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Informant report of practical judgment ability in a clinical sample of older adults with subjective cognitive decline, mild cognitive impairment, and dementia

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ABSTRACT
Despite the importance of capturing problems with judgment and decision-making during neuropsychological evaluations of older adults, there are a limited number of validated measures and no informant rating scales. We developed an informant measure that captures compromised judgment related to safety, medical, financial, and social-ethical issues. After item refinement and piloting in a memory disorders clinic, we utilized the Test of Practical Judgment-Informant (TOP-J-Informant) at two clinics in the Midwestern U.S., including 189 patient/informant dyads (mean age = 79.0, median years of education = 13, % female = 67.7) with various preclinical and clinical dementia conditions. We found psychometric support, including evidence for convergent, divergent, and criterion-related validity, and internal consistency. Importantly, we were able to discriminate between diagnostic groups in the expected direction. The TOP-J-Informant is brief (<5 minutes), easy to administer, and can reveal areas of concern related to poor judgment when administered in the context of a neuropsychological evaluation or clinic visit.

KEYWORDS
Judgment; older adults; informant report; instrument validation; Alzheimer’s disease; mild cognitive impairment; questionnaire; neuropsychological assessment; Test of Practical Judgment

Introduction
Informant report of older adults’ cognitive and adaptive abilities is a crucial component of neuropsychological evaluations. In contrast to objective neuropsychological performance, which may represent a time-limited, “snapshot” of cognitive functioning obtained within a controlled clinical or laboratory setting, informant report by someone who knows an individual well provides valuable information about changes in relevant, ecologically salient capacities (Galvin, 2018). Informant screens are relatively brief and inexpensive, and successfully discriminate between healthy aging, subjective cognitive decline (SCD), mild cognitive impairment (MCI; Ryu et al., 2019), and degree of dementia severity (Neri et al., 2001; Rueda et al., 2015). In SCD, conceptualized as a possible pre-MCI condition (Jessen et al., 2014), self-reported cognitive concerns tend to precede (Caselli et al., 2014) and are elevated relative to those reported by informants (Mulligan et al., 2016; Ryu et al.,
In preclinical dementia stages, informant report may also be more predictive than self-report of incident cognitive decline (Nicholas et al., 2017; Numbers et al., 2020; Risacher et al., 2013), MCI (Caselli et al., 2014), and dementia (Edmonds et al., 2018; Numbers et al., 2020; Rabin, Wang et al., 2012; Risacher et al., 2013). Additionally, relative to self-assessment, informant screens may be more strongly correlated with objective cognitive scores (Edmonds et al., 2018; Farias et al., 2005; Fyock & Hampstead, 2015; Rueda et al., 2015; Slavin et al., 2010). Informant reported cognitive or functional issues are sensitive to positive cerebrospinal fluid Alzheimer’s disease (AD) biomarkers (Edmonds et al., 2014; Rueda et al., 2015), global brain atrophy (Rueda et al., 2015), larger ventricular volume (Rueda et al., 2015), hippocampal (Fyock & Hampstead, 2015; Rueda et al., 2015) and amygdala (Fyock & Hampstead, 2015) atrophy, and diminished whole brain functional connectivity in individuals without objective cognitive impairment (Dong et al., 2018). Taken together, informant report plays an important role in dementia evaluations, serving both as an early marker of functional decline and insidious neural changes, as well as a crucial measure of cognition and function in later disease stages when insight is diminished.

Informant perception of an older adult’s cognitive or adaptive daily functioning may be sensitive to and influenced by executive function abilities. Declines in executive functioning are common in normal aging (Fjell et al., 2017; Kirova et al., 2015; Lezak et al., 2012; Oosterman et al., 2010; Singh-Manoux et al., 2012; Wecker et al., 2005), present in early neurodegenerative processes (Ho & Nation, 2018; Kirova et al., 2015; Seo et al., 2016; Sudo et al., 2017), and frequently impaired in more advanced dementia (Duke & Kaszniak, 2000; Gansler et al., 2016; Guarino et al., 2019; Ramanan et al., 2017; Voss & Bullock, 2004). There is evidence that informant reports of functional problems are closely associated with impairments in executive functioning (Mulligan et al., 2016; Rueda et al., 2015), and that informant reports of executive functioning may portend clinical progression in older adults without dementia (Rabin, Saykin et al., 2010; Rabin, Wang et al., 2012).

An important aspect of executive functioning, practical judgment ability, is highly relevant to real world adaptive capacities in older adulthood, such as avoiding potentially unsafe situations or scams, making sound financial and medical decisions, or engaging in socially appropriate behavior (Rabin, Borgos et al., 2007; Quinn et al., 2018). Making sound judgments requires the ability to appraise information relevant to a novel situation and formulate conclusions based on thoughtful consideration (Rabin, Borgos et al., 2007). Practical judgment may be compromised even in older adults with intact neuropsychological functioning or in preclinical disease stages (Han et al., 2016; Stewart et al., 2018). Such individuals may exercise poor judgment in daily life and/or become susceptible to problematic reasoning and decision-making (Denburg et al., 2007; Löckenhoff, 2018; Peters et al., 2000).

