go Test time ≥ 15 seconds indicates a high risk of falling [50]. Age- and education-normative score (i.e., 65 years and 14 years of education) for Stroop Test, Word Condition = 101 correct responses in 45 seconds; Stroop Test, Colour Condition = 74 correct responses in 45 seconds; Stroop Test, Interference Condition = 36 correct responses in 45 seconds [44]. Age-normative value (i.e., 65 years) for Verbal Digit Span Backward score = 4.5 [66].

### Table 2

Pearson product moment coefficient matrix between age, normalized quadriceps strength, current physical activity level (PASIPD score), executive-controlled processes (Stroop Interference and Digit Span Backward), and performances of balance and mobility (N = 63).

| Variable † | Berg Balance Scale (max. 50 pts) | Timed-Up and Go Test (sec) | 6-Minute Walk Test (m) | Stair Climbing Time (sec) | Gait Velocity (m/s) |
|---|---|---|---|---|---|
| Age | − 0.03 | − 0.06 | − 0.03 | 0.03 | 0.08 |
| Normalized Strength, Non-Paretic | 0.10 | − 0.13 | 0.18 | − 0.15 | 0.15 |
| Normalized Strength, Paretic | 0.22 | − 0.33 ** | 0.39 ** | − 0.43 ** | 0.35 ** |
| PASIPD Score | 0.26 * | − 0.33 ** | 0.32 * | − 0.30 * | 0.26 * |
| Stroop Interference Score | 0.34 ** | − 0.30 * | 0.25 * | − 0.33 * | 0.25 |
| Digit Span Backward Score | 0.18 | − 0.21 | 0.22 | − 0.24 | 0.22 |

* $p < 0.05$

** $p < 0.01$

† Age in years; Normalized quadriceps strength in Newton / (weight in kilograms x height in meters / 2); PASIPD = Physical Activity Scale for Individuals with Physical Disabilities in MET hr/d; Stroop Interference Score in number of correct responses in 45 seconds; Digit Span Backward Score in the longest span length in which the participant gave at least one (out of two) correct answer.

## Table 3

Factor loading (unrotated) for each of the five performances of balance and mobility.

| **Variable** * | **Principal Component 1** |
|---|---|
| Berg Balance Scale (max. 50 pts) | 0.90 |
| Timed Up and Go Test (s) | − 0.97 |
| 6-Minute Walk Test (m) | 0.94 |
| Stair Climbing Time (s) | − 0.90 |
| Gait Velocity (m/s) | 0.94 |

*s = seconds; m = meter; m/s = meters per second.

## Table 4

Hierarchical linear regression model summary for balance and mobility.

| Independent Variable [†] | Balance and Functional Mobility [*] | | | | |
|---|---|---|---|---|---|
| | $R^2$ | $R^2$ Change | Unstandardized B (Standard Error) | Standardized $\beta$ | *P* - value |
| Model 1 | 0.215 | 0.215 | | | < 0.01 |
| Age | | | 0.02 (0.01) | 0.14 | 0.27 |
| Normalized Quad Strength, Paretic | | | 1.54 (0.57) | 0.35 | 0.01 |
| PASIPD Score | | | 0.24 (0.13) | 0.24 | 0.06 |
| Model 2 | 0.278 | 0.063 | | | 0.04 |
| Age | | | 0.02 (0.01) | 0.20 | 0.12 |
| Normalized Quad Strength, Paretic | | | 1.28 (0.56) | 0.30 | 0.03 |
| PASIPD Score | | | 0.23 (0.12) | 0.22 | 0.07 |
| Stroop Interference Score | | | 0.03 (0.01) | 0.27 | 0.04 |

[*] The first principal component extracted from the principal component analysis.

[†] Age in years; Normalized quadriceps strength in Newton / (weight in kilograms x height in meters / 2); PASIPD = Physical Activity Scale for Individuals with Physical Disabilities in MET hr/d; Stroop Interference Score in number of correct responses in 45 seconds.