

Psychological Indicators of Balance Confidence: Relationship to Actual and Perceived Abilities

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Background. This study compares several psychological indicators of balance confidence in relation to physical performance, past and current experience, gender bias, and other perceptions of daily functioning.

Methods. Sixty community-dwelling ambulatory elders (aged 65–95) were administered the Falls Efficacy Scale (FES), the Activities-Specific Balance Confidence Scale (ABC), and three dichotomous questions on fear of falling, activity avoidance, and perceived need for personal assistance to ambulate outdoors. Performance measures on walking (average speed) and balance (static posturography) were obtained on a subsample of 21 subjects.

Results. Balance confidence assessed by the ABC and self-perceived need for personal assistance with outdoor ambulation were the only indicators significantly associated with the performance measures. As expected, perceived balance capabilities were more strongly related to current behavior (frequency of doing specific activities) than to past experience (fall history). Gender differences in self-report emerged for the global fear-of-falling indicator but not for the two efficacy ratings.

Conclusions. Psychological indicators of balance confidence are important to measure both in conjunction with balance test performance and as a legitimate focus of rehabilitation. Of the various indicators assessed here, the dichotomous fear-of-falling question appears to have the least utility. Perceived need for personal assistance to ambulate outdoors has merit as an initial clinical screening question for discriminating persons on the basis of both physical ability and confidence. The ABC scale appears to have the greatest utility as an evaluative index for older persons at a moderate to high level of functioning.

FALLS, their prediction, and prevention have been examined using physical parameters (1–6), most notably measures of balancing ability (2,4,7–11). The greater attention paid to physical indicators than to psychological factors must be reexamined, particularly given that balance test performance appears to be affected by subject apprehension (12–14).

The psychological consequences of falling were first described in the literature over a decade ago (15,16). “Fear of falling,” associated with the “post-fall syndrome,” is believed to lead to activity restriction and loss of independence beyond that warranted by physical injuries resulting from the fall itself (15–18). Self-imposed activity restriction, in turn, can precipitate balance deterioration (12), because inactivity is known to impact negatively on endurance, muscle strength, flexibility, and coordination (19). Thus, psychological considerations may be important precursors as well as consequences of falling. In fact, Tinetti and her colleagues have argued that fear of falling may represent a remediable independent contributor to functional decline (20–22).

Evidence is accumulating that fear of falling is a common phenomenon in the elderly population — not only for people who have experienced falls — and may be a more pervasive problem than falls per se (2,12,20,22,23). When asked, a substantial proportion of both fallers and nonfallers ac-

knowledged activity avoidance or restriction because of fear of falling (2,17,20,22,23).

Until recently, fear of falling has been measured as a dichotomous entity (“Yes/No”). Reservations with this approach are that the construct is atheoretical, that such fear may reflect a more general state of anxiety not specific to falling or balance, and that some subjects might conceal such fear to avoid stigmatization or, conversely, exaggerate to gain sympathy or attention (12,20,22). The latter factors might explain the lower prevalence of fear of falling found in male vs female subjects (12).

Modeled after Bandura’s theoretical framework, self-efficacy — or an individual’s perception of his or her capabilities within a particular domain of activities — is a promising approach for quantifying the psychological or cognitive-motivational component of balance-related behavior (24–27). Two continuous “balance efficacy” measures — the Falls Efficacy Scale (FES) and the Activities-Specific Balance Confidence Scale (ABC) — have been developed (20,28). In contrast to the FES, the ABC has greater item specificity and a wider continuum of item difficulty, including situations or activities of daily living (ADLs) performed outside the home (28).