Identifying older adults at risk for exercising poor judgment is crucial to preventing possible exploitation and abuse (Gatz et al., 2016). Additionally, information derived from judgment evaluations informs diagnosis and provides an objective understanding of safety and
functional competence, including the ability to live independently (American Psychiatric Association [APA], 2013; Kim et al., 2002; Quinn et al., 2018). These data may be helpful to family members and loved ones who must prepare for possible changes in an individual’s functional and decision-making capacities (Hanks et al., 1999). Because traditional, performance-based measures of executive functions are often limited in ecological validity, clinicians and researchers commonly rely upon self- and informant rating scales (Isquith et al., 2013; Meltzer et al., 2017) to provide both unique and corroborative information about executive functions as they pertain to everyday experiences (Isquith et al., 2013; McAuley et al., 2010; Toplak et al., 2012).

Lapses in judgment and decline in pragmatic executive functioning may be readily apparent to informants who know an individual well. However, there are only a few informant report measures that focus on executive functioning in adults (with some support for their use in older adult populations): the Frontal Systems Behavior Scale (FrSBe; Stout et al., 2003) and Behavioral Rating Inventory of Executive Function-Adult version (BRIEF-A; Roth et al., 2005). Other informant measures, which may be useful for gathering clinically relevant information, include items related to executive functioning, such as the: AD8 (Galvin et al., 2005), Brief Informant Form of Neurobehavioral Symptomatology (BINS; Paré et al., 2020); Cambridge Behavioural Inventory (CBI-revised; Wear et al., 2008), Cognitive Change Index (CCI; Ratanabannakit et al., 2016); Measurement of Everyday Cognition (ECog; Farias et al., 2008), and Subjective Cognitive Decline Questionnaire (SCD-Q; Rami et al., 2014). However, while these measures contain items that relate to judgment, planning, and/or problem solving, to our knowledge, there are no informant measures that comprehensively assess everyday judgment and related skills. Given that intact judgment is central for functional independence and safety in older adulthood, and informant reporting increasingly corresponds with objective cognitive functioning as the disease progresses (Edmonds et al., 2018), an informant measure of practical judgment would provide clinically valuable information.

The current study introduces an informant-rating measure that taps into everyday judgment problems commonly faced by older adults. The test was developed to accompany the previously validated, objective Test of Practical Judgment (TOP-J, Rabin, Borgos et al., 2007; Rabin, Saykin et al., 2009), which assesses judgment related to safety, medical, financial, and social/ethical issues. In the current study, we describe the process of developing the Test of Practical Judgment Informant Form (i.e., TOP-J-Informant), provide initial psychometric support, and illustrate how the measure performs in patient groups across the dementia continuum.

**Methods**

**Measure development and study procedures**

To create the TOP-J-Informant, an initial group of 25 Likert scale and 5 open-ended items was generated by authors (LR, CQ), after reviewing published cognitive self- and informant report questionnaires and the neuropsychological literature on judgment in older adult populations (identified through searching PsycInfo and PubMed databases). We generated items that: (1) tapped important aspects of practical judgment and related constructs such as problem solving, planning, and decision-making; and (2) were similar in content to items on the objective TOP-J. We attempted to create item stems that would be easy to understand, with
simple, clear, and unambiguous wording. Items initially consisted of a stem and seven possible response options, ranging from 1 = *above average ability* to 7 = *severe difficulty*.

We presented the initial version of the measure to two doctoral-level neuropsychologists (including author NP) and one neuropsychology doctoral student, who reviewed the content and wording of items. In addition, we tested the items for comprehension on a small group of informant volunteers (n = 8) of patients assessed at a geriatric clinic housed in a private hospital in the Midwestern U.S. These informants were family members who had accompanied patients to their neuropsychological assessment and agreed to provide informal feedback about a newly developed measure. Based on these responses, we discarded items deemed to be potentially confusing, irrelevant, or redundant. We then retained 12 Likert scale and five open-ended items. The form was then administered to an additional 66 informants at the geriatric clinic (as part of clinical care). Response patterns were reviewed for further refinement. We also requested feedback about item content and the overall length of the measure from the supervising neuropsychologist, bachelor level neuropsychology technicians, and post-doctoral fellows.

