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This study evaluates three versions of the Wayfinding Effectiveness Scale (WES), developed to differentiate problems of wayfinding and wandering behavior of community-residing elders with dementia (EWD), in 266 dyads (EWD and caregiver) recruited from Alzheimer's Association chapters. Factor analyses yield a five-factor solution (explained variance = 62.6%): complex wayfinding goals, analytic strategies, global strategies, simple wayfinding goals, and being stimulus bound. Overall, internal consistencies are high: WES (.94-.95), and subscales are stable across all versions. Test-retest reliability is acceptable for the overall WES and two subscales (complex and simple wayfinding goals) for the care recipient current behavior version. Construct validity is supported by the pattern of correlations among subscales and analyses of variance (ANOVAs) showing significant differences among the care recipient (current vs. prior behavior) and caregiver versions overall and for all subscales. Results support the WES as a valid and reliable measure of wayfinding effectiveness in persons with dementia.

Keywords: *dementia; wayfinding; wandering; instrument; community*

Not knowing your whereabouts (spatial disorientation) or being unable to navigate in an environment (wayfinding) is a frightening and dangerous experience. Reduced wayfinding effectiveness is very common in Alzheimer's disease, beginning in the early stages (Cummings & Benson, 1986; Tariot et al., 1986). Losing ability to find one's way results in getting lost and necessitates assistance from others in returning home (Hope & Fairburn, 1990). All too often, getting lost has dire consequences (Rowe & Glover, 2001).

Problems with spatial orientation and wayfinding effectiveness can also manifest as wandering behavior (deLeon, Potegal, & Gurland, 1984). In other words, a reduction in wayfinding effectiveness may explain the occurrence of wandering behavior, at least in part (Ballard, Mohan, Bannister, Handy, & Patel, 1991), but other aspects of wandering, such as its repetitive nature and high volume, may be due to other factors (Algase, 1999). To better understand and intervene, studies are needed to examine how wayfinding effectiveness and wandering are related and also how they are distinct. The purpose of this study was to evaluate the psychometric properties of a new instrument, the Wayfinding Effectiveness Scale (WES), designed to enable such studies.

Wayfinding

People usually move through space with a purpose. They know where they are going and what to look for in the environment, such as landmarks, to assure that they are on the right path. In dementia, cognitive deficits interfere with navigation and with many other functional behaviors. The term *wandering* has been used to characterize the disordered ambulation of persons with dementia (Algase, 1999). Wandering encompasses not only ineffective wayfinding but also includes walking without an obvious goal (Algase, 2003). Measures that can be used to parcel out various aspects of wandering, such as diminished wayfinding effectiveness, are needed.

Downs and Stea (1977) argued that spatial orientation is a cognitive act because one can imagine places that lie beyond the perceptual range of the senses.

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> Orientation refers to the tie between our knowledge of the spatial environment and the environment itself . . . we are lost when we are unable to make the necessary link between what we see around us and what we recognize in our mind. (p. 53)

To capture knowledge of an environment in our mind, some suggest that humans must actively walk, drive, or cycle an area versus passively moving through it (Downs & Stea, 1977). Wayfinding effectiveness, or the relative ability to navigate one's way in an environment, is a multimodal, multifaceted process.

Effective wayfinding basically involves the ability to recognize "here" (current location) in relationship to "there" (desired location). Numerous definitions of wayfinding exist whereby its complexity and dependence on multiple cognitive processes are reflected (Downs & Stea, 1977; Kaplan, 1976; Passini, 1987; Therrien, 1984; Weisman, 1979). Passini (1987) defined wayfinding as "spatial problem solving that comprises three major processes: information processing, decision making, and decision execution or initiation of movement in space comprising a behavioral and (spatial) environmental component" (p. 64). O'Keefe and Nadel (1978) suggested a second approach for successful wayfinding involving the utilization of cognitive maps, which are internal representations of the world in one's mind. Therrien (1984) identified seven cognitive operations as necessary for both acquisition and utilization of cognitive maps in wayfinding: abstraction, reduction, reconstruction, rotation, reversal, prediction, and projection. If any of these operations are affected, spatially disordered behavior may occur. Chown, Kaplan, and Kortencamp (1995) defined human wayfinding as encompassing four tasks: landmark identification, direction selection, path selection, and environmental abstraction. In conclusion, wayfinding is a cognitive process that requires information from the physical environment and from the knowledge base (cognitive map) of the wayfinder; wayfinding effectiveness is an estimate of one's wayfinding ability.