The primary aim of this study was to directly compare various psychological indicators of balance-related confidence in relation to physical performance. The indicators

consisted of the two continuous measures of balance efficacy (the FES and the ABC), and three dichotomous measures — fear of falling, activity avoidance due to fear of falling (situations unspecified), and perceived need for personal assistance with outdoor ambulation — the latter suggested as a further indicator of general mobility confidence (28). To date, examination of the relationship between perceived and actual balancing abilities has been restricted to single measures of each construct (4,12,20,22). We related the five psychological indicators listed above to both a measure of walking (average speed) and balance (spontaneous postural sway activity). The latter was found to be the best predictor of prospective fall risk (4,11), while still moderately correlated with several other measures tapping a wide range of balancing tasks (10).

We hypothesized that perceived balancing capabilities as operationalized via efficacy would be more related to walking and balance performance than would fear of falling. ABC scores, as compared to FES scores, may be more strongly related to the two performance measures, given the marked skewness of the latter measure in several samples (20,22,28) and the greater item responsiveness of the ABC (28). In line with Bandura's theory (25), we did not expect to find a strong relationship between perceptions of balancing capabilities and past experience (fall history). However, we did expect current behavior (frequency of doing specific activities) to be related to balance efficacy for these activities. Since people tend to avoid activities for which they distrust their capabilities (25), we expected to find an interrelationship between the measures of avoidance and efficacy, as well as associations with the more general ADL rating-perceived difficulty. Finally, we hypothesized that self-report bias or stigma, as evidenced by gender differences, would be more likely in the case of the global fear-of-falling indicator.

METHODS

Subjects. — A total of 102 eligible persons (over age 65, ambulatory and living in the community) were approached to obtain 30 "high" and 30 "low" mobility volunteers. The same sample was used to examine the psychometric properties of the ABC (28). Recruitment was conducted at a seniors center and a walking club for the high-mobility group, and at home-care and day-care agencies for the low-mobility group. Caregiver judgment was used to select persons cognitively able to undergo the interview process. Reported need for personal assistance to ambulate outside the home was the determining criterion for classifying subjects as "low" in mobility (28). In many, but not all, cases, this classification agreed with self-reported use of a walking aid. Walking aids (most frequently canes) were reportedly used by 26 subjects inside the home and by 34 subjects outside the home. While 5 subjects classified as "high" in mobility used a walking aid (1 indoors only, 3 outdoors only, 1 both), none of these subjects reported needing personal assistance (apart from transportation) to leave their homes. The one subject in the "low" group who did not also use a walking aid outdoors indicated she could not leave her home without assistance.

Sixty subjects — 17 males and 43 females between the

ages of 65 and 95 (mean = 74.6; $SD = 7.5$) — were interviewed. Compared to "high" mobility subjects, the "low" mobility group was older (mean age = 77.7 vs 71.4, $p < .001$), reported more health problems (mean = 4.4 vs 3.0, $p < .01$), and received more formal assistance (70% vs 10%, $p < .001$).

Of the 60 persons in the interview phase, 39 were asked to participate in the balance and walking assessments two weeks later, which involved being transported to a nearby university (the remaining 21 subjects could not be approached due to either equipment unavailability or reluctance by one of the home-care agencies to permit transport of their residents). Volunteers ($n = 21$) and refusals ($n = 18$) were not significantly different with respect to mean age, number of health problems, fall history, fear of falling, or mobility classification. Compared to the rest of the sample, the performance subsample ($n = 21$) was somewhat younger (mean age = 72.8), included a greater number classified as "high" vs "low" mobility (16 vs 5), and had higher balance confidence scores (mean ABC = 75 vs 50; mean FES = 18 vs 32). None of the 21 volunteers who agreed to go to the university subsequently refused to undergo either of the performance assessments.

Interview protocol. — Regarding fall history, subjects were asked: "Have you fallen in the past year [i.e., ended up on the floor or ground unintentionally]?" If they responded affirmatively, they were further queried as to the number of falls, activity engaged in during the fall(s), and injuries sustained/treatment received as a result. They were then asked, "Are you afraid of falling?" (Yes/No), and "Has fear of falling made you avoid any activities?" (Yes/No).