During this development period, we undertook item revision, added new items, and modified scoring criteria. The resulting measure contained 15 Likert scale items that ranged from 0 = *normal ability/ almost never a problem*; 1 = *mild difficulty/sometimes a problem*; 2 = *moderate difficulty/ often a problem* to 3 = *severe difficulty/ almost always a problem*. The total range for the quantitative portion of the measure was 0–45, identical to range of the 15-item version of the TOP-J, with higher scores indicating more severe judgment difficulties or problems. We also added descriptive items to the beginning of the measure that asked informants to report their relation to the patient (spouse, child, friend, caregiver, other), approximate number of years they have known the patient, and approximate hours per week spent with the patient. We retained one open-ended question that may be useful in clinical settings – i.e., *Please describe any other recent situations in which you felt the patient/participant’s judgment was compromised.*

As appropriate for clinical care, the TOP-J-Informant was included in test batteries at the geriatric clinic (described above) and at a neuropsychology clinic affiliated with an academic/university medical center in the Midwestern U.S. Because clinically relevant data were collected, the IRB considered the process part of clinical care. To be included in retrospective data analyses, patients were diagnosed with SCD, MCI, or dementia, were 60 years of age or older, and fluent in English. Informants included family members, friends, and caregivers who had accompanied the patient to the testing session. Informants were excluded if they were not able to answer questions about the patients’ judgment ability. At both clinical sites, informants completed the TOP-J-Informant while the patient was undergoing neuropsychological assessment.

**Clinical measures**

Because data were retrospective and gathered across two different clinical settings with varying referral questions, neuropsychological test batteries varied across patients. All patients received the TOP-J and had informants who completed the TOP-J-Informant. Additional tests available for most patients and included in our analyses were: the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS, Randolph,
1998), and Letter and Category Fluency from the Delis–Kaplan Executive Function System (D-KEFS; Delis et al., 2001).

We gathered basic demographic information (age, gender, race/ethnicity, years of education) from patients; these data were not available for informants. In addition to the TOP-J-Informant, informants completed the Brief Informant Form of Neurobehavioral Symptomatology (BINS; Paré et al., 2020), which consists of 24 Likert items related to cognitive change over the past 2 years, ranging from 0–3 points per item (0–27 in total). Response options include: 0 = never/no change; 1 = occasional/mild change; 2 = often/noticeable change; 3 = very often/severe problem/much worse. The BINS has shown preliminary evidence of reliability, convergent validity, and criterion-related validity including the ability to distinguish between diagnostic groups (in a sample of older adults with various neurodegenerative diseases) (Paré et al., 2020). An additional 14 open-ended BINS questions inquire about personality, behavior changes, and basic and instrumental ADLs.

**Diagnostic classification**

All patients completed a comprehensive clinical assessment that included a neuropsychological test battery. Diagnoses for patients seen at the geriatric clinic were established through case review by a multidisciplinary care team (geriatricians, geriatric neuropsychologists, social workers, geriatric nurse). Diagnoses for patients seen in the neuropsychology clinic were established by the neuropsychologist in conjunction with the referring neurologist. Clinical groups included SCD, MCI, vascular dementia (VaD), AD (including AD and mixed AD/VaD – i.e., AD+VaD), behavioral variant frontotemporal dementia (bvFTD) with and without a comorbid process such as VaD, parkinsonism, and primary progressive aphasia. Information derived from the TOP-J-Informant was not used in the classification process.

Generally consistent with Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria for major neurocognitive disorder (APA, 2013), patients were classified as having dementia, if: (1) there was substantial cognitive impairment – i.e., scores at least 2 standard deviations below the age- and years of education appropriate normative mean on at least 2 different cognitive tests from two or more domains (possible cognitive domains included memory, executive function, language, attention, and visuospatial ability); (2) the patient or informant reported changes in cognitive function during the clinical interview or on the BINS; (3) there was evidence of functional decline based on patient and informant report such that the individual requires assistance with daily life activities; and (4) cognitive impairment was not better accounted for by the effects of a substance or medication.

More specifically, individuals were classified as VaD if they had: (1) evidence of focal neurological signs; (2) evidence of cerebrovascular disease on imaging; and (3) and a subcortical pattern of cognitive impairment (Román et al., 1993). Conversely, individuals were classified as having mixed dementia if they met the two first criteria consistent with VaD but exhibited a pattern of cognitive impairment similar to AD. In order to be classified as dementia due to AD, and consistent with the classic, amnestic presentation (McKhann et al., 2011), impairment in memory functions, and specifically scores at least 1.6 SD below the mean on at least one test of delayed recall, was required. Behavioral variant FTD was diagnosed when individuals classified as having dementia presented initially with changes in personality, social

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**TABLE 1:**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCD</td>
<td>Substantial cognitive impairment across at least 2 domains</td>
</tr>
<tr>
<td>MCI</td>
<td>Similar to SCD but with no evidence of functional decline</td>
</tr>
<tr>
<td>VaD</td>
<td>Evidence of cerebrovascular disease on imaging</td>
</tr>
<tr>
<td>AD</td>
<td>Evidence of functional decline based on patient and informant report</td>
</tr>
<tr>
<td>AD+VaD</td>
<td>Evidence of both AD and VaD</td>
</tr>
<tr>
<td>bvFTD</td>
<td>Evidence of behavioral variant FTD</td>
</tr>
</tbody>
</table>

---

**FIGURE 1:**

Diagram showing the diagnostic flowchart with the primary neurocognitive disorders: SCD, MCI, VaD, AD, AD+VaD, and bvFTD.
comportment, and cognition, as well as with a predominant pattern of executive dysfunction on neuropsychological testing (Rascovsky et al., 2011).

