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Verbal test of practical judgment (VPJ): a new test of judgment that predicts functional skills for older adults

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ABSTRACT

Objectives: The clinical assessment of older adults' judgment is important for mitigating safety risks that often precipitate loss of independence. Our national survey of geriatric healthcare providers (N = 496; M years of experience = 17.11 $\pm$ 10.60) indicated that formal judgment tests are underutilized in clinical practice. We developed the Verbal Test of Practical Judgment (VPJ) as a new test of judgment for older adults intended to identify difficulty performing instrumental activities of daily living (IADL).

Method: In two prospective studies, participants were long-term care facility residents (age $\geq$ 50) in Maryland, USA (Study 1, N = 51; Study 2, N = 110) referred to licensed psychologists for neurocognitive and mood evaluation by facility attending physicians. Psychometric analyses were performed to examine the construct validity of the VPJ.

Results: The VPJ evidenced adequate reliability and strong construct validity across both studies. Receiver operating characteristic analysis yielded an optimal VPJ cut score for identifying impaired judgment. The VPJ significantly predicted IADL performance beyond clinician and participant ratings.

Conclusion: The VPJ appears to be a valid tool for assessing judgment among older adults with suspected cognitive impairment. VPJ score inferences can inform clinicians on the odds of requiring assistance for specific IADLs.

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Judgment; cognitive impairment; functional status; long-term care; psychometrics

Executive functioning, conceptualized as the brain's command and control center responsible for cognitive efficiency, is critical for applying knowledge and ability necessary to perform novel and daily tasks (Glisky, 2007; Princotta, Melissa, & Goldstein, 2014). Older adults with executive deficits, as a result of age- or disease-related processes, are more likely to have difficulty successfully completing instrumental activities of daily living (IADL) than cognitively intact peers (Bell-McGinty, Podell, Franzen, Baird, & Williams, 2002; Cahn-Weiner, Boyle, & Malloy, 2002; Jefferson, Paul, Ozonoff, & Cohen, 2009). IADL impairments can precipitate a 'slippery slope' toward loss of independence and residential status due to their association with adverse events such as falls at home (Brown, Kurichi, Xie, Pan, & Stineman, 2014), hospital readmissions (Greysen, Stijacic Cenzer, Auerbach, & Covinsky, 2015), and nursing home placement (Fogel, Hyman, Rock, & Wolf-Klein, 2000). This is consequential because an estimated one in three older adults (age $\geq$ 60) have at least mild executive impairment, while one in six have moderate to severe executive deficits according to a population-based study (Grigsby et al., 2002).

Judgment is considered a key executive function and most neuropsychological batteries assess judgment skills (Strauss, Sherman, & Spreen, 2006; Woods, Patterson, & Whitehouse, 2000). Judgment can be defined as the ability to carefully evaluate a situation, make appropriate decisions, in specific contexts, after careful consideration of available information and possible outcomes (Capucho & Brucki, 2011; Rabin et al., 2007). Judgment impairment can pose safety risks and negatively impact a person's ability to function independently. Clinicians who assess judgment can use this knowledge to inform decisions about diagnosis, cognitive capacity, and treatment interventions (Bertrand & Willis, 1999; Karlawish, Casarett, James, Xie, & Kim, 2005; Kim, Karlawish, & Caine, 2002). This information can also help caregivers prepare and hopefully mitigate risk associated with poor judgment in loved ones who have cognitive impairment (Duke & Kaszniak, 2000).

Despite the potential value of instruments that assess judgment, there appears to be a shortage of ecologically valid ones specifically designed for this purpose (Mansbach, MacDougall, Clark, & Mace, 2014a; Rabin et al., 2007). A survey of neuropsychologists by Rabin, Borgos, and Saykin (2008) highlighted a lack of consensus regarding judgment assessment methods and nearly 90% of the respondents indicated the need for improved instruments. We conducted our own online national survey in a broader sample of geriatric healthcare professionals (N = 496) to investigate their perceptions of current judgment assessment practices. Respondents (M age = 50.05 years $\pm$ 12.82) included speech and occupational therapists, social workers, nurses, and other health care professionals (M geriatrics experience = 17.11 years $\pm$ 10.60) across 38 U.S. states. Most respondents (85%) reported that they routinely assess judgment during the evaluation of their patients; however, only 38% use a formal assessment of judgment (i.e. validated judgment test). Respondents underscored the need (85% agreed) and potential utility (83% agreed) for new judgment instruments that more directly assess specific

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IADL risks in older adults, such as medication errors (93% agreed) and safety at home (81% agreed). Respondents indicated that such instruments could be helpful for identifying at-risk older adults who may benefit from the addition of a home health aide (89% agreed) or caregiver (92% agreed), alternative housing (84% agreed), or ongoing cognitive assessment (83% agreed).