Subjects were then administered the 10-item FES (1 = extreme confidence to 10 = no confidence), followed by the 16-item ABC (20,28). For each of the 16 items on the ABC, subjects were first asked to rate their balance confidence (0% = no confidence to 100% = completely confident), followed by ratings of perceived difficulty, extent of avoidance of the particular activity, and extent of pain or discomfort experienced doing the activity (using a 0% = never, to 100% = always format). The latter rating was included to examine a response set bias concerning perceived functional capabilities. In addition, subjects were asked how frequently they did each activity, and whether they knew others who had fallen doing the activity.

Performance protocol. — For each subject, the static posturography tests of spontaneous postural sway were administered in random order — two trials with eyes open and two trials while blindfolded. Each trial lasted 20 seconds, and subjects were given a 2-minute seated rest period between each trial. Subjects were asked to stand on a forceplate, unshod, with feet comfortably spaced, hands clasped together in front of the abdomen, and looking straight ahead at a mark on the wall (or wearing a blindfold), as described elsewhere (4,11,12). Foot tracings were used to replicate positioning on subsequent trials. A researcher stood alongside to provide assistance, if necessary.

Forceplate signals, sampled at 25 Hz, were used to calculate the center of pressure (COP). Anterior-posterior

(A/P) and medial-lateral (M/L) sway responses were quantified in terms of the root-mean-square (RMS) COP displacement, relative to the mean COP location (4,11,12). COP displacement is a measure of the stabilizing "sway activity" (i.e., flexion-extension ankle torque or "A/P" measures, and lateral weight shift or "M/L" measures).

Following the posturography tests, walking speed (meters per second) was assessed using a stopwatch (29). Instructions were to walk 30 meters in one direction down the middle of a hallway, at a comfortable pace, from a standing start to the finishing line. Regularly used walking aids were permitted, and the researcher walked alongside the subject during testing.

RESULTS

Relationship to Ability

The Kruskal-Wallis test was used to compare group differences in performance according to mobility, fall history, fear of falling, and balance efficacy scores (the small number of reported "avoiders" ($n = 3$) in this subsample precluded a comparison between "avoiders" and "nonavoiders"). In order to perform analogous analyses of the relationship between the continuous measures of balance confidence (FES and ABC) and the performance measures, subjects were divided by dichotomizing at the median FES (13) or ABC score (80). For both FES and ABC, this "cut-point" served to separate a relatively tight cluster of subjects at the high-confidence end of the scale from the remaining subjects, whose scores were spread over a wider range.

Since no significant differences occurred between trials 1 and 2, the average was used in the analyses of postural sway. As can be seen in Table 1, fallers and nonfallers had similar amplitudes of COP displacement during quiet standing, and similar walking speed scores. While fearful subjects tended to have higher sway activity scores and a slower walking speed compared to nonfearful subjects, the differences were not statistically significant.

Balance confidence was related to both ability measures in

the expected direction, i.e., subjects with greater confidence (high ABC and low FES) had lower sway scores and faster walking scores. However, the differences between the high and low confidence groups were statistically significant with respect to both sway (M/L) and walking speed only when using the ABC scores (vs the FES scores). It is noteworthy that significant differences emerged across the board when groups were distinguished according to the low vs high general mobility classification.

Spearman correlation coefficients were calculated to further quantify the associations between each of the performance measures and confidence scores. Correlations with the posturography measures tended to be similar for the ABC and FES scales and moderately strong, ranging from .37 to .61. Walking speed also correlated significantly with ABC scores ($r = .56, p < .01$), but not with FES scores ($r = -.25$).

