

Psychometric Evaluation of the Original and Canadian French Version of the Activities-Specific Balance Confidence Scale Among People With Stroke

Nancy M. Salbach, PhD, Nancy E. Mayo, PhD, James A. Hanley, PhD, Carol L. Richards, PhD, Sharon Wood-Dauphinee, PhD

ABSTRACT. Salbach NM, Mayo NE, Hanley JA, Richards CL, Wood-Dauphinee S. Psychometric evaluation of the original and Canadian French version of the Activities-Specific Balance Confidence scale among people with stroke. *Arch Phys Med Rehabil* 2006;87:1597-604.

Objective: To evaluate the internal and absolute reliability and construct validity of the Activities-Specific Balance Confidence (ABC) scale and a new Canadian French version (ABC-CF) of it among people with stroke.

Design: Cross-sectional data from a randomized controlled trial.

Setting: Community.

Participants: Ninety-one people with a residual walking deficit between 57 and 386 days poststroke.

Interventions: Not applicable.

Main Outcome Measures: The ABC and ABC-CF scales, Berg Balance Scale (BBS), comfortable and maximum gait speeds, Timed Up & Go (TUG) test, 6-minute walk test (6MWT), Barthel Index, physical function scale of the Medical Outcomes Study 36-Item Short-Form Health Survey, Geriatric Depression Scale (GDS), and the EQ-5D visual analog scale (EQ VAS).

Results: Internal consistency (Cronbach α) was .94 and .93 and the standard error of measurement was 5.05 and 5.13 for the ABC (n=51) and the ABC-CF (n=35) scales, respectively. Spearman ρ values ranged from .30 to .60 for the ABC scale and from .45 to .68 on the ABC-CF scale for associations with scores on the BBS, comfortable and maximum gait speeds, TUG, 6MWT, Barthel Index, physical function scale, GDS, and EQ VAS.

Conclusions: Evidence of internal and absolute reliability and of construct validity of the ABC and the ABC-CF scales supports their use for cross-sectional measurements of balance self-efficacy among community-dwelling people in the first year poststroke.

Key Words: Balance; Cerebrovascular accident; Rehabilitation; Self efficacy; Treatment outcome.

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IMPAIRMENT IN VOLUNTARY movement caused by stroke commonly leaves people with a residual walking limitation¹⁻³ that hinders participation in leisure, work, and other activities essential to community living.⁴⁻⁶ It has recently been shown that impairment to balance self-efficacy, operationally defined as *the degree of confidence a person has in performing activities without losing balance or becoming unsteady*,⁷ accompanies walking limitation poststroke.⁸ This is of concern, because self-efficacy is considered as an important motivator of human behavior.⁹ According to Bandura's self-efficacy theory,⁹ judgments of the ability to organize and execute different types of activities, known as self-efficacy beliefs, influence decisions to engage in or avoid particular activities or settings. Findings from 2 studies^{8,10} of people with stroke have shown that falls and balance self-efficacy may be as or more important than balance and walking capacity, respectively, in predicting the performance of meaningful physical activities in the community setting. Self-efficacy has also been identified as an important determinant of perceived health status.⁸ These results support targeting balance self-efficacy in addition to physical capacity in rehabilitation to help people living with stroke in the community achieve higher levels of functioning and perceived health. Fortunately, self-efficacy is considered a modifiable variable, and 4 mechanisms for improving self-efficacy have been proposed. Explained in the context of rehabilitation, these mechanisms include providing the client with opportunities to master a task (performance accomplishment), to observe peers master a task (vicarious experience),¹¹ to receive verbal encouragement (verbal persuasion), and to feel emotionally and physiologically stable during therapy sessions (emotional arousal).^{9,12} There is emerging evidence from randomized controlled trials (RCTs) conducted among community-dwelling people with stroke^{13,14} that repetitive practice of mobility tasks in a secure environment leads to enhanced balance self-efficacy as measured with the Activities-Specific Balance Confidence (ABC) scale.¹⁵ Given the value and increasing interest in measuring balance self-efficacy for clinical and investigative purposes, the ABC scale may provide a useful adjunct to standard measures of physical capacity to better understand the effects of therapeutic interventions. Little is known, however, about the psychometric properties of this measure among people with stroke.