The clinical assessment of older adults' judgment abilities is also limited by weaknesses of available measures; of the five judgment tests most cited in the literature, each is lacking in terms of psychometric properties, ease of administration, and/or generalizability. Woods et al. (2000) found content, statistical, and insensitivity problems with the Judgment Questionnaire subtest of the Neurobehavioral Cognitive State Exam (Northern California Neurobehavioral Group Inc., 1988). The Judgment subtest of the Neuropsychological Assessment Battery (NAB-JDG; Stern & White, 2003) primarily addresses basic safety and hygiene issues rather than higher-level judgment (MacDougall & Mansbach, 2013). Both of these instruments, as well as the Problem Solving Subscale of the Independent Living Scales (Loeb, 1996), are part of larger test batteries which may limit their use by most healthcare professionals. Clinicians may lack the time and training to use larger test batteries; older patients may lack the time, energy, and financial resources to benefit from them. The Test of Practical Judgment (Rabin et al., 2007) may be less appropriate for assessing individuals with more severe cognitive impairment and could be susceptible to educational and cultural influence due to its use of longer sentences and complex scenarios (Durant, Berg, Banks, & Miller, 2017). Also, the Test of Practical Judgment scoring system may be difficult to master for clinicians without advanced training in neuro-cognitive evaluation. Finally, the Kitchen Picture Test (KPT; Mansbach et al., 2014a) does not provide opportunities to assess multiple judgment domains (e.g. medical or financial decisions) and is not appropriate for older adults with visual impairment.

Our primary aim was to develop and validate a new test of practical judgment. We created the Verbal Test of Practical Judgment (VPJ) in response to the need for a brief judgment measure that (1) is appropriate for use across healthcare disciplines, (2) can be administered by professionals and paraprofessionals, (3) adequately predicts specific IADL risks in older adults with suspected or identified cognitive impairment, and (4) is appropriate for older adults with lower levels of education and cognitive functioning. In contrast to traditional neuropsychological (e.g. Wisconsin Card Sorting Test; Heaton, Chelune, Talley, Kay, & Curtiss, 1993) and visually presented (e.g. KPT) judgment tests, the VPJ was designed to be orally administered. Such tests can be advantageous for assessing older adults with visual and/or motor impairments—a frequent occurrence in geriatric care (Killen et al., 2013; Wittich, Phillips, Nasreddine, & Chertkow, 2010). We report findings from two prospective independent VPJ validation studies. In Study 1, we hypothesized that the VPJ would demonstrate strong evidence for reliability and construct validity as a brief measure of judgment. Study 2 was conducted to confirm preliminary evidence for the psychometric properties of the VPJ. Additionally, we hypothesized that the VPJ would demonstrate clinical utility by identifying dementia and increased odds of requiring assistance on specific IADLs.

Method–study 1

Participants and procedures

The purpose of Study 1 was to develop the VPJ and examine its psychometric properties as a test of practical judgment. Participants consisted of 51 older adult residents in Maryland long-term care facilities who were referred to three licensed psychologists between February 2016 and July 2016. Study clinicians had specific expertise in clinical geropsychology and the evaluation of cognitive dysfunction. The referrals were for evaluation of neuro-cognitive and mood functioning by facility attending physicians. Study clinicians administered and scored a battery of cognitive and psychological tests, including the VPJ, to the residents as part of the usual and customary evaluation procedures for such referral questions. The testing battery also included The Brief Cognitive Assessment Tool (BCAT®; Mansbach, MacDougall, & Rosenzweig, 2012), KPT (Mansbach et al., 2014a), NAB-JDG (Stern & White, 2003), and Brief Anxiety and Depression Scale (BADS; Mansbach, Mace, & Clark, 2015), which were administered to investigate the validity of VPJ score inferences. The BCAT, KPT, NAB-JDG, and VPJ were administered by study clinicians and scored based on participants' cognitive performance (i.e. participants did not rate their own cognitive ability). The BADS was scored by study clinicians using participants' self-report of depression and anxiety symptoms. Test administration was counterbalanced by assigning participants to one of two protocols. In protocol A, the order of testing was: BCAT®, KPT, NAB-JDG, BADS, then VPJ. In protocol B, the order of the testing was: VPJ, KPT, NAB-JDG, BADS, then BCAT®. The facilities' Medical Affairs Committee approved all procedures. All participants or their responsible parties completed appropriate consent agreements.

Completion of study measures, proficiency in English, and age $>$ 49 were required for inclusion in the data analysis performed using RStudio 1.0.143 (RStudio RStudio Team, 2016). The majority of participants were skilled nursing (64.0%) or assisted living (30.0%) residents. An additional 6.0% of participants were receiving care services but resided in the 'independent' section within their facility. Participant characteristics are presented in Table 1.

Measures

Verbal practical judgment (VPJ)

Four psychologists with expertise in neurocognitive assessment (the principal investigator and psychologists who evaluated participants in Study 1) and one occupational therapist with extensive experience in evaluating functional impairment collaborated on the VPJ development over a six-month period. They identified ecologically valid functional domains in which practical judgment is expected to play an important role in successful task performance. These domains were food preparation, shopping, managing medications, handling finances, housekeeping chores, doing laundry, using transportation, and telephone use. VPJ items were constructed to simulate everyday scenarios in which older adults with executive dysfunction may demonstrate poor judgment. Each VPJ question is novel and open-ended (concluding with 'what would you do?') to reduce structure posed by the testing environment and decrease the opportunity for 'rehearsed

Table 1. Select demographics and clinical characteristics.