The balance and walking scores of our subsample were indicative of a moderate level of functional ability. For example, we found that the mean M/L sway score under blindfolded conditions (3.6 mm) was higher than the mean (2.9 mm) reported for a cohort of relatively mobile residents from two self-care institutions, 16% of whom relied on a walking aid (4,11,12). However, our M/L score was lower than the mean (4.3 mm) recorded for an elderly cohort in which 67% used a walking aid (10). Concerning walking speed, our sample mean (0.76 m/s; range 0.23–1.13) was higher than that reported for Tinetti et al.'s (22) older cohort (mean age = 79.6; mean speed = 0.5 m/s; range = .01 to 1.11). The marked difference in all sway scores and walking speed between our "high" and "low" mobility groups further supports our contention that these groups represent different points along a continuum of physical functioning. In comparing our findings to the studies above, a note of caution is in order due to some method variance (i.e., duration of the sway test and length of the walking test).

Relationship to Experience

Over half the sample (57%) reported at least one fall over the past year. Of the 34 subjects who had reportedly fallen,

Table 1. Group Comparisons on Postural Performance and Self-Paced Walking

Group Comparisons	n	Anterior-Posterior Sway		Medial-Lateral Sway		Walking Speed
		Eyes Open	Vision Deprived	Eyes Open	Vision Deprived	
Total sample	21	5.4 ± 2.1	5.9 ± 3.0	3.3 ± 2.4	3.6 ± 3.1	.76 ± .26
Low mobility	5	7.5 ± 2.7	9.2 ± 3.5	6.1 ± 2.8	7.2 ± 4.0	.39 ± .20
High mobility	16	4.7 ± 1.3*	4.8 ± 2.0**	2.4 ± 1.3**	2.4 ± 1.6**	.88 ± .13***
Fallers	10	5.2 ± 2.3	5.5 ± 3.3	2.5 ± 1.9	3.2 ± 3.5	.78 ± .23
Nonfallers	11	5.6 ± 1.9	6.3 ± 2.9	4.0 ± 2.8	4.0 ± 2.8	.75 ± .29
Fearful	11	5.5 ± 2.7	6.7 ± 3.4	4.2 ± 2.9	4.8 ± 3.8	.69 ± .33
Nonfearful	10	5.3 ± 1.2	4.9 ± 2.4	2.3 ± 1.0	2.2 ± 0.9	.85 ± .11
High FES	11	6.1 ± 2.5	6.5 ± 3.6	4.0 ± 2.6	4.7 ± 3.8	.74 ± .29
Low FES	10	4.7 ± 1.1	5.3 ± 2.5	2.4 ± 1.9	2.6 ± 1.9	.80 ± .24
Low ABC	11	6.3 ± 2.3	6.9 ± 3.5	4.4 ± 2.8	5.1 ± 3.9	.65 ± .30
High ABC	10	4.5 ± 1.2	5.0 ± 2.3	2.0 ± 0.6*	2.2 ± 0.9*	.89 ± .14*

Note. Postural sway activity is reported as the root mean square center-of-pressure displacement (mm); walking speed (meters/second) was recorded over 30 meters. Means and standard deviations are shown.

* $p < .05$; ** $p < .01$; *** $p < .001$. Observed level of significance from Kruskal-Wallis test.

32% reported only one incident; however, the average was two falls over the past year ($SD = 1.7$). Of the 34 fallers in the sample, 23 had reportedly sustained an injury, 44% consisting of fractures (mostly Colles fractures; no hip fractures were reported).

Nineteen of the 34 reported fallers (56%) responded "yes" to the question on "fear of falling," and 10 (29%) acknowledged activity avoidance due to fear of falling. However, fear of falling and activity avoidance were also reported by roughly the same proportion of the 26 nonfallers (58% and 31%, respectively). No significant relationships (χ^2 analyses) were found between either fear of falling or avoidance with recent falls or recent fall injury.

While not significantly different ($p < .06$), the group who had reportedly fallen in the past year had a lower ABC score (mean = 53.7, $SD = 27.4$) than the group who had not fallen (mean = 67.4, $SD = 26.7$). Those who had reportedly sustained a fall-related injury also scored lower on the ABC (mean = 52.4, $SD = 26.9$), but were not significantly different from subjects who had fallen but not been injured (mean = 56.5, $SD = 29.6$). The same pattern emerged when the FES scores were examined. On the other hand, there were significantly more fallers in the low mobility (62%) vs the high mobility (38%) groups ($\chi^2 = 4.4, p < .05$).