Purpose

This study's purpose was to evaluate the validity and reliability of the WES, a new tool designed for self or caregiver report of wayfinding ability. Three versions of the WES, caregiver (self-report), care recipient prior behavior (caregiver's report), and care recipient current behavior (caregiver's report), were evaluated for internal consistency, test-retest reliability, and construct validity.

Operational Definition

In this study, wayfinding effectiveness is an estimate of one's ability to navigate through space to reach an intended goal, operationally defined using the WES. To construct the WES we adopted a view of wayfinding based on work by Kaplan and Kaplan (1982), using the constructs of goal (or destination) and problem-solving strategies. Goals were considered in terms of distance (destinations that are near or within visual range vs. those that are far away) and familiarity (destinations that are known and for which one has a cognitive map vs. ones that are new or unfamiliar and for which one has no such map). Problem-solving strategies were determined as analytic or global. Analytic strategies were those wayfinding techniques that employ known or observable elements of an environment to construct a route, for example, using one's relationship to one or more landmarks to infer a direction or path. Global strategies were understood as broader approaches that do not rely on data from or knowledge of a particular environment, for example, asking another for directions.

Design

A survey design was selected for this study using a nonprobability sample of caregivers of persons with dementia who were residing in the community. Caregivers provided data concerning the wayfinding effectiveness of their care recipient referencing two time points: the present and prior to the onset of dementia when the affected person was in his or her prime of health. For purposes of construct validity testing, caregivers also provided data concerning their own wayfinding effectiveness.

Sample

The sample was drawn from among members from five area Alzheimer's Association chapters in two Midwestern states of the United States. A random sample of members was drawn from the three larger chapters; all members were included from the two smaller chapters. Chapters were sampled sequentially until a sufficient sample size was obtained, using the rule of thumb that no fewer than 5 participants per each of the 41 items comprising the original WES or a minimum of 205 caregiver respondents. Each member was mailed a letter describing the study and the inclusion criteria. Members who determined that they met the criteria and were willing to participate returned a postcard indicating their interest. Survey instruments were then mailed to

534 parties expressing interest. A follow-up letter and another set of instruments were mailed as a reminder to respondents who did not return the survey instruments within 4 weeks. Study procedures were approved by the Institutional Review Board–Health at the University of Michigan.

The final sample consisted of adults ($N = 266$) who self-identified as primary caregivers to a person with dementia and an equal number of persons with dementia under their care. Of the 534 original respondents, 465 were determined to have met inclusion criteria. Of the returned questionnaires (59% response rate), 8 were discarded due to a change in the care recipient's status, for example, death. Inclusion criteria for caregivers were (a) being a relative 18 years of age or older, (b) serving as primary caregiver for a person with dementia, and (c) having intimate knowledge of that person over time. A typical caregiver was a retired (52%) female (74.1%) spouse (50%) aged 63 years who had been providing care for an average of 48 months. Inclusion criteria for care recipients were (a) being aged 50 or older, (b) having a medically diagnosed dementia, and (c) being capable of independent ambulation with or without assistive devices. A typical care recipient was also a woman (55%), aged 79, with Alzheimer's disease. Characteristics of caregivers and care recipients are shown in Table 1.

Method

Data collected for this study comprised demographics about the care recipient and caregiver and scores for three versions of the WES (care recipient's current behavior, care recipient's prior behavior, and caregiver's behavior). Because our intent in developing the WES was to estimate wayfinding effectiveness in persons with dementia, the care recipient's current behavior version was used in factor analyses to explicate the underlying structure of the WES for comparison to its conceptual basis. Internal consistency and test-retest reliability (stability) were evaluated using a second set of responses obtained from a convenient subset of 43 respondents at 2 to 4 weeks after receiving their initial responses. Construct validity was examined using convergent and divergent approaches. The pattern of correlations among WES subscale and overall scores within each version was compared across versions, expecting the pattern to be similar, and by contrasting scores for groups with known or expected differences (care recipient's current with prior behavior and with caregiver behavior) and similarities (care recipient's prior behavior with caregiver behavior).