	Study 1 (n = 51)	Study 2 (n = 108)	p
Age	76.58 (SD = 11.20)	78.19 (SD = 11.47)	.41
Gender	Male (23.53%)	Male (41.28%)	.03*
	Female (76.47%)	Female (58.72%)	
Race	European American (82.35%)	European American (95.24%)	.01*
	Black (17.65%)	Black (4.76%)	
Marital	Single (15.69%)	Single (13.08%)	.29
	Married (11.76%)	Married (27.10%)	
	Widowed (52.94%)	Widowed (44.86%)	
	Separated (7.84%)	Separated (4.67%)	
	Divorced (11.76%)	Divorced (10.28%)	
Education	$\leq$ 11 (23.53%)	$\leq$ 11 (22.12)	.04*
	12 (45.10%)	12 (38.46)	
	13–15 (19.61%)	13–15 (16.35)	
	16 (1.96%)	16 (19.23%)	
	$\geq$ 17 (9.80%)	$\geq$ 17 (3.85%)	
Facility	Skilled nursing (62.75%)	Skilled nursing (73.64%)	.09
	Assisted living (37.25%)	Assisted living (26.36%)	
Cognitive category	No dementia (58.82%)	No dementia (70.00%)	.16
	Dementia (41.18%)	Dementia (30.00%)	

Note. *$p < .05$. Cognitive category based on Brief Cognitive Assessment Tool (BCAT®) scores.

responding' that tap implicit memory. Each item was carefully worded to minimize possible education and cultural biases. The VPJ originally contained 16 items. The four psychologists reviewed the VPJ for face and content validity. To increase brevity, each psychologist was asked to individually rank VPJ items for relevance to the construct of practical judgement. The final version of VPJ consisted of the top ten items from the consensus of the psychologists' ratings.

The VPJ is administered as a structured oral interview. Study clinicians asked the participant how they would respond or solve the hypothetical situation posed by each VPJ item. Supplementary Table 1 provides brief descriptions of all VPJ items. Full text of two sample items are included below to illustrate how the VPJ assess practical judgment related to medication management and social situations. Sample item 1: *'Suppose you realize that you accidentally took too much of your medication. You took twice the prescribed dose. What would you do?'* Sample item 2: *'Suppose someone you do not know comes to your door to sell you a magazine subscription. He asks if he can come into your home to tell you about great magazine discounts. What would you do?'*

Total VPJ scores range from 0 to 20, and it can be administered in approximately ten minutes. Beyond identifying potential dangers in each scenario, correct answers on the VPJ require an integrated explanation of how the participant would resolve the situation using practical judgment and decision-making. Eight VPJ items are scored on a zero (incorrect) to two (correct) point scale, with one point awarded for partial credit. Two items use a simple dichotomous scoring (0 = incorrect, 2 = correct) because they require a convergent solution (e.g. determining the correct departure time to arrive promptly for a doctor appointment). To score sample item 1 above: 2 points = contact health care provider to determine if medical assistance is necessary; 1 point = monitor my reactions, call for help if I get sick; and 0 points = do nothing, wait, or other inappropriate response. For sample item 2: 2 points = do not let him inside, ask for written information, inform him that I will contact if interested; 1 point = do not answer (vague response, without gathering more information); 0 points = invite him in and listen to his sales pitch (without considering potential consequences), or other inappropriate response.

Convergent validity

Judgment. The KPT (Mansbach et al., 2014a) and NAB-JDG were used in this study to examine the convergent validity of the VPJ. The KPT is a visually presented (as opposed to the oral administration of the VPJ) performance-based test of basic judgment. Participants are shown a picture of a dangerous kitchen scene and are asked to: (1) identify the problems unfolding (e.g. young boy reaching for a hot pan), (2) rank them in terms of dangerousness, and (3) provide solutions for dangers. In a two-part study (Study 1; N = 99 nursing home residents; Study 2, N = 163 long-term care residents), psychometric analyses indicated robust evidence for reliability and construct validity as a judgment test (Mansbach et al., 2014a). KPT total score (range = 0–8) can be used to differentiate nursing home and assisted living residents with and without dementia (Mansbach et al., 2014a).

The NAB-JDG is an orally administered subtest included in the Executive Functions module of the Neuropsychological Assessment Battery (Stern & White, 2003). The 10-item judgment subtest (score range = 0–20) 'includes a series of questions about home safety, health, and medical issues likely to be encountered in everyday life.' (Stern & White, 2003, p. 30). In the development study, the NAB-JDG demonstrated strong inter-rater reliability and factorial validity within the Executive Function module (Stern & White, 2003). In a sample of residents in assisted-living facilities, the NAB-JDG demonstrated strong internal reliability and significant associations with cognitive functioning and IADLs (MacDougall & Mansbach, 2013).

The internal consistency reliability of the KPT and NAB-JDG, based on Cronbach's alpha of standardized items, was .79 and .61, respectively.

Global cognition. The BCAT® (Mansbach et al., 2012) was similarly used to examine the association between VPJ scores and levels of cognitive functioning. The BCAT® is a 21-item (score range = 0–50) multi-domain cognitive instrument. Cognitive levels were identified based on the BCAT® score ranges: normal = 44–50, mild cognitive impairment (MCI) = 34–43, mild dementia = 25–33, and moderate–severe dementia = 0–24 (MacDougall, Mansbach, Mace, & Clark, 2015; Mansbach et al., 2012; Mansbach, Mace, & Clark, 2014b). It also yields separate factor scores for contextual memory and executive functioning. Psychometric analyses among nursing home and assisted living residents indicated strong evidence for reliability and construct validity (Mansbach & MacDougall, 2012; Mansbach et al., 2014b). The internal consistency reliability of the BCAT® in this sample was .83.