With respect to vicarious experience, respondents were asked whether they knew anyone who had fallen doing each of the activities on the ABC scale. Affirmative responses occurred most frequently for walking around the house ($n = 17$), walking outside ($n = 11$), using stairs ($n = 9$), and standing on a chair ($n = 5$). While persons who reportedly knew someone who fell in each of the above situations tended to have lower corresponding ABC confidence scores, small cell sizes precluded meaningful analyses.

To examine the relationship to current behavioral patterns, balance confidence was related to frequency of doing the various activities (daily vs a few times a week vs once a week vs less than once a week). Sweeping the floor and shopping were selected from the 16 activities for examination since both are discrete events that subjects may more readily recall (as compared to activities such as using the stairs or reaching). Persons who reportedly swept the floor more frequently also reported more balance efficacy regarding this activity ($r = .70, p < .001$). Similarly, shopping frequency was related to balance confidence ($r = .54, p < .001$) using a composite score of relevant ABC items (nos. 3–5, 9–12, and 15).

Relationship Between Indicators

Next, we examined the relationships between the various psychological indicators of balance confidence. Thirty-four people reportedly were afraid of falling, and 18 acknowledged activity avoidance due to fear of falling. Not surprisingly, given the wording of the latter question, all subjects who reported activity avoidance also reported, on the preceding question, being afraid of falling.

Subjects who reported fear of falling scored significantly lower on the ABC than nonfearful subjects (means = 48.6 vs 74.0, respectively, $t = 3.91, p < .001$). Subjects who reportedly avoided activity because of fear of falling also scored significantly lower on the ABC when compared to

nonavoiders (means = 30.8 and 71.9, respectively, $t = 7.19, p < .001$). Significant differences in FES scores were similarly found between the fear/no fear groups (means = 32.4 vs 19.7, $t = 2.88, p < .001$, and the avoid/not avoid groups (means = 43.4 vs 19.9, $t = 5.46, p < .001$).

Similar to Tinetti et al. (20,22), we separated subjects into three groups — nonfearful, fearful but not avoiding activity, and fearful and avoiding — and compared balance confidence scores via both the FES and ABC. The Tukey-B procedure was used to compare the three group means. As can be seen in Table 2, both FES and ABC scores were able to discriminate between subjects who reportedly avoided activity because of fear of falling, and those who did not. While the group who reported being fearful but not avoiding activity had a poorer average balance confidence score than nonfearful subjects, this group contrast was not statistically significant. The mean efficacy scores of the two extreme groups — nonfearful/nonavoiding and fearful/avoiding — showed a much wider separation using the ABC vs FES (see Table 2).

Although proportionately more of the "low" mobility group were reportedly afraid of falling compared to the "high" group (67% vs 47%), the difference was not significant. Avoidance of activities, however, was significantly higher ($\chi^2 = 9.6, p < .001$) in the low vs high mobility groups (reported by 50% vs 10% of each group, respectively).

The two confidence scores were highly correlated ($r = -.84, p < .001$), and high mobility subjects had significantly better balance efficacy scores on both the ABC and the FES (28). As previously reported, the ABC scale was more efficient in discriminating between the two mobility groups (28). Comparatively, the FES yielded a very restricted range of scores, particularly for higher mobility subjects (28).