WES item generation. The concepts of goals (in terms of distance to and familiarity with a destination) and problem-solving approaches (in terms of

Table 1
Characteristics of Caregivers and Care Recipients

Variable	Caregiver ($N = 266$)		Care Recipient ($N = 266$)		Caregiver ($N = 266$)			Care Recipient ($N = 266$)		
	n	%	*n*	%	*M*	*SD*	Range	*M*	*SD*	Range
Age					62.9	13.76	26 to 90	78.6	7.65	53 to 97
Duration of caregiving in months					47.5	36.6	2 to 210			
Sex										
Female	197	74.1	146	54.9						
Male	60	22.6	110	41.4						
Missing	9	3.4	10	3.8						
Relationship										
Spouse/partner	134	50.4								
Adult child/child-in-law	108	40.6								
Others	17	6.4								
Missing	7	2.6								
Marital status										
Has a spouse	184	69.2	148	55.6						
No spouse	68	15.6	100	37.5						
Other	1	0.4	2	.8						
Missing	13	4.9	16	6.1						
Education										
<High school	129	48.5	176	66.2						
>High school	126	47.3	81	30.5						
Missing	11	4.1	9	3.4						

Employment status				
Not working	176	66.2		
Employed	77	29.1		
Missing	13	4.9		
Hours of care provided per week				
> 40	141	53.0		
11 to 40	75	18.2		
10 or less	39	14.7		
Missing	11	4.2		
Race				
Caucasian			223	83.8
African American			27	10.2
Latino/Hispanic			3	1.1
Other			5	1.9
Missing			8	3.0
Diagnosis				
Alzheimer's disease (AD)			191	71.8
Multi-infarct dementia (MID)			5	1.9
AD and MID			12	4.5
Parkinson's disease with dementia			3	1.1
Other			27	10.2
Do not know			13	4.9
Missing			15	5.6

analytic and global strategies used to reach a goal) provided the framework (Kaplan & Kaplan, 1982) for developing the WES. These concepts were used to create a matrix (goal type by problem-solving approach), which constituted the content map for guiding item generation. In all, using clinical experience and thinking within this framework, the research team generated 41 items to initially represent multiple aspects of wayfinding effectiveness. Because more than one concept from the framework was represented in most items, no specific number of factors was predicted a priori. We expected to find a small number of moderately correlated factors that represented dimensions of wayfinding and were interpretable within the framework.

WES scale construction. Generated items were randomly ordered and formatted into an instrument using a Likert scaling model ranging from 1 (*never or unable*) to 5 (*always*) such that higher scores indicated better wayfinding effectiveness. Although the primary goal was to develop an instrument applicable to persons with dementia, three versions of the WES (care recipient's current behavior, care recipient's prior behavior, the caregiver's own behavior) were developed to evaluate construct validity of the scale. Each responding caregiver received all three versions of the WES. Respondents were directed to think about the care recipient during their periods of best health, before the onset of dementia, in responding to the version for care recipient's prior behavior; in both other versions, caregivers were directed to respond using current behavior, either for themselves of their care recipient, as indicated.

For stability reliability purposes, a subset of 43 respondents, selected for convenience, also completed instruments a second time within 2 to 4 weeks of their initial response. Tests for equality of means and variance did not differ significantly between the subset and the remaining sample for age of caregiver or recipient or for duration or weekly hours of caregiving. Measures of association revealed no association with subset selection for race, marital status, relationship, and educational level of either caregivers or recipients or with care recipient's dementia type. The subset did encompass a significantly higher proportion of female caregivers (86% vs. 74%), unemployed caregivers (21% vs. 14%), and male care recipients (58% vs. 40%) and a lower proportion of caregivers who were retired (49% vs. 52%) than did the remainder of the sample.

Analysis of Data

Data were entered, cleaned, and verified. Case means were used to substitute for missing data, where respondents had completed at least 75% of the

items. To estimate the optimal number of factors to extract in the final analysis and to identify weak items (no factor loading over .40), a pair-wise, preliminary, principal component factor (PCA) analysis with varimax rotation was performed. Because individual items of the WES encompassed more than one construct, multiple cross-loadings were likely. Therefore, PCA was selected to maximize the loading of each item on one factor, thereby leading to factors that were most distinct (Kim & Mueller, 1978). Data from the WES version representing the care recipient's current behavior were used in factor analyses because (a) our goal was to develop an instrument applicable to persons with dementia and (b) information about current behavior may be more trustworthy than reliance on potentially faulty or incomplete memory of the care recipient's prior behavior.