Patients were classified as MCI, generally consistent with criteria set forth by DSM-5 for mild neurocognitive disorder (Stokin et al., 2015) if: (1) cognitive performance was below the expected range based on all available information from the clinical assessment (neuropsychological test performance, interview with the patient and informant, clinical judgment of multidisciplinary team). We specifically required scores on at least two different cognitive tests from the clinical battery to be at least 1.6 SD below the age- and education appropriate normative mean (possible domains included memory, executive function, language, attention, and visuospatial ability); (2) there was a decline in cognitive performance from baseline as reported by the individual or informant, or observed change on longitudinal testing (previous test scores were only available for approximately 5% of patients); and (3) the individual performed daily life activities (ADL) independently, though there may be detectable but mild functional impact on complex, instrumental activities (IADL), either self- or informant-reported.

The syndromal staging of cognitive impairment, independent of biomarker profiles, accounts for a subset of cognitively unimpaired individuals who report subjective cognitive decline (Jack et al., 2018). We included these individuals as a separate SCD group, based on the increasing recognition that SCD is associated with AD biomarkers and clinical progression (Jessen et al., 2014; Molinuevo et al., 2017; Rabin, Smart et al., 2017). Individuals were classified as SCD if: (1) there was self-reported persisting cognitive decline from a previous level of cognitive function and unrelated to an acute event based on the clinical interview and responses on the BINS; (2) the individual had intact age-, gender-, and years of education-adjusted scores on cognitive tests (same tests used to classify MCI or dementia in the clinical assessment, with no test scores in the borderline or impaired range); and (3) the individual was able to independently complete ADLs and IADLs based on information from the clinical interview.

Data analyses

A series of analyses was conducted, including: (1) descriptive statistics for the patient groups on relevant study variables including both quantitative and qualitative TOP-J-Informant items; (2) bivariate Pearson’s correlation between age and TOP-J-Informant scores to understand the strength of association between this demographic variable and TOP-J-Informant scores; (3) Spearman’s correlation between patients’ years of education and TOP-J Informant scores to understand the association between education and TOP-J-Informant scores; (4) bivariate Pearson’s correlations between TOP-J-Informant scores and (a) length of informant–patient relationship and (b) average weekly time spent with patient; (5) Exploratory Factor Analysis (EFA) to reveal the factor structure of the TOP-J-Informant; (6) bivariate Pearson’s correlations between the TOP-J-Informant scores and BINS, TOP-J 9-item, TOP-J 15-item total scores, and relevant neuropsychological measures for convergent validity evidence; (7) bivariate Pearson’s correlations between the TOP-J-Informant scores and unrelated measures for divergent validity evidence; (8) analysis of variance (ANOVA) between diagnostic group on TOP-J-Informant scores for criterion validity evidence; (9) ANOVA between diagnostic group on age; (10) Kruskal–Wallis H test between diagnostic group on patients’ years of education; (11)
Pearson’s chi-square test between sex and diagnostic group; and (12) alpha coefficient to determine internal consistency/item homogeneity (Cronbach, 1951).

Parametric assumptions were assessed prior to all analyses (Field, 2013; Laerd Statistics, 2020). Square-root transformation was applied to the following variables for parametric analyses: TOP-J-Informant scores due to moderate positive skew, TOP-J Form A 9 and 15-item total scores due to moderate negative skew, length of informant–patient relationship in years due to moderate negative skew, and RBANS story recall due to moderate positive skew. Logarithmic transformation was applied to weekly time in hours spent with patient and RBANS digit span scores due to strong positive skew. The nonparametric Spearman’s correlation was used to assess the association between patients’ years of education and TOP-J-Informant due to extremely positively skewed education scores that were not corrected by transformation. Similarly, the nonparametric Kruskal–Wallis H test was conducted to determine if there were differences in patients’ years of education between diagnostic group.

Results

Descriptive statistics and demographic effects

The sample included 189 patient and informant dyads, exclusively White with the exception of one Black/African-American patient, consistent with the demographic composition of the surrounding region. Within the entire sample, mean age was 78.97 years (SD = 6.64) and median education was 13 years (mean = 13.8; SD = 2.30). Females comprised 68% of the sample. Table 1 presents relevant descriptive statistics of the informant–patient relationship, including length of relationship, average weekly time spent with patient, and relation to patient. Pearson’s correlation between patient age and TOP-J-Informant scores revealed a statistically significant, weak association, \( r(187) = .18, p = .012 \). Spearman’s correlation between patients’ years of education and TOP-J-Informant scores revealed a statistically significant, weak association, \( r_{s}(187) = -.15, p = .045 \). The length of informant–patient relationship in years, \( r(171) = .03, p = .657 \), and average weekly time spent with patient in hours, \( r(128) = -.00, p = .994 \), were not associated with TOP-J-Informant scores. Kruskal–Wallis H test revealed a non-statistically significant difference in education between diagnostic group, \( H(4) = 6.17, p = .187 \). Pearson’s chi-square test revealed a non-statistically significant difference in proportions between sex and diagnostic group, \( p = .117 \).