The ABC scale was designed to evaluate balance self-efficacy in the performance of a wide range of activities that involve position change or walking and that are relevant to community living. The original English-language version of the ABC scale was developed and tested in ambulatory, com-

From the Department of Epidemiology and Biostatistics (Salbach, Hanley, Wood-Dauphinee) and School of Physical and Occupational Therapy (Mayo, Wood-Dauphinee), McGill University; Division of Clinical Epidemiology, Royal Victoria Hospital (Mayo, Hanley, Wood-Dauphinee), Montreal, QC, Canada; and Rehabilitation Department, Laval University and Interdisciplinary Research Centre for Rehabilitation and Social Integration, Rehabilitation Institute of Quebec, Quebec City, QC, Canada (Richards).

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Correspondence to Nancy M. Salbach, PhD, Dept of Physical Therapy, University of Toronto, 160-500 University Ave, Toronto, ON M5G 1V7, Canada, e-mail: nancy.salbach@utoronto.ca. Reprints are not available from the author.

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munity-dwelling older adults living in Canada.^{7,15,16} Acceptable levels of construct validity and test-retest reliability based on ratings from people at least a year poststroke have been reported.¹⁷ Additional evidence is required before recommending the use of this measure in the first year after stroke when outpatient and home-based rehabilitation interventions are commonly provided. To expand the use of the ABC scale to French-speaking people living in Canada, where French is one of the official languages, the scale must undergo the process of translation and cultural adaptation.^{18,19}

An RCT^{14,20} of task-oriented walking training involving community-dwelling people in the first year poststroke was recently undertaken in the Canadian province of Quebec, where French is the predominant language spoken.²¹ To enable recruitment of French-speaking residents, the original English-language version of the ABC scale was translated and culturally adapted into Canadian French in adherence with standard procedures.¹⁸ It is important to verify the reliability and validity of the translated versions of self-report measures to estimate the degree of error associated with assessment and to provide evidence that the construct of interest is being captured. Thus, the purpose of this study was to evaluate the psychometric properties of the original ABC scale and the Canadian French version (ABC-CF scale) among community-dwelling people in the first year poststroke. Specific objectives were to estimate (1) internal consistency, (2) floor and ceiling effects, (3) absolute reliability, and (4) construct validity. We evaluated cross-sectional convergent construct validity by testing the hypotheses that fair to moderate correlations²² would exist between scores on each version of the ABC scale and scores on measures of balance, walking capacity, functional mobility, ability to perform activities of daily living (ADLs), physical function, depressive symptoms, and perceived health status. These hypotheses were constructed a priori based on the findings of previously conducted research.^{7,10,15-17,23-27}

METHODS

Overview and Procedures

We undertook a secondary analysis of baseline data from an RCT of task-oriented walking training that enrolled 91 community-dwelling people with stroke.²⁰ We used data collected by trained research personnel on measures of balance self-efficacy, balance, walking capacity, functional mobility, ADL performance, physical function, depressive symptoms, and perceived health status in the analysis.

Participants

Eligibility for the study was based on a clinical diagnosis of a first or recurrent stroke, the presence of a residual walking deficit, mental competency confirmed using the telephone version of the Mini-Mental State Examination,²⁸ the ability to walk 10m independently with or without an aid or supervision, the ability to comprehend instructions for the testing procedures, residence in the community, discharge from physical rehabilitation, and a time interval between the most recent stroke and recruitment of 1 year or less.