This analysis resulted in elimination of three items. The scree test and Eigen values suggested that the optimal solution would have four to six factors. PCA analyses with varimax rotation were repeated on the remaining pool of 38 items forcing four, five, and six factors; the six-factor model failed after 25 iterations. Results of the five-factor solution were most interpretable and thus applied to construct scale scores for remaining analyses. Results of the five-factor solution and resulting subscales (calculated as item means) are reported in the next section. A significance level of $p \leq .01$ was selected for all relevant analyses.

To demonstrate internal consistency reliability, Cronbach's alpha was calculated on the overall WES and on each subscale for all three versions of the instrument; results were compared across versions. Test-retest reliability was estimated on a subset of the sample ($n = 43$) using paired correlations and t test for the overall WES and subscales for each version.

To demonstrate construct validity, WES subscale scores were correlated with one another and with the overall WES, corrected to exclude the relevant subscale in each case, for each version. Analyses of variance (ANOVAs) were performed using all versions to determine if the overall WES and subscales differentiated among caregivers' and care recipients' prior and current behavior.

Findings

The five-factor PCA solution for the reduced WES (38 items), displayed in Table 2, explained a total of 62.62% of the variance. The Kaiser-Meyer-Olin measure of sampling adequacy was .92 or meritorious. Four items did not load on any factor at a value of .40 or higher and were eliminated from

further analysis; several items that cross-loaded were assigned to the factor with the closest conceptual fit. Resulting factors were labeled as *complex wayfinding goals* (CWG), *analytic strategies* (AS), *global strategies* (GS), *simple wayfinding goals* (SWG), and *being stimulus bound* (SB). The AS and GS subscales directly reflect the two types of strategies in the concept map, whereas the CWG and SWG subscales each reflect a combination of distance and familiarity, the two aspects of goals in the concept map. The SB subscale was not clearly representative of any concept in the framework.

Cronbach's alpha for the WES and its subscales, constructed from items loading on each factor, was calculated for all versions. For the overall WES (33 items) the alphas were very high (.93 or .94) for all versions. Across versions, alphas ranged between .93 and .94 for the CWG subscale, .79 and .90 for the AS subscale, .82 and .88 for the SWG subscale, and only .36 and .64 for the SB subscale. For the GS subscale, one item (Prefers a route in terms of left-right when obtaining directions to a new destination.) was eliminated because it detracted substantially from the subscale alpha; resulting alphas ranged between .71 and .77. Although this item was a conceptual fit for the AS subscale, it was not included there as its cross-loading to this factor was below .40. All subscales, excepting SB, exceeded the standard (.70) for new scales (Nunnally, 1978). The SB subscale was clearly below the standard and was eliminated from further analyses. The remaining 29 items constituted the overall WES and its four retained subscales used in further analyses. Alphas for the shortened WES (29 items) were between .94 and .95.

Descriptive statistics for all versions of the overall WES reveal that ratings on the care recipient's current behavior were consistently lower than those of both other versions, whereas standard deviations were similar on all versions. This pattern was consistent among all four subscales across all three versions of the WES.

To assess test-retest reliability, paired correlations of Time 1 and Time 2 were computed using data from the subset of 43 participants; all correlations were significant ($p < .001$). For the overall WES, correlations were .80, .72, and .72 for the care recipient current, care recipient prior, and caregiver versions, respectively. In the same order, they were .78, .76, and .62 for the CWG subscale; .81, .45, and .86 for the SWG subscale; .60, .54, and .87 for the AS subscale; and .63, .67, and .55 for the GS subscale. On means testing, no significant differences were found for either care recipient version of the WES or WES subscales, although the difference approached significance ($p = .04$) for the CWG subscale of the care recipient prior behavior version. For the care recipient current behavior version, mean differences between

(text continues on p. 1028)

Table 2
Five-Factor Principal Component Factor Analysis Factor Loadings, Eigen Values, Explained Variance, and Number of Items Used in Resulting Subscales

Item	Complex Wayfinding Goals	Analytic Strategies	Global Strategies	Simple Wayfinding Goals	Stimulus Bound
Can find way to distant and unfamiliar places	**.75**				
Can find way to near and unfamiliar places	**.75**				
Can find way to distant places if route and destination are familiar.	**.71**				
Can generate alternate routes of comparable efficiency to common destinations	**.69**				
Can compensate for forced detour when traveling to familiar location	**.67**				
Can detect when "off course" to an unfamiliar location	**.63**				
Can detect when "off course" to a familiar location	**.60**				
Can find way to near places if route and destination are familiar	**.57**				
Can find way to unfamiliar places around area of residence	**.57**				
Can compensate without assistance once off course to an unfamiliar location	**.52**				
Overall, has a good sense of direction	**.52**				
Locates an unfamiliar location by circling in on it	**.47**				