Validity and reliability evidence

Internal structure evidence

EFA was conducted using a Principal Axis Factoring (PAF). Based on the results of the initial analysis, the scree plot showed a clear one-factor solution. Although two eigenvalues were identified as greater than 1 (i.e., 8.54 and 1.11), not all items were clearly loading to specific

<table>
<thead>
<tr>
<th>Table 1. Informant data (N = 189).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of years of patient relationship</td>
</tr>
<tr>
<td>Hours per week spent with (or speaking with) the patient</td>
</tr>
<tr>
<td>Relation to patient (%)</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
</tbody>
</table>
factors. Moreover, referring to eigenvalues above 1 has been criticized as tending to overestimate the number of factors (Furr & Bacharach, 2014). Thus, we conducted a second analysis with one fixed factor. Results (Table 2) indicated that one factor was appropriate because all of the items had high loadings on that factor. The scree plot (Figure 1) again supported a one-factor solution.

Table 2. Factor loadings with one factor extracted.

<table>
<thead>
<tr>
<th>Item</th>
<th>Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.765</td>
</tr>
<tr>
<td>2</td>
<td>.675</td>
</tr>
<tr>
<td>3</td>
<td>.677</td>
</tr>
<tr>
<td>4</td>
<td>.678</td>
</tr>
<tr>
<td>5</td>
<td>.703</td>
</tr>
<tr>
<td>6</td>
<td>.697</td>
</tr>
<tr>
<td>7</td>
<td>.740</td>
</tr>
<tr>
<td>8</td>
<td>.728</td>
</tr>
<tr>
<td>9</td>
<td>.799</td>
</tr>
<tr>
<td>10</td>
<td>.642</td>
</tr>
<tr>
<td>11</td>
<td>.754</td>
</tr>
<tr>
<td>12</td>
<td>.756</td>
</tr>
<tr>
<td>13</td>
<td>.831</td>
</tr>
<tr>
<td>14</td>
<td>.749</td>
</tr>
<tr>
<td>15</td>
<td>.791</td>
</tr>
</tbody>
</table>

Figure 1. Scree Plot for TOP-J-Informant
Note. N = 189

Convergent and divergent validity evidence
Pearson’s correlations were conducted across the entire sample (collapsed across diagnostic group). Bonferroni correction was applied to minimize type I error for seven correlations, and
Table 3. Patient demographic and informant score data.

<table>
<thead>
<tr>
<th>Diagnostic Group</th>
<th>SCD (n = 17)</th>
<th>MCI (n = 48)</th>
<th>AD/AD+VaD (n = 88)</th>
<th>VaD (n = 14)</th>
<th>bvFTD/bvFTD+ (n = 22)</th>
<th>Group Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOP-J-Informant (max score = 45)</td>
<td>10.59 (9.88)</td>
<td>11.02 (8.85)</td>
<td>17.27 (11.52)</td>
<td>20.36 (9.68)</td>
<td>22.82 (11.69)</td>
<td>( p &lt; .001 ) bvFTD/bvFTD+ &gt; SCD***, MCI**** VaD &gt; SCD*, MCI* AD/AD+ &gt; SCD*, MCI** ( p = .001 ) AD/AD+ &gt; MCI*, bvFTD/bvFTD+*</td>
</tr>
<tr>
<td>Age (years)</td>
<td>76.24 (7.01)</td>
<td>77.38 (7.27)</td>
<td>80.98 (5.46)</td>
<td>79.71 (5.74)</td>
<td>76.05 (7.52)</td>
<td>NS (Kruskal-Wallis H test)</td>
</tr>
<tr>
<td>Education (years)</td>
<td>14.18 (2.07)</td>
<td>14.00 (2.58)</td>
<td>13.73 (2.33)</td>
<td>12.50 (1.16)</td>
<td>13.77 (2.11)</td>
<td>NS (Pearson’s chi-square test)</td>
</tr>
<tr>
<td>Gender (M, F)</td>
<td>5, 12</td>
<td>18, 30</td>
<td>21, 67</td>
<td>6, 8</td>
<td>11, 11</td>
<td></td>
</tr>
</tbody>
</table>

Data are mean (SD) except for gender. SCD = subjective cognitive decline; MCI = mild cognitive impairment; AD = Alzheimer’s disease; VaD = vascular dementia; bvFTD = behavioral variant frontotemporal dementia. ANOVA analyses for TOP-J-Informant score used the Bonferroni correction for post hoc comparisons.