Discriminant validity

Depression and anxiety. The BADS (Mansbach et al., 2015) is a brief self-reported questionnaire (administered in three minutes or less) designed to identify anxiety and depression in long-term care residents. The 8-item scale produces *Anxiety Factor* (range = 0–10) and *Depression Factor* (range = 0–6) scores that are sensitive to generalized anxiety disorder and major depressive episode, respectively (Mansbach et al., 2015). Psychometric analyses on data from long-term care

residents with and without dementia ($N = 224$) suggest strong reliability and construct validity (Mansbach et al., 2015). BADS factor scores are robust to the co-occurrence of cognitive impairment (Mansbach et al., 2015), which is notable given the high rates of dementia in both studies. The internal consistency reliability of the BADS in this sample was .71.

Results–study 1

Reliability

The internal consistency reliability of the VPJ, as estimated by Cronbach's alpha for standardized items, was low (.53). Inter-rater reliability, using the two-way mixed intra-class correlation coefficient (ICC), was estimated for a random subsample of protocols ($n = 39$, 76.5%) that were originally scored by the attending psychologist tester and were then rescored by a different psychologist. The intra-class correlation coefficient for the VPJ (ICC = .99, 95% CI: .97, .99) was excellent (Cicchetti, 1994).

Validity

Table 2 presents descriptive statistics for all validity measures included in this study. VPJ scores were normally distributed (skewness = –.34, kurtosis = –.50). VPJ scores were not significantly associated with age, gender, marital status, education, residential status, counterbalance protocol, or psychologist tester ($ps > .10$). However, European American participants scored significantly higher on the VPJ ($M = 13.29$, $SD = 3.24$) than African American participants ($M = 9.78$, $SD = 2.68$), $t(49) = 2.84$, $p = .01$, $d = 1.18$. This finding may have been influenced by the imbalance of European American participants ($n = 42$) relative to African American participants in Study 1 ($n = 9$). The VPJ was not significantly associated with BADS scores indicative of major depressive episode or generalized anxiety disorder ($ps > .10$). Participants with dementia scored significantly lower on the VPJ ($M = 11.67$, $SD = 3.35$) than those without dementia ($M = 13.67$, $SD = 3.12$), $t(49) = 2.16$, $p = .04$, $d = .62$.

As presented in Table 3, convergent validity was demonstrated for the VPJ by significant and moderate correlations with two tests of judgment: NAB-JDG ($r = .46$, $p < .001$) and KPT ($r = .42$, $p < .001$). The VPJ was also significantly and moderately associated with the BCAT®, a test of global cognition ($r = .48$, $p < .001$). Discriminant validity for the VPJ was demonstrated by the absence of a statistically significant relationship with the BADS anxiety ($r = .03$, $p = .84$) and depression ($r = -.05$, $p = .71$) factors.

Linear multiple regression provided additional evidence for the construct validity of the VPJ. We examined the extent to which the VPJ significantly predicted executive functioning, as measured by the BCAT® executive control factor, relative to other judgment tests (KPT, NAB-JDG). The model explained 32.6% of the variance in executive functioning (F (3, 46) = 8.12, $p < .001$)); the VPJ was the only significant predictor ($\beta = .39$, $p < .001$).

Table 2. Descriptive statistics for study measures.

	M (SD)	Median	Range	Skewness	Kurtosis
Study 1 ($n = 51$)					
VPJ	12.49 (3.37)	12	4–18	–0.34	–0.5
KPT	6.04 (1.83)	6	4–8	–1.39	2.33
NAB-JDG	11.35 (2.73)	11	4–18	–0.01	0.24
BCAT	31.18 (8.03)	33	4–45	–0.3	–0.73
BADS DF	2.49 (1.67)	2	4–6	0.44	–0.47
BADS AF	2.88 (2.18)	3	4–7	0.26	–1.21
Study 2 ($n = 110$)					
VPJ	11.52 (3.90)	11	0–20	–0.12	–0.29
BCAT	26.96 (9.17)	28	4–44	–0.25	–0.75
FAQ	17.32 (7.64)	18.5	0–30	–0.39	–0.83
BADS DF	2.63 (1.88)	2	0–6	0.33	–0.92
BADS AF	3.59 (3.09)	3	0–10	0.47	–0.96

Note. Verbal Test of Practical Judgment (VPJ); Kitchen Picture Test (KPT); Depression (DF) and Anxiety Factor (AF) of the Brief Anxiety and Depression Scale (BADS); Brief Cognitive Assessment Tool (BCAT®); Functional Activities Questionnaire (FAQ).

Table 3. Correlation matrix of study measures.

Measures	1	2	3	4	5	6
1. VPJ	1	0.47*	–0.05	0.03	0.42*	0.46*
2. BCAT	0.65*	1	0.01	–0.03	0.47*	0.62*
3. BADS DF	0.07	0.09	1	0.41*	–0.14	0.1
4. BADS AF	–0.02	0.08	0.49*	1	–0.06	–0.01
5. KPT					1	0.5
6. NAB-JDG						1
7. FAQ	–0.37*	–0.41*	0.16	0.15		

Note. *$p < .001$. Values above and below the diagonal are for Study 1 and Study 2, respectively. Verbal Test of Practical Judgment (VPJ); Kitchen Picture Test (KPT); Depression (DF) and Anxiety Factor (AF) of the Brief Anxiety and Depression Scale (BADS); Brief Cognitive Assessment Tool (BCAT®); Functional Activities Questionnaire (FAQ).