Measurement

Balance self-efficacy and balance function were evaluated using the ABC scale¹⁵ and the Berg Balance Scale (BBS),²⁹ respectively. Walking speed and functional walking capacity³⁰ were captured using the 5-m walk³¹ and the 6-minute walk test (6MWT),³² respectively. The Timed Up & Go (TUG) test³³ was used to measure functional mobility. Performance in

ADLs was evaluated with the Barthel Index.³⁴ Physical function, depressive symptoms, and perceived health status were measured with the physical function scale of the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36),³⁵ the Geriatric Depression Scale (GDS),³⁶ and the EQ-5D visual analog scale (EQ VAS),³⁷⁻³⁹ respectively. Information on sociodemographic and stroke characteristics was obtained from the medical chart.

The ABC scale is a 16-item questionnaire that can be administered through self-report, by telephone, or by face-to-face interview, as in the current study.¹⁵ Each item describes a specific activity that requires some position change or walking in progressively more difficult situations ranging from walking inside the home to walking on icy sidewalks. Subjects are asked to rate their confidence level on an 11-point scale that ranges from 0% (no confidence) to 100% (complete confidence) in performing each activity without losing balance or becoming unsteady. This continuum of self-confidence is used to operationalize self-efficacy.¹⁵ Item scores are averaged to obtain a total score that ranges from 0% to 100%.

The BBS is used to assess balance function in the performance of 14 tasks required in everyday living. Item-level ratings on a 5-point scale are summed to provide a total score that may range from 0 to 56, with higher scores reflecting a higher level of balance ability.

Walking speed at a comfortable and maximum pace was computed using the time, measured with a stopwatch, to walk the middle 5-m portion of a 9-m walkway. When administering the 6MWT, the maximum distance covered on a 20-m walkway in 6 minutes was recorded.⁴⁰ Evaluators provided standard encouragement,⁴¹ and subjects rested when necessary. The best performance in 2 trials was analyzed. To administer the TUG, the time a subject took to stand up independently from an armchair, walk 3m, turn, and return to the seated position without physical assistance was recorded.

To complete the Barthel Index, subjects were asked to rate their ability to accomplish feeding, personal hygiene, bathing, dressing, toilet transfers, bowel control, bladder control, chair-to-bed transfers, walking, and stairs on a 3-point scale. Total scores range from 0 to 100, with higher scores indicating higher levels of functioning.

The physical function scale from the original³⁵ and a validated Canadian French version⁴² of the SF-36 was used in this study. Subjects rated the degree to which they felt limited in performing 10 activities that range in difficulty from bathing or dressing to running. Scores may vary from 0 to 100, with higher scores reflecting a higher level of physical function.

The original³⁶ and a Canadian French version⁴³ of the GDS were administered. To complete the scale, subjects responded yes or no to 30 questions that reflect symptoms of depression. Raw summary scores are obtained using an algorithm and may range from 0 to 30, with higher scores signifying a greater severity of depressive symptoms.

For the EQ VAS, subjects were instructed to rate the level of their current overall health status on a feeling thermometer that is calibrated between 0 (worst imaginable health state) and 100 (best imaginable health state). A Canadian French version of the EQ-5D⁴⁴ was used for French-speaking subjects. A coauthor (NEM) had previously obtained the Canadian French version by using forward and back translation and pilot testing procedures. Construct validity was evaluated and evidenced by associations observed between overall health status rated using the EQ VAS and 3 alternative measures of health status, including an unweighted sum of the ranked categories over the 5 dimensions of the EQ-5D, comorbidity, and responses to a

single question rating health compared with people of similar age (N.E. Mayo et al, unpublished data, 1996).