To examine the hypothesized relationship between balance capabilities and other perceptions of ADL functioning (22), subjects were also asked to rate the extent of difficulty (30,31), avoidance, and discomfort experienced for each of the 16 activities on the ABC. Total balance confidence scores were highly related ($p < .001$) to both total difficulty scores ($r = -.89$) and total avoidance ratings ($r = -.92$), but, as expected, less related to total discomfort ratings ($r =$

Table 2. Comparisons of Nonfearful, Fearful, and Fear/Avoidance Group Means on Balance Confidence

	A Non- fearful $n = 26$	B Fearful, But Not Avoiding $n = 16$	C Fearful and Avoiding $n = 18$	Significant Contrasts of Means B Tukey
FES Score				
Mean	19.8	20.1	43.4	AvC, BvC
(SD)	(12.7)	(15.8)	(18.4)	
ABC Score				
Mean	74.0	68.7	30.8	AvC, BvC
(SD)	(20.9)	(23.4)	(16.2)	

Note. Items on the FES are rated from 1 (extreme confidence) to 10 (no confidence); items on the ABC are rated from 0% (no confidence) to 100% (complete confidence). Possible range of scores on the FES is 10–100; on the ABC 0–100.

-.52). Similarly, total avoidance and discomfort ratings were only moderately correlated ($r = .53$). Mean scores (0% = never, to 100% = always) for discomfort (16.3 ± 22.2), avoidance (24.35 ± 20.38), and difficulty (34 ± 27.3), in comparison to confidence ratings (0% to 100%, mean = 59.6 ± 27.7), show that the discomfort ratings in particular were highly skewed.

Next, we replicated Tinetti et al.'s (22) multiple regression analyses relating fear of falling and FES scores to ADL functioning. In our study, the total ADL difficulty score (based on the 16 ABC items) constituted the dependent variable, and models were constructed using each of the five psychological balance indicators as predictors. Similar to Tinetti et al. (22), the backward elimination procedure was used, and the variables age, gender, and number of falls in the past year were forced into each model. The entire sample was used (no missing values on any of these variables). The resulting models are shown in Table 3. As can be seen, except for fear of falling ($p < .08$), all four indicators of balance confidence were strong correlates of perceived difficulty ($p < .001$). It should be noted that number of health problems was a significant correlate in all the models.

In addition, a stepwise regression was run starting with a base model consisting of the four variables shown in Table 3. The ABC score was selected first [$F(1,54) = 169.13, p < .0001$]; mobility was selected next [$F(1,53) = 19.0, p < .0001$]. The base model containing these two predictors explained 89% of the variance in the total difficulty score. It is noteworthy that none of the other predictor variables — FES score, avoidance, fear of falling — added significantly to this model.

Gender Differences

Finally, we examined the various indicators of balance confidence with respect to gender differences in self-report. Females were disproportionately more likely to say they were afraid of falling ($\chi^2 = 15.3, p < .001$) than were the males in our sample (72% vs 18%). A greater percentage of the females than the males (37% vs 12%) also reported related activity avoidance ($\chi^2 = 4.22, p < .05$). These gender differences were not due to differential mobility classification, as roughly half of both the males and females fell into either the high or low groups, although a greater proportion of males reportedly used walking aids (76% vs 56%).

In contrast to the dichotomous fear of falling and activity avoidance questions, no gender difference emerged for balance confidence ratings (using either the ABC or FES scores). While males had better efficacy ratings than females on both the ABC (mean = 66.4 vs 57.9) and the FES (mean = 25.9 vs 27.3), neither *t*-test approached significance.

DISCUSSION

Diminished balancing ability has been presumed to confer fall risk and, in turn, falling can have both physical and psychological consequences. While previous studies have demonstrated significant differences in balance test performance between fallers and nonfallers, this finding is not consistent (4,7,9,14,17). In the present study, for example, these two groups did not differ significantly on either the balance or the walking measure.