Method–study 2

Participants and procedure

The goals of Study 2 were to: (a) confirm the preliminary evidence for the psychometric properties of the VPJ presented in Study 1 and (b) examine the clinical utility of the VPJ for predicting IADLs. Participants were older adult residents ($N = 110$) in Maryland long-term care facilities referred for an evaluation of current neuro-cognitive and mood functioning. Study clinicians administered several cognitive and psychological tests to participants as part of the usual evaluation procedure for such referral questions. Similar to Study 1, the testing battery included the VPJ, BCAT®, and BADS. Additionally, the Functional Activities Questionnaire (FAQ; Pfeffer, Kurosaki, Harrah, Chance, & Filos, 1982) was administered to investigate the ability of the VPJ to predict IADLs. This was predicated on the consensus from survey respondents regarding the importance of identifying older adults at risk for adverse outcomes associated with functional difficulties (e.g. medication mismanagement).

Four licensed clinical psychologists administered and scored all of the testing. The study clinicians had expertise in clinical geropsychology and cognitive evaluations. As in Study 1, the BCAT and VPJ were scored based on cognitive performance while the BADS used participant self-report of mood and anxiety symptoms. FAQ was scored by study clinicians based on informant report of participant's IADLs. Possible informants included facility rehabilitation therapists or other staff members, caregivers, or family members knowledgeable of the participant's functional ability. Test administration was counterbalanced by assigning participants to one of two protocols. In protocol C, the order of testing was: BCAT®, VPJ, BADS, FAQ. In protocol D, the order of the testing was: BCAT®, BADS, FAQ, VPJ. The facilities' Medical Affairs Committee approved all procedures; all participants or their responsible parties completed informed consent. Completion of all study

measures, proficiency in English, and age > 49 were required for inclusion in the data analysis. Participant characteristics are presented in Table 1.

Measures

Instrumental activities of daily living (IADL). The FAQ (Pfeffer et al., 1982) is a functional assessment commonly used in long-term care and research to examine the relationship between cognition and IADLs (Marshall et al., 2015; Teng et al., 2010). Informants are asked to rate the older adult's functional ability to complete each of the 10 IADL items (see Table 5 for the IADLs assessed), with higher total scores indicating greater IADL impairment. FAQ items were also dichotomized (can do independently or with some difficulty = 0, requires assistance from others or is fully dependent, = 1; range 0–10) to identify participants that require support in performing *specific* IADLs. Both scoring methods are equally valid for assessing IADL impairment (Vittengl, White, McGovern, & Morton, 2006). Psychometric analyses have demonstrated the utility of the FAQ for detecting cognitive impairment (Castilla-Rilo et al., 2007; Teng et al., 2010).

Prior to and separate from FAQ administration, clinicians and participants provided their own perceptions of participants' IADL functioning. Study clinicians were asked: 'Do you think that cognitive problems prevent the participant from independently managing IADLs?' Study clinicians were instructed to provide the IADL ratings (0 = no, 1 = yes) solely based on information obtained during the clinical interview (i.e. without knowledge of scores on the VPJ or other supplementary measures). Participants were also asked: 'Do you have concerns about your abilities to perform everyday tasks like handling your medications, preparing food, shopping, housekeeping, laundry, managing medication, and handling finances? (0 = no; 1 = yes).' These ratings were collected to determine whether the VPJ, as a formal judgment test, can predict IADLs (FAQ scores) beyond clinician and participant perceptions of functioning.

Results–study 2

Pre-analysis

Descriptive statistics for the study measures are included in Table 2. VPJ scores were normally distributed (skewness = –.11, kurtosis = –.28). Several preliminary analyses were conducted to explore the relationships among participant characteristics and to descriptively compare the two study samples. VPJ scores were not significantly associated with gender, race, marital status, education, residential status, counterbalance protocol, or licensed clinician tester (*ps* > .05). Increasing age was significantly and moderately associated with worse performance on the VPJ ($r = -0.41$, $p < 0.001$). Study 2 had a significantly greater proportion of males (Study 1, 23.5%; Study 2, 41.2%), European Americans (Study 1, 82.3%; Study 2, 95.2%), and college graduates (Study 1, 11.8%; Study 2, 23.1%) relative to Study 1. The two study samples did not significantly differ with respect to age, marital status, cognitive category (BCAT®), depression and anxiety (BADS), or VPJ scores (*ps* > 0.10).

Reliability

The internal consistency reliability of the VPJ in Study 2 (Cronbach's alpha = .68) was higher than Study 1 and within the acceptable range (.60–.80) recommended by Nunnally and Bernstein (1994) for clinical decision-making. Supplementary Table 1 presents additional item-level reliability statistics for the VPJ in Study 2.