Translation Procedures

Established procedures^{18,19} were followed to translate and culturally adapt the ABC scale from English to Canadian French. First, 2 native French-speaking translators from the province of Quebec translated the ABC scale into Canadian French. Subsequently, a validation committee consisting of 3 researchers from the health disciplines of physical therapy, occupational therapy, and medicine, an economist, and 1 of the forward translators was convened. Four of the 5 members were native French speakers from Quebec, and all members spoke both English and French. The committee met on 1 occasion and produced a preliminary version of the ABC-CF scale after comparing and discussing the differences between the original version and the forward-translated versions. Committee members considered the importance of using wording that was familiar to lay people and older adults, given the intended use of the scale among the elderly. For example, for translation of the word *crowded* in item 12, members of the validation committee selected *plein de monde* instead of *bondé*, because the former term is more commonly used in conversation and would thus be more familiar to older adults; the latter term is primarily used in written form. The use of terms and expressions in the ABC-CF scale that are unique to Canadian French culture represent cultural adaptations of the ABC scale. Three clear examples include translation of the word *closet* in item 3 to *garde-robe* instead of the term *placard* that is more commonly used in France. In item 8, the word *parked* was translated as *stationnée* instead of the French term *garé*, and in item 14, the word *railing* was translated as *la rampe* instead of the French term *une main courante*. Translation of the preliminary version of the ABC-CF scale back into English by a translator with no prior knowledge of the content of the original version verified that wording of the ABC-CF conveyed the same meaning as the original scale. The preliminary version of the ABC-CF was also pilot tested among 5 bilingual people from Quebec, all with French as their native tongue. Their ages ranged from 56 to 89 years. Three people had completed an elementary school education, 1 held a secretarial diploma, and 1 had been trained as a nurse. These people completed the ABC-CF scale without prior knowledge of the original version. They were asked to comment on the comprehensiveness and meaningfulness of each question, and they discussed their comments with a research evaluator. These 5 people found the wording of the instructions and of the items easy to read and understand, and they did not suggest any revisions to the final version of the scale (appendix 1).

Psychometric Evaluation and Statistical Analyses

The following statistical procedures were undertaken for each scale. Internal consistency was estimated using the Cronbach α ,⁴⁵ which reflects the degree of error associated with item sampling. As with other reliability coefficients, a minimum value of .70 is considered acceptable for group comparisons, whereas a value between .90 and .95 is required for individual comparisons.⁴⁶ Reliability coefficients below .90 result in individual scores that are too imprecise for monitoring purposes.

Floor effects and ceiling effects were defined as the truncation of data at minimum and maximum values of a measurement scale, respectively.⁴⁷ These effects were evaluated by determining the proportion of subjects scoring the minimum or maximum score for each item and for the total score of each

ABC scale. Effects exceeding 20% were noted.⁴⁸ The percentage of subjects with a total score between 20% and 80% out of 100% on each version of the ABC scale was also calculated.

Absolute reliability, which reflects the level of precision for an individual score based on the standard error (SE) of measurement,⁴⁹ was also estimated. The SE of measurement for an individual score is computed as:

$$\text{SE of measurement} = \text{SD} \sqrt{1 - \text{reliability}}$$

where SD is the standard deviation of scores and reliability is measured using the α coefficient.⁵⁰ The interpretation is that with repeated scoring, the true ABC score would lie within 1 SE of measurement of the observed value 68% of the time.⁴⁹

Self-efficacy theory supports a positive association between self-efficacy beliefs and physical ability when these constructs are measured for similar activities.⁹ The stroke literature provides evidence of this tenet through observed correlations between ABC scale ratings and scores on the BBS ($\rho = .36$) and walking speed ($\rho = .48$).¹⁷ Correlating measures of falls efficacy, a related construct, with scores on the BBS and measures of motor function and mobility has yielded coefficients ranging from .49 to .87.^{10,23}

In the elderly, associations have also been observed between balance or falls self-efficacy ratings and ratings of balance,^{7,25,51-53} mobility,^{7,15,27,52-54} depression,^{27,54,55} ADL ability,^{52,55-57} physical function,^{52,57} and perceived health status.⁷ Where reported, the magnitude of correlation coefficients relating ratings on the ABC scale with scores on the BBS, walking speed, and the TUG ranged from .47 to .81^{7,16,25,51} and was $-.33^7$ for an association with depression scores, although in this study⁷ the association was not statistically significant ($P < .09$). This empiric evidence supported testing the hypotheses that measures of balance self-efficacy would be fairly to moderately (r range, .25–.75²²) correlated with measures of balance, walking capacity, functional mobility, performance of ADLs, physical function, depressive symptoms, and perceived health status to evaluate cross-sectional convergent construct validity.^{49,58} Cross-sectional data from the baseline evaluation of the trial were used in the analysis, because few data were missing at this time point. Spearman correlation coefficients and associated 95% confidence intervals (CIs) were used to estimate associations because of the ordinal nature of the ABC scale. Statistical significance was based on a type I error level of .05.

