Self-report questionnaires about memory complaints as screening tools for early cognitive impairment in community dwelling older adults

Mahairidou, S.¹, Theodoraki, I.¹, Moraitou, D.¹, Papantoniou, G.², & Masoura, E.¹

¹School of Psychology, Aristotle University of Thessaloniki
²Department of Early Childhood Education, University of Ioannina
Subjective Cognitive Impairment

- The term ‘Subjective Cognitive Impairment (SCI)’ is the most widely accepted term used for cognitive complaints of otherwise apparently healthy older persons, in the absence of objective evidence of cognitive decline or psychopathology.

- Recently, the state of SCI is considered by the majority of neuroscientists the “very-very early stage” of AD (Jessen et al., 2010).
Subjective Cognitive Impairment

- Based on the literature (Caselli et al., 2014; Reisberg et al., 2010) to examine the characteristic of the SCI very subtle cognitive decline, self-report measures developed to assess ‘self-experience’ of minimal decline in cognition and especially in memory appear the most appropriate tools till now ...
The purpose of the study

• In this vein, the present study aimed at examining the capacity of two self-report instruments of the aforementioned type to detect SCI in community dwelling older adults

Main questions

➢ Is there any ‘objective measure’ of cognition that could predict self-reports?
➢ Can these self-report instruments predict each other’s performance?
➢ Which could be the cut-off scores for SCI?
Method

Participants

N = 295 /Four groups according to age* =>

<table>
<thead>
<tr>
<th>Young adults</th>
<th>Middle-aged adults</th>
<th>Older adults**</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n = 106, M = 22.8 years, SD = 3)</td>
<td>(n = 108, M = 47.9 years, SD = 5.1)</td>
<td>(n = 53, M = 69.9 years, SD = 3.6)</td>
</tr>
</tbody>
</table>

*the first three groups did not differ in Gender & Educational Level (low EL was not represented in these groups) and all were relatively to very satisfied with their life

**MoCA ≥ 25, M = 26.8, SD = 0.9

Older-old adults

(n = 28, M = 83.5 years, SD = 3.3, 64.3% = women, 42.9% = low educational level, MoCA: M = 21.7, SD = 4.4)
Method

Instruments

- The Cognitive Failures Questionnaire (CFQ; Broadbent et al., 1982)

  - a 25-item questionnaire designed to measure everyday slips of actions and memory failures (e.g., bumping into people, forgetting names).

  - participants are asked to indicate the frequency with which they make such errors on a 5-point scale from 0 (never) to 4 (very often).
Method

Instruments

- The Cognitive Failures Questionnaire (CFQ; Broadbent et al., 1982)

- Structural validity in Greek adult sample (Moraitou & Efklides, 2009)

A single-factor structure of the Greek version of the CFQ was verified:


Internal consistency was excellent:

Cronbach’s $\alpha = .93.$
Method

Instruments

- The Prospective and Retrospective Memory Questionnaire (PRMQ; Smith, Della Sala, Logie, & Maylor, 2000)
  - A 16-item measure of prospective and retrospective memory slips in everyday life (e.g., Do you forget appointments if you are not prompted by someone else or by a reminder?)
  - Participants have to rate how often each type of memory failure occurred, on a 5-point scale from 1 (never) to 5 (very often).
Instruments

- The Prospective and Retrospective Memory Questionnaire (PRMQ; Smith, Della Sala, Logie, & Maylor, 2000)

- Structural validity

Of the PRMQ items, 8 address prospective and 8 retrospective memory failures. Crawford, Smith, Maylor, Della Sala, and Logie (2003) found that responses to the PRMQ are best accounted for by a general factor of Self-Rated Memory, beyond the two specific factors.
Method

Instruments

- The Prospective and Retrospective Memory Questionnaire (PRMQ; Smith, Della Sala, Logie, & Maylor, 2000)

- Structural validity in Greek adult sample (Moraitou & Efklides, 2009)

The existence of the general factor was confirmed: CFA, $\chi^2(88, N = 464) = 186.14$, $p < .001$, $CFI = .959$, $SRMR = .035$, $RMSEA = .049$.

The internal consistency for the factor was satisfactory: Cronbach’s $\alpha = .84$. 
Method

Instruments (objective measures)

- **The D-KEFS Tower Test (TT; Delis, Kaplan, & Cramer, 2001): 9 conditions**
  - Objective => to move disks varying in size across three pegs to build a “tower” in the fewest number of moves possible and by following two rules.