Validity

As presented in Table 3, Study 2 confirmed the evidence for convergent and discriminant validity of the VPJ found in Study 1. The VPJ was significantly and moderately correlated with cognitive functioning, as measured by the BCAT® ($r = .65$, $p < .001$). A one-way analysis of variance revealed that mean VPJ scores significantly differed across levels of cognitive functioning based on the BCAT®; $F(2, 107) = 37.92$, $p < 0.001$. The effect size for these differences was large (partial $\eta^2 = .41$). Multiple comparisons using Tukey's test indicated significant differences in VPJ scores between participants without dementia (including MCI), mild dementia, and moderate–severe dementia based BCAT score ranges (*ps* < .001). The VPJ was not significantly associated with the BADS anxiety ($r = -.04$, $p = .80$) and depression ($r = .05$, $p = .45$) factors.

We examined the predictive utility of a measure of practical judgment (VPJ scores) to identify participants with suspected dementia via analyses of sensitivity, specificity, positive predictive value, and negative predictive value. A VPJ cut score of 12 (i.e. scores 12 and below) yielded the optimal balance of sensitivity (.81) and specificity (.88) for detecting impaired judgment consistent with probable dementia on the BCAT® (positive predictive value = .94, negative predictive value = .66). A receiver operating characteristic curve, calculated from sensitivity and 1-specificity values, is presented in Figure 1. The area under the curve for impaired judgment as a predictor of dementia was .87 (95% CI: .79, .94). Table 4 presents psychometric properties for alternative VPJ cut scores.

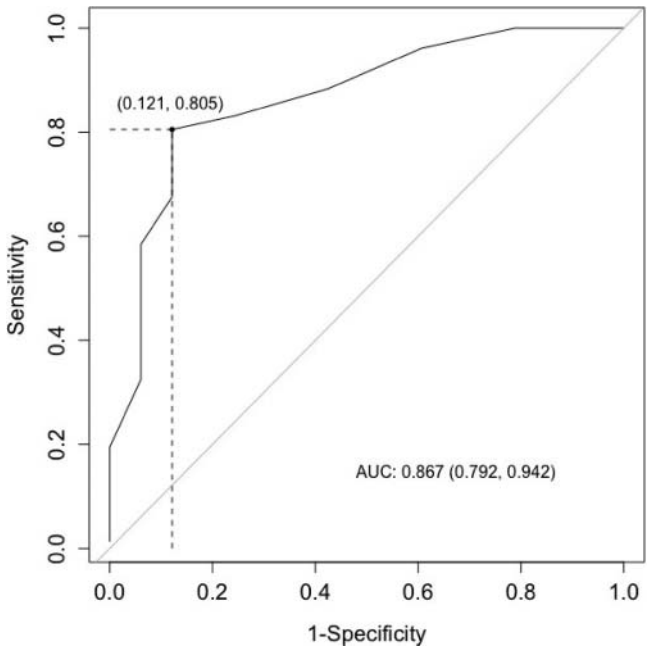

Figure 1. Receiver operating characteristic (ROC) and area under the curve (AUC) were calculated from sensitivity and 1- specificity values for the VPJ in identifying impaired judgment consistent with dementia.

Table 4. Predictive utility of several VPJ cut scores.

Cut score	Sensitivity	Specificity	PPV	NPV
10	.58 (.47, .69)	.94 (.78, .99)	.96 (.84, .99)	.49 (.37, .62)
11	.68 (.56, .78)	.88 (.71, .96)	.93 (.82, .98)	.54 (.40, .67)
12	**.81 (.70, .88)**	**.88 (.71, .96)**	**.94(.84, .98)**	**.66 (.50, .79)**
13	.83 (.72, .90)	.76 (.57, .88)	.89 (.79, .95)	.66 (.49, .80)
14	.88 (.78, .94)	.57 (.39, .74)	.83 (.73, .90)	.68 (.48, .83)

Note. PPV (Positive Predictive Value); Negative Predictive Value (NPV). 95% confidence interval in parentheses. The VPJ cut score with the optimal balance of sensitivity, specificity, PPV, and NPV for identifying participants with dementia is bolded. Area Under the Curve = .87.

Judgment and IADLs

Study 2 also provided preliminary evidence on the relationship between IADL functioning and judgment, as measured by the VPJ. Greater severity of judgment impairment on the VPJ was significantly and moderately associated with increased need for IADL assistance based on the FAQ (r = –.37, $p < .001$). According to ratings from licensed clinician testers, participants with cognitive issues that prevented them from independently managing IADLs scored significantly lower on the VPJ (M = 10.64, SD = 3.73) relative to those that do not (M = 15.10, SD = 3.18); $t(89) = 3.62$, $p < .001$. The effect size for this difference was large (d = 1.29). Participants with concerns about their ability to independently perform IADLs scored significantly lower on the VPJ (M = 10.69, SD = 4.07) compared to those without concerns about their functional ability (M = 12.29, SD = 3.36), $t(90) = 1.94$, $p = 0.04$, $d = 0.42$.