Statistical analyses were performed using SAS.^a The institutional review board of McGill University and the research ethics committees in each hospital center approved the study protocol. Subjects provided voluntary, informed, and written consent.

RESULTS

Ninety-one subjects consented to participate in the study. At baseline, 5 people were unable to complete either version of the ABC scale because of expressive dysphasia, cognitive deficit, or an inability to understand English or French beyond a rudimentary level. In total, 51 people completed the ABC scale, and 35 completed the ABC-CF scale. Among these 86 people, baseline data were missing for the 6MWT ($n = 3$) because of failure on the medical screen for this test and for the GDS and the SF-36 because of language impairment ($n = 1$).

Subjects were between 38 and 91 years of age (mean \pm SD, 72 ± 11), and the interval from the time of the stroke to the baseline evaluation ranged from 57 to 386 days (median, 222d; mean, 227 ± 79 d). Although all subjects were within a year poststroke at the time of consent, 4 subjects were between 366

Table 1: Subject Characteristics by Version of the ABC Scale Completed

Variable or Measure	ABC (n=51)	ABC-CF (n=35)
Age (y)	73±10 (38–90)	70±12 (46–91)
Sex, n (%)		
Male	35 (69)	21 (60)
Female	16 (31)	14 (40)
Living with, n (%)		
Spouse	32 (63)	22 (63)
Other	8 (16)	7 (20)
Alone	11 (22)	6 (17)
Side of hemiplegia, n (%)		
Left	24 (47)	13 (37)
Right	26 (51)	22 (63)
Bilateral	1 (2)	0 (0)
Type of stroke, n (%)		
Ischemic	45 (88)	29 (83)
Hemorrhagic	6 (12)	6 (17)
No. of strokes, n (%)		
1	43 (84)	33 (94)
>1	8 (16)	2 (6)
Days poststroke	217±76 (57–374)	244±82 (88–386)
ABC scale scores (range, 0–100), n (%)	62±21 (19–99)	58±20 (22–97)
0 to <50 points	12 (24)	13 (37)
50 to <80 points	27 (53)	15 (43)
80–100 points	12 (24)	7 (20)
BBS scores (range, 0–56)	40±12 (12–56)	44±12 (5–56)
Comfortable walking speed (m/s)	0.65±0.35 (0.08–1.90)	0.62±0.34 (0.1–1.41)
Maximum walking speed (m/s)	0.84±0.47 (0.08–2.32)	0.79±0.46 (0.12–1.84)
TUG test (s)	23.14±17.31 (7.02–100.00)	23.65±18.88 (7.85–88.85)
6MWT (m)	216±126 (31–594)	222±125 (40–520)
Barthel Index scores (range, 0–100)	88±13 (55–100)	87±12 (65–100)
SF-36 PF scale scores (range, 0–100)	40±24 (0–90)	44±24 (0–90)
GDS scores (range, 0–30)	12±7 (1–27)	10±6 (0–23)
EQ VAS scores (range, 0–100)	64±21 (0–100)	66±23 (0–100)

NOTE. Values for (pseudo)continuous variables are mean ± SD (range). Abbreviation: PF, physical function.

and 386 days poststroke at the time of assessment. Table 1 compares the sociodemographic and stroke characteristics of subjects as well as ratings on measures of balance self-efficacy, balance, walking capacity, functional mobility, ADL performance, physical function, depressive symptoms, and perceived health status according to the version of the ABC scale completed. Groups were similar except for sex, side of hemiplegia, number of strokes, and days poststroke; however, differences were not statistically significant. The average rating of balance self-efficacy was 62±21 points (range, 19–99) among people who completed the ABC scale and 58±20 points (range, 22–97) among people who completed the ABC-CF scale.