Clearly, a variety of intrinsic and extrinsic factors are important regarding falls in the elderly (1–3,18). The present study demonstrated that an association exists be-

Table 3. Multivariate Models Relating Psychological Balance Indicators to IADL Difficulty

Variable	ABC Score		FES Score		Fear of Falling		Avoidance		Mobility	
	<i>b</i> (<i>SE</i>)	Beta	<i>b</i> (<i>SE</i>)	Beta	<i>b</i> (<i>SE</i>)	Beta	<i>b</i> (<i>SE</i>)	Beta	<i>b</i> (<i>SE</i>)	Beta
Age	-6.20 (3.11)	-0.11*	-1.33 (4.85)	-0.02	3.63 (5.95)	0.07	-0.12 (5.42)	-0.002	-10.22 (4.17)	-0.187*
Female	-115.77 (48.86)	-0.13*	-12.66 (75.79)	-0.01	-84.88 (109.55)	-0.09	-87.75 (88.01)	-0.10	32.48 (61.44)	0.036
Number of falls	9.80 (13.48)	0.04	25.25 (21.82)	0.11	80.89 (24.14)	0.36***	68.75 (21.82)	0.30**	24.92 (16.98)	0.110
Number of health problems	34.20 (13.20)	0.15*	74.80 (19.80)	0.33***	92.36 (24.43)	0.41***	70.05 (22.67)	0.31**	47.09 (16.71)	0.211**
ABC score	-0.81 (0.06)	-0.87***								
FES score			13.07 (2.20)	0.59***						
Fearful (no)					-178.41 (101.07)	-0.22				
Avoid (no)							-394.22 (94.68)	-0.44***		
High mobility									-636.62 (70.50)	-0.783***
	$R^2 = .85$		$R^2 = .62$		$R^2 = .41$		$R^2 = .53$		$R^2 = .75$	

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

tween physical ability and perceived capabilities; however, statistical significance emerged for only two of the indicators — ABC scores and mobility classification. The small size of our performance subsample attests to the special challenges inherent in recruiting seniors for studies involving balance testing. While highly apprehensive persons may screen themselves out of such studies (12), gatekeepers of service agencies, as well as family caregivers, may also underestimate seniors' abilities and prevent direct recruitment. Travel to test sites is a further barrier to participation. Equally important, the testing protocol must constitute a sufficient challenge to mobility and balance, while still allowing the majority of subjects to complete the protocol (as was the case in this study). Clearly, motivational factors must be addressed in relation to both participation itself and test performance in future balance studies.

According to Bandura's efficacy framework, perceived capability rather than actual physical ability is more predictive of behavior in a given domain, i.e., the activities an individual is likely to engage in (24,25). This would explain the activity restriction (beyond that warranted by physical injuries) observed in some post-fall patients (15–18). Similarly, use of walking aids may be more related to an individual's perceived need for balance support than to deteriorated physical abilities per se.

Efficacy beliefs do not simply reflect past experience (24,25), even though one might intuitively expect fallers to have reduced confidence in their balancing capabilities. The present study provides added support for the contention that not all fallers report fear of falling, and that fear of falling may be present even in persons who have not experienced a recent fall. While Tinetti et al. (22) found a significant difference in FES scores between reported fallers and non-fallers, this group difference was not significant in their earlier study (20) nor in the present study (using either FES or ABC scores). The circumstances surrounding a fall may be more important than the fall itself; for instance, an association has been found between balance efficacy and reported difficulty getting up alone after a fall (20). Interestingly, the only indicator significantly associated with fall history in the present study — mobility classification — involved the perceived need of others' assistance. Since perceived control is a major contributor to anticipatory anxiety (24,25), it is possible that the "low" mobility group experienced "drop attacks" or other types of falls with no obvious precipitating events. Recent efforts to differentiate between types of falls (4,11) should be very useful to future research.

Mastery or actual performance accomplishments exert the strongest influence on efficacy expectations (24–27). Successfully executing a behavior raises expectations, while repeated failure lowers expectations. Thus, individuals should be more confident about activities they engage in on a regular basis. In the present study, frequency of sweeping the floor and shopping were correlated with balance confidence scores for these activities. Whether people actually *do* the specific activities contained in both balance confidence scales (28) and general ADL/IADL scales (30), and the reasons why people may not do certain activities (e.g. avoidance due to fear of falling vs division of labor vs lack of

opportunity or interest) should be explored by clinicians and researchers alike (28,30).