*\( p < .05 \); **\( p = .01 \); ***\( p = .001 \); ****\( p < .001 \).
the alpha level was set to .007. Results revealed a statistically significant strong correlation between the TOP-J-Informant and another informant measure of general cognition (BINS), \( r(184) = .75, p = < .001 \). Statistically significant correlations emerged between the TOP-J-Informant scores and the objective TOP-J Form A 9-item, \( r(187) = -.23, p = .001 \), and TOP-J Form A 15-item scores, \( r(187) = -.23, p = .001 \), with small effect sizes. We examined associations between the TOP-J-Informant and additional neuropsychological measures tests of executive functioning with which the TOP-J-Informant theoretically should correlate with a small-moderate effect size. Statistically significant correlations emerged between TOP-J-Informant scores and D-KEFS Category Fluency Switching scores, \( r(184) = -.30, p < .001 \), and RBANS coding scores, \( r(168) = -.21, p = .005 \), with small effect sizes. In support of divergent validity, TOP-J-Informant scores were not significantly associated with measures of simple attention and recognition memory – i.e., RBANS digit span, \( r(174) = -.12, p = .120 \) and RBANS list recognition, \( r(169) = -.13, p = .104 \).

**Criterion validity evidence**

ANOVA revealed a statistically significant difference in TOP-J-Informant scores between diagnostic group with a medium effect size, \( F(4, 184) = 7.60, p < .001 \), partial \( \eta^2 = .14 \). Bonferroni post hoc analysis (Table 3) revealed that TOP-J-Informant scores for each dementia group were statistically significantly higher than for the SCD and MCI groups. That is, TOP-J-Informant

<table>
<thead>
<tr>
<th>Diagnostic Group</th>
<th>Item</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCD</td>
<td>10. Has trouble making up his/her mind</td>
<td>1.06</td>
</tr>
<tr>
<td></td>
<td>8. Handles sensitive social situations</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>5. Manages medical matters</td>
<td>0.94</td>
</tr>
<tr>
<td>MCI</td>
<td>10. Has trouble making up his/her mind</td>
<td>1.33</td>
</tr>
<tr>
<td></td>
<td>5. Manages medical matters</td>
<td>1.10</td>
</tr>
<tr>
<td></td>
<td>2. Comes up with various ways to solve a problem*</td>
<td>0.98</td>
</tr>
<tr>
<td></td>
<td>3. Carries out a plan*</td>
<td>0.98</td>
</tr>
<tr>
<td>AD/AD+VaD</td>
<td>5. Manages medical matters</td>
<td>1.52</td>
</tr>
<tr>
<td></td>
<td>10. Has trouble making up his/her mind</td>
<td>1.51</td>
</tr>
<tr>
<td></td>
<td>3. Carries out a plan</td>
<td>1.44</td>
</tr>
<tr>
<td>bvFTD/bvFTD+</td>
<td>5. Manages medical matters*</td>
<td>1.91</td>
</tr>
<tr>
<td></td>
<td>10. Has trouble making up his/her mind*</td>
<td>1.91</td>
</tr>
<tr>
<td></td>
<td>2. Comes up with various ways to solve a problem**</td>
<td>1.86</td>
</tr>
<tr>
<td></td>
<td>1. Uses good judgment**</td>
<td>1.73</td>
</tr>
<tr>
<td>VaD</td>
<td>5. Manages medical matters**</td>
<td>2.07</td>
</tr>
<tr>
<td></td>
<td>10. Has trouble making up his/her mind</td>
<td>1.79</td>
</tr>
<tr>
<td></td>
<td>15. Handles emergencies</td>
<td>1.64</td>
</tr>
</tbody>
</table>

*Items are tied in endorsement ranking; **Item was endorsed in all patients within diagnostic group.

**Table 5.** Sample responses to open-ended question about recent examples of compromised judgment.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>Allows people into his house without knowing them, late at night on occasion</td>
</tr>
<tr>
<td></td>
<td>Left dog in hot car (with bad outcome)</td>
</tr>
<tr>
<td>Medical</td>
<td>Rearranges pills that have been set out, changes dosage/time</td>
</tr>
<tr>
<td></td>
<td>Covers up medical issues in front children, refuses their offers of assistance</td>
</tr>
<tr>
<td>Financial</td>
<td>Sent $10k to craigslist scam</td>
</tr>
<tr>
<td></td>
<td>Withdraws large amounts of cash without checking bills/balance</td>
</tr>
<tr>
<td>Social</td>
<td>Allows young children to watch inappropriate movies, does not understand why an issue</td>
</tr>
<tr>
<td></td>
<td>Threw temper tantrum when asked not to cut the grass, lashed out at spouse</td>
</tr>
</tbody>
</table>
scores for the bvFTD group were statistically significantly higher than for the SCD (p = .001) and MCI (p < .001) groups. TOP-J-Informant scores for the VaD group were statistically significantly higher than for the SCD (p = .027) and MCI (p = .026) groups. TOP-J-Informant scores for the AD/AD+VaD group were significantly higher than for the SCD (p = .045) and MCI (p = .012) groups. TOP-J-Informant scores for the SCD and MCI groups were not significantly different, p = 1.00.