Internal Consistency

The values of the Cronbach α were .94 and .93 for the ABC scale and the ABC-CF scale, respectively. Stepwise deletion of each item from the scale did not improve the α value for either version of the ABC scale.

Floor and Ceiling Effects

The proportion of subjects reporting no confidence (0%; floor effect) exceeded 20% for 3 items—*walking outside on icy sidewalks*, *standing on a chair and reaching*, and *stepping onto or off of an escalator not holding the railing*—on both the ABC scale and the ABC-CF scale. The proportion of subjects reporting complete confidence (100%; ceiling

effect) exceeded 20% for 8 items on each version of the ABC scale. The 2 items on the ABC scale with the greatest ceiling effects were *reach at eye level* (51%) and *walk outside the house to a car parked in the driveway* (41%). The 2 items on the ABC-CF scale with the greatest ceiling effects were *get into or out of a car* (34%) and *walk around the house* (34%). There were no floor or ceiling effects for the total score on the ABC scale or on the ABC-CF scale based on the range of ratings shown in table 1. The percentages of subjects with a total score between 20% and 80% out of 100% on the ABC and ABC-CF scales were 75% and 80%, respectively.

Absolute Reliability

The SE of measurement for the ABC scale and the ABC-CF scale was 5.05 and 5.13, respectively. Thus, the true value of a rating on either version of the scale would be expected to lie within 5 points of that observed 68% of the time if the same evaluation were repeated.

Cross-Sectional Convergent Construct Validity

Table 2 presents Spearman correlation coefficients and associated 95% CIs for associations between scores on each version of the ABC scale and scores on measures of balance, walking capacity, functional mobility, ADL performance, physical function, depressive symptoms, and perceived

Table 2: Correlations Between Scores on Balance Self-Efficacy Measures and Measures of Physical Function, Depressive Symptoms, and Perceived Health Status

Measure (unit or scoring)	Spearman ρ (95% CI)	
	ABC (n=51)	ABC-CF (n=35)
SF-36 PF scale (range, 0–100)	.60 (.39 to .76)	.56 (.29 to .76)
EQ VAS (range, 0–100)	.52 (.28 to .69)	.68 (.44 to .82)
BBS (range, 0–56)	.42 (.16 to .62)	.49 (.19 to .71)
Maximum walking speed (m/s)	.43 (.18 to .63)	.53 (.24 to .74)
Comfortable walking speed (m/s)	.42 (.16 to .62)	.48 (.17 to .70)
6MWT (m)	.40 (.13 to .61)	.48 (.18 to .70)
Barthel Index (range, 0–100)	.37 (.11 to .59)	.45 (.14 to .68)
TUG (s)	-.34 (-.07 to -.56)	-.52 (-.22 to -.73)
GDS (range, 0–30)	-.30 (-.03 to -.53)	-.61 (-.34 to -.79)

health status. Coefficients are listed in order of decreasing strength for the original ABC scale. Spearman ρ values ranged between .30 and .60 for the ABC scale and between .45 and .68 on the ABC-CF scale; all 95% CIs excluded zero. The difference in the magnitude of the correlation coefficients between the 2 versions of the ABC scale for each measure was greater than .10 for the EQ VAS (.16), the TUG (.18), and the GDS (.31).

DISCUSSION

This study expands on the work of Botner et al¹⁷ in that it provides evidence supporting the psychometric properties of the ABC scale in the first year poststroke and a new culturally adapted and translated version of the tool into Canadian French. The original and Canadian French versions of the ABC scale were found to be internally reliable, and these findings are consistent with previous reports in people beyond a year poststroke,¹⁷ those with lower-extremity amputation,⁵⁹ and in the elderly.¹⁵ These findings suggest that the homogeneity of ABC scale items, generated by clinicians and older adults living in the community,¹⁵ is unaffected by the time interval poststroke.