(continued)

Table 2 (continued)

Item	Complex Wayfinding Goals	Analytic Strategies	Global Strategies	Simple Wayfinding Goals	Stimulus Bound
Relies on maps when heading for a familiar location		**.89**			
Relies on maps when heading for an unfamiliar location		**.87**			
Relies on landmarks when traveling to an unfamiliar location		**.63**			
Prefers a route in cardinal signs when getting directions to new location		**.59**			
Finds way about in a mall or museum by accessing a directory		**.56**			
Prefers distance estimates in terms of miles or blocks when traveling to new location		**.55**			
Relies on landmarks when traveling to a familiar location		**.52**			
Locates lost items in the home by retracing steps			**.64**		
Locates lost items in the home by systematically searching each room		**.46**	.58		
Prefers a route in terms of landmarks when obtaining directions to a new location		**.46**	.47		
Prefers a route in terms of left-right when obtaining directions to a new destination		.39	.42		
Uses organizers, such as key hooks, to place often used items			**.46**		
Ascribes to the saying: A place for everything and everything in its place			**.43**		

Can find way through own home with eyes closed			**.42**	.41	
Can locate any familiar room in own home				**.74**	
Can locate any unfamiliar room in own home				**.67**	
Can find way around area of residence if route and destination are familiar				**.56**	
Locates lost items by asking help of others				**.42**	
Exemplifies the saying: Could not find way out of a paper bag					**.60**
Personifies the saying: Out of sight, out of mind					**.60**
Focuses on things that are physically present and visible					**.47**
Can look right at something, like an item in the closet, and not see it.					**.42**
Rotation Eigen value	6.61	4.82	3.35	3.29	1.76
Percentage explained variance (total = 62.62)	17.38	12.68	9.28	8.66	4.62
Number of items used in subscale	12	9	4	4	4

Note: Bolded loadings indicate items used in subscales for subsequent analyses.

Time 1 and Time 2 for the WES and its subscales were between .006 and .0955; for the prior behavior version, the range of differences was between –.0650 and .1479. On the caregiver version, the mean differences ranged between .0850 and .2033. Differences for the caregiver version were nearly significant ($p = .043$) for the overall WES ($t = 2.097$) and were significant ($p = .006$) on its SWG subscale ($t = 2.913$).

To assess construct validity, correlations among WES subscales and of subscales to the total WES (corrected to exclude relevant subscale) were examined for all versions. Within each version, significant, positive, moderate correlations were anticipated; across versions, the pattern of correlations was expected to be similar. Table 3 shows the *r* values; all correlations were significant ($p < .001$) and in the moderate to high moderate range.

ANOVAs were computed to evaluate whether the WES and its subscales differentiated among participants expected to have normal wayfinding (care recipient's prior behavior and caregiver behavior) and those expected to have poorer wayfinding due to dementia (care recipient's current behavior). Differences were significant for the overall WES ($F = 609.73$) and for all subscales ($F = 452.82$, CWG; $F = 206.41$, AS; $F = 264.43$, GS; and $F = 409.71$, SWG). Post hoc analyses showed that all groups differed from one another on the overall WES and on each subscale. Paired *t* tests were also used to examine differences in means comparing care recipient current behavior with their prior behavior. All differences were significant ($p < .001$) with *t* values between –.29 and .08 for the CWG subscale and –.20 and .060 for the GS subscale.

Discussion

These analyses support an assertion that the 29-item, four-subscale version of the WES is a valid and reliable instrument for estimating wayfinding effectiveness of persons with dementia. Although factor analyses revealed a five-factor structure to the original scale, subsequent analyses suggested that only four subscales (CWG, AS, GS, and SWG) had sufficient internal consistency. The retained factors of the WES reflected underlying dimensions of wayfinding: goals or destinations and problem-solving strategies. Both types of wayfinding strategies, analytic and global, were represented in separate factors. The other two retained factors reflect a combination of distance and familiarity, the two dimensions of goals, at two ends of a continuum. The Complex Wayfinding Goals subscale included items where destinations were far away and either familiar or unfamiliar; the Simple Wayfinding Goals

Table 3
Intercorrelations for Three Versions of Wayfinding Effectiveness Scale (WES) and WES Subscales