Reliability evidence
The alpha coefficient was determined to be .95.

Additional descriptive results
Across the entire sample (collapsed across diagnostic group), item 10 “has trouble making up his/her mind” received the highest score (M = 1.49, SD = 0.99), followed by item 5 “manages medical matters” (M = 1.45, SD = 1.10) and item 2 “comes up with various ways to solve a problem” (M = 1.32, SD = 0.92). These three items were the highest rated in each diagnostic group of varying order, with the exception of the SCD group in which item 8 (“handles sensitive social situations”) was slightly higher than item 2. The item with the lowest score was item 7 “is ethically responsible,” and this held for the entire sample (M = 0.46, SD = 0.89) and within each diagnostic group. See Table 4 for ranking of the three highest scored items by diagnostic group.

In terms of the qualitative/open-ended item, 31% of respondents chose to provide a response (or multiple responses), and responses generally coincided with the domains assessed by the TOP-J-Informant (Table 5 presents sample responses). Some of the responses did not reflect problems in judgment and related skills – instead they related to problems with memory, language, IADLs, or medical/psychological issues.

Discussion
Practical judgment, under the umbrella domain of executive functioning, is an ecologically relevant ability that underlies functioning and safety in daily life, and a cognitive domain almost always assessed by neuropsychologists during dementia evaluations (Rabin, Borgos et al., 2008). Informant reports of cognitive and adaptive functioning skills are increasingly recognized as crucial markers of diminished decision-making and functional capacity (Edmonds et al., 2018; Farias et al., 2005; Fyock & Hampstead, 2015; Rueda et al., 2015; Slavin et al., 2010) as well as risk for incident cognitive decline (Caselli et al., 2014; Edmonds et al., 2018; Nicholas et al., 2017; Numbers et al., 2020; Rabin, Wang et al., 2012; Risacher et al., 2013). Moreover, older adults deal with a multitude of complex life matters that have important consequences (e.g., estate, savings, and retirement planning, assisted living/nursing home placements, medical problems, and associated costs, role shifts following the death of a spouse). When one considers possible executive dysfunction, in conjunction with fraudulent and nefarious intentions aimed at older adults, the importance of assessing judgment in older adults cannot be understated. Unfortunately, no informant report measures of judgment with evidence of validity and reliability are currently used, likely reducing the ability of clinicians and researchers to identify older adults at risk for abuse, exploitation, and compromised decision-making in essential domains. To address this gap, we present the TOP-J-Informant, a rating
measure that taps into everyday judgment problems commonly faced by older adults. Our results demonstrated preliminary psychometric evidence including strong reliability, strong association with another informant report measure of general cognition, and the ability to distinguish between various clinical groups with dementia and two preclinical dementia groups.

Our approach to the development of the TOP-J-Informant sought to complement the objective TOP-J, by including items related to safety, medical, financial, and social/ethical domains. We reviewed the literature related to clinical assessment of judgment and related constructs (e.g., planning, problem solving decision-making), consulted on item development with neuropsychologist colleagues, and piloted the TOP-J-Informant to assess for comprehension, accessibility, and response patterns for refinement of item and scoring criteria. The resulting measure, comprised of 15 Likert scale items, ranging from 0 = normal ability/almost never a problem to 3 = severe difficulty/almost always a problem, surveys issues regularly faced by older adults as observed by informants. We also include one open-ended item (for use in clinical settings), inquiring about recent examples of compromised judgment. With promising utility in both clinical and research settings, the TOP-J-Informant is brief (<5 minutes), simple to administer, and well-tolerated by informants.

In exploratory analyses, we found that as patient age increased and at lower levels of education, informant reports of problems with judgment increased, although only to a minimal extent. This is consistent with research that has reported weak correlations between age and education and: (1) informant report measures of general cognition and executive functioning specifically (Farias et al., 2008; Jorm et al., 1994; Paré et al., 2020; Perroco et al., 2009; Rabin, Roth et al., 2006); and (2) standardized objective measures of judgment such as the TOP-J, Judgment/Daily Living subtest of the Neuropsychological Assessment Battery, and Judgment Questionnaire subtest of the Neurobehavioral Cognitive Status Exam (Rabin, Borgos et al., 2007; Goldfrad et al., 2018; MacDougall & Mansbach, 2013; Woods et al., 2000). In addition, there was no association between the TOP-J-Informant scores and length of informant–patient relationship and time spent with the patient. However, these results should be interpreted with caution because the restriction of range on these characteristics may have attenuated the association with TOP-J-Informant scores. Specifically, our informants on average had long-standing, multi-decade relationships with the patients and spent many hours with them each week. Future investigations should include a more diverse range of informant–patient relationship strength, as individuals without close relationships or who experience social isolation may be at increased risk for cognitive and functional decline (Andrew & Rockwood, 2010).