The α coefficient observed in the current study is sufficiently high to enable precise measurement of balance self-efficacy, using either version of the ABC scale, at the individual level.⁴⁶ Clinicians and researchers can be assured that the true level of an individual rating of balance self-efficacy obtained using either the original or the Canadian French version will be within ± 5 points of the recorded score 68% of the time. This margin of error, which represents $\pm 5\%$ of the maximum score, appears acceptable, and it means that the level of balance self-efficacy between people with scores that differ by less than 5% cannot be distinguished. The similarity between α and SE of measurement values obtained for each version of the ABC scale provides evidence that the high levels of internal and absolute reliability in the original version were maintained after translation and cross-cultural adaptation.

For comparative purposes, the SE of measurement of the ABC scale administered to people more than a year poststroke in the study by Botner¹⁷ was computed using the SD of ABC scores and the value of the Cronbach α reported (SD=17.5, $\alpha=.94$). The SE of measurement was ± 4 points—only slightly lower than the SE of measurement observed in the current

study. This difference appears attributable to a lower level of variability in the ABC scale scores obtained by Botner than in the current study.

Subjects studied by Botner¹⁷ were an average of 4 years poststroke and had higher average ratings of balance self-efficacy than subjects in our study. This difference may be explained by the younger age and higher level of balance capacity of subjects studied by Botner compared with our subjects, who were in the first year poststroke. Levels of self-efficacy are expected to decrease as people age because of personal experiences of physical and mental decline and more frequent observations of peers suffering diminished health,^{60,61} but it is unclear whether this association is upheld in people with stroke.⁸ In addition, balance capacity has been positively linked with self-efficacy among people with stroke,^{17,23,62} as would be expected given the proposed relation between ability and perceptions of ability.⁹ The influence of the time interval poststroke on balance self-efficacy levels is unclear. A recent study⁶³ found that mobility status in approximately 21% of 205 subjects with a first-ever stroke declined between 1 and 3 years poststroke, and balance self-efficacy in these people would be expected to diminish concurrently. Among those who maintain their level of walking capacity, levels of balance self-efficacy may also remain stable. Overall, balance self-efficacy among people with stroke may be additionally influenced by factors such as depressive symptoms and comorbidity.¹⁴

Although subjects in the study by Botner¹⁷ showed a higher level of balance capacity, they walked at slower speeds than subjects in the current study. This may be due to the requirement of subjects to use their usual walking aids, resulting in slower walking speeds than subjects in our study, who were permitted to choose whether or not to use their walking aids.

Floor and ceiling effects were observed for similar numbers of items on the ABC and ABC-CF scales, indicating that each version captured a comparable range of self-efficacy ratings. The higher proportion of items showing a ceiling rather than a floor effect on each version may be due to the moderate to high functional levels of subjects, who were required to walk independently to enter the study. The lack of floor or ceiling effects for the summary score combined with the high proportion of subjects (75%–80%) scoring between 20% and 80% on the scale indicates that the ABC scale covers a range of walking-related tasks that are relevant to community life in the first year poststroke. This coverage was maintained after translation. These findings are prerequisites to the ability of a measure to detect change.⁴⁹ The results of this study, however, may have limited generalizability to people with severe gait deficits, and perhaps the prevalence of floor effects would have been greater with the inclusion of such people in the study.

As hypothesized, balance self-efficacy rated on the original version of the ABC scale was associated with measures of balance, walking capacity, functional mobility, ADL performance, level of depressive symptoms, physical function, and perceived health status. The same associations were observed when the Canadian French version of the ABC scale was used to measure balance self-efficacy. Correlations between scores on each version of the ABC scale and scores on the GDS and the TUG were negative, indicating that higher levels of balance self-efficacy were associated with lower levels of depressive symptoms and faster performance times on the TUG test. The comparable strength of the associations between scores on the BBS, maximum and comfortable gait speeds, the 6MWT, the Barthel Index, and the physical function scale and ratings on each ABC scale version provides convincing evidence of the preservation of construct validity of the original scale after translation and cross-cultural adaptation. Although differences