A hierarchical multiple regression analysis evidenced the incremental validity of the VPJ in significantly predicting IADL functioning (FAQ scores) over clinician and participant ratings. Pre-analysis revealed that none of the participant characteristics were significantly associated with FAQ scores ($ps > .10$); consequently, they were excluded from the model. As presented in Table 5, participant and clinician ratings (dummy coded) were entered at Step 1, explaining 7.61% of the variance in IADL functioning (R^2 = .08, $F(2, 80) = 4.38$, $p = .02$). Only the clinician rating significantly predicted IADL functioning at Step 1 (β = .23, $p < .001$). After entry of the VPJ at Step 2, the total variance in IADL functioning explained by the model was 23.29% (R^2 = .24, $F(3, 79) = 9.30$, $p < .001$). The VPJ significantly accounted for an additional 15.68% of the variance in IADL functioning beyond participant and clinician ratings (R^2 change = .16, F change = 4.92, $p < .001$). In the final model, only the VPJ significantly predicted IADL functioning (β = –.44, $p < .001$).

Finally, we examined the clinical utility of the VPJ cut score for identifying increased odds of requiring assistance on *specific* IADLs. As presented in Table 6, the proportion of participants classified as requiring assistance was significantly different between the VPJ cut score for nine of the 10 IADLs assessed by the FAQ ($ps < 0.05$). Participants who scored below the VPJ cut off (i.e. indicating impaired judgment) had significantly greater odds of requiring assistance tracking current events (odds ratio = 6.10), traveling (odds ratio = 6.06), tracking media (odds ratio = 5.34), managing taxes and other financial paperwork (odds ratio = 4.22), remembering events/medication (odds ratio = 3.49), shopping (odds ratio = 4.08), stove use (odds ratio = 3.43), bill payment and checkbook balancing (odds ratio = 3.22), and playing a game of skill (odds ratio = 3.05) relative to those that scored above the VPJ cutoff.

Table 6. Odds ratios for requiring assistance on IADLs by cognitive category.

IADL	*OR (CI)*	*p*
1. Bills/checkbook	3.22 (1.33, 8.11)	0.013
2. Taxes/financial paperwork	4.22 (1.49, 13.31)	0.008
3. Shopping	4.08 (1.34, 14.25)	0.013
4. Games	3.05 (1.32, 7.52)	0.009
5. Stove	3.43 (1.51, 8.26)	0.003
6. Cooking	1.92 (0.75, 4.98)	0.229
7. Current events	6.10 (2.27, 19.85)	< 0.001
8. Tracking media	5.34 (1.84, 20.00)	0.002
9. Remembering	3.49 (1.50, 8.42)	0.005
10. Traveling	6.06 (1.68, 29.93)	0.005

Note. Instrumental activity of daily living (IADL) correspond to dichotomized Functional Activities Questionnaire (FAQ) items. Values represent the odds ratio (OR) and 95% confidence intervals (CI) of requiring assistance on each IADL associated with impaired judgment (VPJ scores 12 and below). Fisher's exact test used to test statistical significance (p).

Discussion

We developed the VPJ to address an important clinical need for a judgment test that can be used across the healthcare spectrum, by professionals and paraprofessionals, written in unbiased language and that adequately predicts IADL risks in older adults. Across two independent and prospective studies, the VPJ demonstrated adequate reliability and strong construct validity. VPJ inter-rater reliability was excellent and in Study 1. Internal consistency reliability was initially low, but comparable to estimates reported for other judgment measures (Stern & White, 2003). Rabin et al. (2007) argued that lower estimates of internal consistency reliability are expected for brief instruments that tap into multiple judgment domains, which may explain the relatively low VPJ reliability estimate in Study 1. In the larger sample of Study 2, internal consistency improved and fell within the acceptable range (.60–.80) recommended by Nunnally and Bernstein (1994) for clinical decision-making.

Table 5. Summary of a hierarchical regression for predicting IADL functioning.

	B	*SE*	β	*t*	*p*-value	F (df)	adjusted R^2
Step 1						4.38 (2, 80)	0.08
(Intercept)	10.19	2.49	–	4.09	< 0.001*		
Clinician rating	5.59	2.60	0.23	2.15	0.03*		
Participant rating	2.79	1.77	0.17	1.57	0.12		
Step 2						9.30 (3, 79)	0.23
(Intercept)	23.58	3.93	–	5.99	< 0.001*		
Clinician rating	2.03	2.51	0.08	0.81	0.42		
Participant rating	1.81	1.63	0.11	1.11	0.27		
VPJ	–0.86	0.21	–0.44	–4.17	< 0.001*		

Note. Clinician and participant ratings (dummy coded: 0 = no, 1 = yes) of instrumental activities of daily living (IADL) predicting Functional Activities Questionnaire (FAQ) scores (Step 1). The Verbal Test of Practical Judgment (VPJ) at Step 2 significantly accounted for an additional 15.68% of the variance in FAQ scores (R^2 change = .16, F change = 4.92, $p < .001$). Unstandardized regression coefficient (B), standardized beta (β), standard error (SE), t-statistic (t), F-ratio (F), degrees of freedom (df), multiple correlation coefficient (R).

Both studies evidenced strong construct validity for the VPJ as a judgment test. Convergent and discriminant validity was demonstrated through significant associations for the VPJ with measures of cognition and non-significant associations with a measure of depression and anxiety. The VPJ also significantly predicted participants' executive functioning over and above two other judgment measures: the KPT and NAB-JDG. This finding may reflect the emphasis of higher-order judgment skills on VPJ items relative to the NAB-JDG, which emphasizes basic safety and hygiene issues (MacDougall & Mansbach, 2013). The KPT, a visually-administered test of basic judgment, may be less sensitive to the different aspects of executive abilities captured by the BCAT® executive function factor (working memory, set-shifting, manipulation, basic judgment) relative to the VPJ.