Version and Scale	*n*	Complex Wayfinding Goals (CWG)	*n*	Analytic Strategies (AS)	*n*	Global Strategies (GS)	*n*	Simple Wayfinding Goals (SWG)
Care recipient's current behavior								
Overall WES	255	.78	256	.67	257	.67	257	.68
CWG			254	.71	255	.62	257	.66
AS					256	.55	257	.54
GS							257	.59
Care recipient's prior behavior								
Overall WES	255	.78	255	.64	255	.61	255	.74
CWG			255	.65	255	.57	255	.74
AS					255	.46	255	.54
GS							257	.57
Caregiver's behavior								
Overall WES	256	.79	257	.70	257	.72	257	.79
CWG			256	.60	256	.65	256	.82
AS					257	.62	259	.65
GS							258	.64

Note: All correlations significant at $p < .001$.

subscale grouped items wherein the goal was both immediate and familiar, namely, within the home. The deleted SB subscale did not clearly reflect any one concept in the guiding framework. Our results indicate that Kaplan and Kaplan's (1982) framework is a useful one for conceptualizing wayfinding effectiveness among persons with dementia.

Internal consistency reliability of the 29-item WES and its four retained subscales was strong for all versions of the instrument. Alphas were generally stable across versions and consistently exceeded the .70 criterion. From a total of 15 estimates, 5 were between .80 and .89 and another 6 were above .90. Lower than satisfactory internal consistency of the SB subscale may be because items did not reflect discreet behaviors and required greater interpretation by respondents.

Test-retest reliability was also acceptable for the overall WES and at least two of four subscales (CWG and SWG) in the care recipient current behavior version. Correlations between scores at two time points for these scales neared or exceeded .80 and differences between scale means were very small, less than .10 on a 5-point scale. Although the same correlations for AS and GS subscales were only in the moderate range, differences in these scales scores were likewise insignificant and even smaller, less than .05 of 1 point. The lower correlations obtained on these subscales may be due to the fact that they related to goals and as such contain items that are more directly observable by caregivers than items on the AS and GS subscales, where knowledge of a care recipient's current thinking ability is involved. Some caregivers may not have sufficient exposure or skills to make consistent judgments about care recipients' thinking ability. Some may simply have been cued to observe thinking ability by completing the instrument at Time 1, thereby affecting Time 2 ratings. Depending on the goals of a future study, this level of reliability may be acceptable for AS and GS subscales. Because the sample for test-retest reliability was small and the level of cognitive impairment of care recipients was unknown, additional estimates of test-retest reliability, especially for the AS and GS subscales, for this version of the WES are warranted.

Although the WES was developed to measure wayfinding effectiveness in persons with dementia, we point out that test-retest reliability for those without dementia was not acceptable. The most likely explanations for this finding on the care recipient prior behavior version are either faulty recollection by the caregiver or improved recollection following Time 1 testing. However, this finding is particularly puzzling for the caregiver version, where participants reported on their own behavior. The reasons for this are not entirely clear and differences noted in the subset of caregivers used for these analyses do not offer an obvious explanation.

This study also provided strong evidence for the construct validity of the WES. The moderately strong interrelatedness of WES subscales and of subscales to the overall WES, not only the care recipient's current behavior version but in all versions, supports this assertion given the conceptual map and strategy for item generation that we used. Lower scores and significant differences between the overall WES (and WES subscale) scores on the care recipient current behavior version as compared to both other versions also argue for construct validity. On the other hand, significant differences found between care recipient prior behavior and caregiver versions, both of which would represent normal functioning, were not anticipated. This finding may represent faulty recollection on the part of caregivers, a tendency of caregivers to evaluate their own behavior more favorably, and/or better wayfinding abilities of caregivers due to their younger age. Although differences in wayfinding ability of men (as compared to women) is well established (Ernest, 1998), the male advantage is not a likely explanation for this finding as men were underrepresented among caregivers (26%) as compared to care recipients (45%).

Although these initial estimates of the psychometric properties of the WES are promising, caution in using the measure is warranted. Due to methodological limitations, the level of cognitive impairment in the care recipients in this study is unknown. Although it is likely that persons at all levels of cognitive impairment were included, given comparability of care recipient characteristics in this sample to other community samples where a wide range of dementia stages are represented (Baumgarten et al., 1994; Chang, 1999), we advise confirmation of these results and extension of analyses in an independent sample comprised of care recipients whose stage of dementia or level of cognitive impairment is known and whose medical diagnosis is validated.

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