in the magnitudes of correlations ranging from .16 to .31 were observed between the 2 ABC scales and the EQ VAS, the TUG, and the GDS, the 95% CIs for each version overlapped and captured the comparative point estimate. The subgroups of subjects compared in this study were not formed through a randomized process but on the basis of language preference, which may have led to an imbalance in unmeasured variables related to culture, for example, confounding the relations between balance self-efficacy and functional mobility, depressive symptoms, and perceived health status. The translated version of the GDS has never been validated, and its use may have introduced a degree of error that led to stronger associations with ABC-CF ratings. Some degree of variability was expected, however, given the range in coefficients observed in the elderly when correlating scores on the ABC scale and the BBS (r range, .36–.87^{7,25,51}) and scores on the ABC scale and gait speed (r range, .47–.60^{7,16}). Overall, the verification of numerous hypotheses constructed a priori for the evaluation of construct validity and based in theory and in empiric evidence provides convincing evidence of the construct validity of both the original and Canadian French versions of the ABC scale among people living in the community in the first year after stroke.

Although there has been limited investigation of self-efficacy poststroke, studies involving other clinical populations provide a basis for comparing most findings observed here. The fair to moderate correlations between balance self-efficacy ratings obtained using either version of the ABC scale and scores on the BBS and comfortable walking speed observed in the current study were comparable with those observed among people more than a year poststroke¹⁷ and were slightly lower than those observed in the elderly.^{7,25,51} The moderate correlation observed between ratings on the ABC-CF scale and on the TUG was consistent with findings among the elderly.⁷ The fair correlation observed between the level of depressive symptoms and ABC scale ratings is consistent with previously reported findings among the elderly⁷ and among people with cardiac disease.⁶⁴ The moderate associations found between ratings on either version of the ABC scale and ratings of perceived health status were similar to those observed for other types of self-efficacy among people with stroke²⁴ or with chronic obstructive pulmonary disease.⁶⁵ These similarities support the robustness and universality of these relations across clinical populations.

CONCLUSIONS

The findings of this study support the internal and absolute reliability and construct validity of the original ABC scale and a new Canadian French version among people living in the community within the first year after a stroke. This study provides sufficient evidence to recommend the use of the ABC scale and the ABC-CF scale to obtain individual ratings of balance self-efficacy with an acceptable margin of error. It also provides a depth of information regarding how such ratings may relate to the level of physical capacity, ADL performance, physical function, and perceived health status. A follow-up study to provide evidence of test-retest reliability and of the longitudinal construct validity⁶⁶ of each version of the ABC scale is recommended before using the scale to monitor and interpret change in balance self-efficacy during the first year poststroke.

APPENDIX 1: CANADIAN FRENCH VERSION OF THE ABC SCALE

Instructions aux Participants

Pour chacun des points suivants, veuillez indiquer votre niveau de confiance quant à votre capacité de faire l'activité sans perdre l'équilibre ou sans devenir chancelant(e) en choisissant un chiffre sur l'échelle de 0% à 100%. Si vous ne faites pas présentement l'activité en question, essayez d'imaginer quel serait votre niveau de confiance si vous aviez à faire cette activité. Si vous utilisez d'habitude une canne ou une marchette, ou si vous devez vous appuyer sur quelqu'un pour cette activité, évaluez votre niveau de confiance comme si vous utilisiez ces supports. Si vous avez quelque question que ce soit, veuillez la poser au responsable.

Pour chacune des activités suivantes, veuillez indiquer votre niveau de confiance en vous-même en choisissant un chiffre sur l'échelle:

	0%	10	20	30	40	50	60	70	80	90	100%	
	Aucune confiance										Pleine confiance	
"À quel point êtes-vous confiant de ne pas perdre l'équilibre ou de ne pas devenir chancelant(e) lorsque vous. . .												
1.	...											___%
2.	...											___%
3.	...											___%
4.	...											___%
5.	...											___%
6.	...											___%
7.	...											___%
8.	...											___%
9.	...											___%
10.	...											___%
11.	...											___%
12.	...											___%
13.	...											___%
14.	...											___%
15.	...											___%
16.	...											___%

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