Study 2 evidenced a significant association between the VPJ and overall IADL functioning based on informant ratings. Participants with lower VPJ scores had greater IADL impairment (i.e. higher FAQ scores), whereas participants with higher VPJ scores had greater IADL independence. Our study builds upon previous research that found a significant relationship between tests of judgment/problem-solving abilities and functional status (Mayo et al., 2013). Whereas, Mayo et al. (2013) based their finding on a subjective rating scale (Clinical Dementia Rating, Judgment and Problem-Solving), our findings were derived from a formal and performance-based test of judgment.

Participant ratings of their IADL functioning did not significantly predict FAQ scores in the first step of the Study 2 hierarchical regression model. This finding may reflect diminished awareness of ability present in dementia (Feher, Mahurin, Inbody, Crook, & Pirozzolo, 1991; Sevush, 1999), which highlights the importance of multimodal assessment of IADL functioning in care settings with high base rates of cognitive impairment. The incremental validity of the VPJ was further underscored by its ability to predict IADL functioning beyond clinician and participant ratings. Our findings suggest that the VPJ could enhance, not replace, the clinician's assessment of a patient's functional ability. Accurate prediction of IADL difficulties by a formal judgment test, such as the VPJ, could offer providers in post-acute care settings a reliable and valid method for identifying patients with post-discharge functional vulnerabilities. Identifying such at-risk patients is critical because cognitive impairment and functional dependencies complicate post-acute outcomes for older adults (Greysen et al., 2015; Mathews, Arnold, & Epperson, 2014). For long-term care residents, identification of decline in judgment and IADL impairment by the VPJ may support decisions to escalate levels of supervision and care.

Receiver operating characteristic curve analysis yielded a VPJ cut score (12 and below) that had optimal balance of sensitivity and specificity for identifying impaired judgment consistent with dementia. The clinical utility of the VPJ cut score is further underscored by its association with *specific* IADLs. Compared to participants with VPJ scores above the cutoff, those with VPJ scores below the cutoff had significantly higher odds of requiring assistance on nine of 10 IADLs. The IADL outlier category was 'meal preparation.' One possible explanation for this outlier is that successful meal preparation may be challenging for older adults with varying degrees of cognitive impairment as this functional task requires a plurality of intact processes. Yantz, Johnson-Greene, Higginson, and Emmerson (2010) found that successful cooking performance was related not only to overall cognitive performance, but also required adequate delayed verbal memory, simple auditory attention, and visuospatial skills.

Preliminary evidence suggested that VPJ score inferences can inform clinicians on the odds of requiring assistance on specific IADLs. This information can be used to plan treatment in a more efficient manner and advise caregivers as to which IADLs to target. For those who score below the VPJ cut score, we identified three categories in which the odds of needing assistance are at least 5 times (i.e. large effect) that of those who score above the cut score. These categories are *keeping track of current events*, *traveling out of the neighborhood*, and *paying attention to, understanding, discussing TV, books, and magazines*. These odd ratios are consistent with previous research on the association between cognition and performance on specific IADLs. In investigating the utility of the FAQ to identify MCI and dementia, Teng et al. (2010) reported that tracking current events and traveling out of the neighborhood were two of the three FAQ items that were significant differentiators. Future studies should clarify relationships between judgment tests and requiring assistance on specific IADLs, and additional research is needed to replicate the odds ratios found in Study 2.

Several study limitations warrant further discussion. Our sample was predominantly comprised of European American participants; VPJ research in ethnically and racially diverse samples is needed before generalizing to multicultural populations. A strength of the study was that both samples were educationally diverse and we did not find an education bias for the VPJ—a common limitation of other judgment tests (Durant et al., 2017). Second, IADL skills were not assessed by 'objective' methods, such as direct observation or performance-based measures. We selected the FAQ for this study because it can be easily administered without special equipment and training, thereby making the questionnaire more appropriate for clinical applications (Royall et al., 2007). Future studies should compare both rater- and objective-report formats because they may make unique contributions to ecologically valid functional assessments (Glass, 1998). Similarly, VPJ score inferences are based on responses to questions posed in clinical situations. As is the case with other cognitive instruments, one cannot always know how people with respond in real-time to everyday situations. Finally, participants in both studies came from long-term care facilities. These settings have a higher base rate of cognitive and functional impairment than most community samples. An important next step is to attempt to cross-validate the VPJ in a community sample.

Despite these limitations, the VPJ appears to be a reliable and valid tool for assessing judgment and predicting IADLs among older adults with suspected cognitive impairment. The oral administration of the VPJ enhances the accessibility of judgment assessment for older adults with visual and motor impairments. From a clinical perspective, we recommend the use of the VPJ to assess practical judgment. A specific application of the VPJ is to improve discharge planning for post-acute patients who are returning to the community. Care facilities are increasingly focused on 'transitions in care' because a sizeable number of residents, with and without cognitive and functional limitations, leave care homes and may subsequently return to them. Based on our findings, the VPJ can be used to identify the odds of specific IADL risks and help ensure that protective measures can be put in place with

the aim of preventing hospital readmission and adverse events associated with cognitive impairment. We suggest that the VPJ be used to strengthen more subjective clinical observations of judgment as it demonstrated incremental validity in the present study.

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