Efficacy theory further argues that people tend to avoid behaviors or situations for which they distrust their capabilities (24,25). Similar to Tinetti et al.'s findings with the FES (22), we expected to find that both balance efficacy scores would be more strongly related to the global activity avoidance (due to fear of falling) measure than to fear of falling per se. We were somewhat surprised, however, by the strength of the relationship between mobility classification (based on the single question) and the efficacy measures.

Tinetti et al. (22) found that FES scores were more strongly related to physical ADL ratings than to ratings of social activity, as would be expected by the situational specificity inherent in the efficacy construct (25). Since both the FES items and the ADL situations used in Tinetti et al.'s (22) study consisted of fairly basic indoor ADLs, we replicated their analyses using the 16 situations on the ABC. While one would expect a high correlation between perceived confidence and difficulty in the *same* situations, the findings suggest that balance confidence indicators do generalize to some extent (i.e., FES scores were also predictive of difficulty ratings on the more complex ABC items). However, use of separate regression models [as done by Tinetti et al. (22) for the FES vs fear of falling predictors] does not permit a direct comparison concerning marginal explanatory power. In the full regression model we found that the FES score, global avoidance, and fear of falling did not add significant variance beyond the ABC score and mobility classification.

It is possible that respondents may not always make the distinction between various ratings of perceived capabilities (22). Our inclusion of the pain/discomfort rating served the purpose of ruling out a response set bias and supports previous research that functional status ratings are not interchangeable (31). In any case, caution is advised in interpreting such ADL ratings as indicative of "actual performance," as was done by Tinetti et al. (22). Whether the rating is "ability to perform without human help" (22), "difficulty," or "confidence," such ratings still constitute perceptions of capabilities and not actual performance — an important distinction (30,31).

With respect to the various psychological indicators of balance confidence, the dichotomous fear of falling rating appears to have the least utility. The dichotomous activity avoidance question may be more useful as an initial screening mechanism, although stigma (gender differences) may be attached to such reporting, and clinicians would still need to pinpoint specific areas of avoidance. The screening question used in the mobility classification — perceived need for personal assistance to ambulate outdoors — appears to have merit for discriminating between persons on the basis of both physical ability (all postural sway and walking test scores were significantly different) and overall balance confidence. However, such an approach has limited utility as an evaluative index (i.e., persons would have to move from one category to the other to show evidence of change).

The continuous rating formats and multiple items of both the FES and the ABC render them more reliable assessment tools, and both have demonstrated psychometric support

(20,28). While the two scales use slightly different rating directives (20,28), both are based on the same conceptual model, and total scores are correlated. The primary distinction concerns item difficulty and thus, suitability for different populations. Published FES scores for three different community-dwelling ambulatory samples of seniors to date have been highly skewed (20,22,28). Given the focus on more basic, primarily indoor ADLs, the FES may be most suitable for seniors who are quite frail and even housebound. In contrast, the wider continuum of item difficulty makes the ABC more suitable for seniors at a moderate to high level of balancing and walking abilities, persons whose daily activities include those outside the home. Further research with a variety of populations is needed to establish norms for these scales, examine their responsiveness to therapeutic change (as well as concomitant changes in actual daily behaviors).

In conclusion, efficacy is a promising approach to quantifying the psychological component of balance-related behavior. Efficacy expectations are amenable to therapeutic change as demonstrated in a number of other areas of rehabilitation (24–27). Greater attention to psychological factors may also lead to a reexamination of fall prevention as the ultimate objective in the field. While concurrent enhancement of balance ability and perceived capability may be related to improved balance recovery and reduced injury, more active living could result in an increased incidence of falls per se. The cautions inherent in fall prevention must ultimately be weighed against the impact of activity restriction and functional dependence on quality of life.

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