The TOP-J-Informant demonstrated a single-factor internal structure, which is also found in the original TOP-J (Rabin, Borgos et al., 2007). We found statistically significant evidence for convergent validity as demonstrated by a strong association with another informant report of general cognitive abilities (i.e., BINS), and by weaker yet statistically significant associations with the 9- and 15-item TOP-J versions, and with other objective measures of executive function. Divergent validity evidence emerged as weak nonsignificant associations with simple attention and recognition memory. Further, as evidence of criterion validity, the TOP-J-Informant was able to distinguish between each diagnostic group with dementia and the two nondementia groups (i.e., average AD/AD+VaD, VaD, bvFTD scores were each significantly higher than SCD and MCI). An unsurprising pattern was revealed, with the lowest level of judgment problems reported for the SCD group, followed by MCI, AD/AD+VaD, VaD, and
bvFTD, consistent with overall levels of objective cognitive impairment and specific deficits in executive functions in these patient groups (Elderkin-Thompson et al., 2004; Karantouzis & Galvin, 2011). This pattern is also consistent with previous research suggesting that informant report of cognitive and adaptive functioning problems is lowest in preclinical stages (Mulligan et al., 2016; Ryu et al., 2019) and increases as dementia ensues (Edmonds et al., 2014, 2018; Rabin, Smart et al., 2017; Rueda et al., 2015; Ryu et al., 2019). With regard to reliability evidence, the alpha coefficient of the TOP-J-Informant was .95, indicating strong internal consistency.

Although the TOP-J-Informant is a unitarily structured measure that generates a total score, representing overall problems with practical judgment abilities, particular attention to specific item endorsement by the informant may yield clinically useful data. Therefore, we also examined the item-by-item pattern of responding in the entire sample and by diagnostic group. Item 10 “has trouble making up his/her mind”, item 5 “manages medical matters”, and item 2 “comes up with various ways to solve a problem” were among the items endorsed as most problematic by informants, regardless of clinical diagnosis. Endorsement of these items might cue the clinician that, in the proper clinical context, early changes in specific aspects of judgment and decision-making may be occurring.

Notably, among those with SCD, item 8 “handles sensitive social situations” was highly endorsed (more so than item 2), which may indicate that subtle changes in social realms occur very early in the disease process. As MCI and dementia ensue, these social/interpersonal difficulties may become less salient to informants as more concerning or potentially dangerous problems emerge, or individuals may become increasingly socially withdrawn and thus less inclined to even attempt to handle delicate social matters. In the bvFTD group, item 1 “uses good judgment” was highly rated as problematic, consistent with the frontal dysexecutive clinical presentation of these individuals. In addition, all patients with bvFTD were identified as having at least mild difficulty on items 1 “uses good judgment” and 2 “comes up with various ways to solve a problem.” Together, these findings may reflect overarching issues that these individuals experience with judgment and with divergent thinking and problem solving, often reflected by prominent issues with perseverative behavior or cognitive rigidity. Finally, across the entire sample and within each diagnostic group, the least endorsed was item 7 “is ethically responsible.” While further research is required to determine the underlying reason(s) for this low endorsement, possible explanations include that it was a less well understood item or that loved ones were underreporting problems with this sensitive issue that touches upon personal values and ethics.

Overall, while further broad validation studies are required, given its brevity and simplicity, the TOP-J-Informant is well suited to be used as a quick screen, administered during a neuropsychological evaluation or before a clinic visit. Items endorsed (or additional problems noted for the open-ended question) may serve as a guide for clinical interview and facilitate detection of possible areas of concern related to judgment abilities. Such a use of the TOP-J-Informant may yield essential information to help safeguard older adults at risk for cognitive and functional decline, exploitation, and dangerous decision-making.

Our study is not without limitations. The available sample size was relatively small, particularly within specific diagnostic groups, and largely homogenous across sociodemographic variables. Because this was a clinical sample, we did not have the opportunity to include healthy control participants without subjective or objective cognitive deficits. Future research should investigate the TOP-J-Informant in larger and more diagnostically and demographically diverse samples in order to improve generalizability of interpretations to individuals of varied
backgrounds. Cognitively healthy older adults are also needed to establish normative data. We present cross-sectional data; future studies should investigate the ability of the TOP-J-Informant to predict cognitive and functional decline longitudinally. Additionally, previous work has indicated that informant report may be influenced by characteristics such as mood/affect (Jorm et al., 1994), personality (Best et al., 2019; Sutin et al., 2019), sociocultural factors (Hackett et al., 2020) of both the informant and the patient. Exploring the manner in which such variables may be related to TOP-J-Informant scores was limited by the homogeneity of the sample and beyond the scope of the current study, but should be addressed in future work. Finally, in future research, we would hope to provide additional validity evidence for the TOP-J-Informant by evaluating its association with specific neuroanatomical correlates (e.g., prefrontal brain regions of patients).

Note

1. The TOP-J-Informant is available upon request from authors L. Rabin: lrabin@brooklyn.cuny.edu or C. Quinn TOPJrequest@gmail.com).

Disclosure statement

No conflict of interest was declared.

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