  - Complex Executive Functioning tapped => Spatial Planning + Rule Learning + Inhibitory Control + Working Memory (Updating)
Method
Instruments (objective measures)

- The D-KEFS Color-Word Interference Test (C-WIT; Delis, Kaplan, & Cramer, 2001): 4 conditions
  - Color Naming (90′′)
  - Word Reading ((90′′)

Executive Functions tapped =>
  - Inhibitory Control (180′′): verbal inhibition.
  - Cognitive flexibility [Inhibitory Control & Task Switching (180′′)] => interchangeably, naming the color – reading the word
## Results

- **The CFQ: statistics for every age-group**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Mean (M)</th>
<th>Standard Deviation (SD)</th>
<th>Range</th>
<th>Scored ≥ 47</th>
<th>Cronbach’s α (α)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young adults</td>
<td>37.5</td>
<td>14</td>
<td>9–69</td>
<td>25.7%</td>
<td>.88</td>
</tr>
<tr>
<td>Middle-aged adults</td>
<td>34.5</td>
<td>14.3</td>
<td>10–73</td>
<td>20.8%</td>
<td>.90</td>
</tr>
<tr>
<td>Older adults</td>
<td>38.7</td>
<td>16</td>
<td>6–72</td>
<td>35.8% (75th percentile)</td>
<td>.92</td>
</tr>
<tr>
<td>Older-old adults</td>
<td>35.5</td>
<td>14</td>
<td>8–62</td>
<td>25%</td>
<td>.87</td>
</tr>
</tbody>
</table>

- No age-group effects on CFQ score were found
Results

- The CFQ: ROC curves analyses were subsequently performed, using objective measures’ scores as ‘test variable’ and group classification according to the CFQ score as ‘state variable’.

- Based on the CFQ score (=47) at the 75th percentile as regards both the total sample and the older adult group, the participants were divided into two groups:
  - Group 0 => those reported a low level of CF
  - Group 1 => those reported a high level of CF
Results

- ROC curves analyses: ‘Tower Test time of completion’ as test variable – CFQ classification in every age-group as state variable

*no differentiation for these age-groups*
Results

In contrast with the findings for the younger age-groups, ‘planning’ as ‘time to complete TT’, seems to differentiate somewhat older adults reporting low and high level of cognitive failures.

AUC = 0.67, $p = 0.04$, 95%CI: 0.50-0.82; cut-off: 685,00
Results

Moreover, the examination of age-group effects on the:

- n of TT total problems administered
- n of movements
- TT total achievement score
- TT total completion time

showed that

a. older adults solved the same n of problems, made the same n of movements but needed more time to complete the TT, compared to younger adult groups. Thus, completion time seems to be an early index of complex EF problems in community dwelling older adults.

b. older-old adults had significantly lower scores as regards the first three variables examined and this affected the completion time variable.
Results

- ROC curves analyses: ‘Stroop 1, 2, time of completion’ as test variables – CFQ classification in older adult age-group as state variable

(a) \( AUC = 0.81, p < 0.001, 95\%CI: 0.69-0.93; \text{cut-off:}39.00 \)

(b) \( AUC = 0.81, p < 0.001, 95\%CI: 0.69-0.93; \text{cut-off:}32.04 \)
## Results

**The PRMQ: statistics for every age-group**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>Percentage ≥ 43</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young adults</td>
<td>36.1</td>
<td>10.2</td>
<td>19–64</td>
<td>23.6%</td>
<td>.89</td>
</tr>
<tr>
<td>Middle-aged adults</td>
<td>35.3</td>
<td>9.5</td>
<td>20–63</td>
<td>19.4%</td>
<td>.91</td>
</tr>
<tr>
<td>Older adults</td>
<td>37.9</td>
<td>11.4</td>
<td>17–64</td>
<td>28.3% (75th percentile)</td>
<td>.93</td>
</tr>
<tr>
<td>Older-old adults</td>
<td>39.5</td>
<td>11.1</td>
<td>22–67</td>
<td>39.3%</td>
<td>.90</td>
</tr>
</tbody>
</table>

**No age-group effects on PRMQ score were found**
Results

- The PRMQ: ROC curves analyses were subsequently performed, using objective measures’ scores as well as CFQ score as ‘test variable’ and group classification according to the PRMQ score as ‘state variable’.

- Based on the PRMQ score (=43) at the 75th percentile as regards the older adult group, all participants were divided into two groups:
  - Group 0 => those reported a low level of PRM problems
  - Group 1 => those reported a high level of PRM problems
Results

- ROC curves analyses:
  - ‘Stroop 4 – Cognitive flexibility: time to completion’ as test variable & PRMQ classification in older adult group as state variable

(a) AUC = 0.73, \( p = 0.01 \), 95%CI: 0.58-0.89;

* As regards age-group effects on Stroop 4 scores, all groups differed significantly in all variables.
Results

- ROC curves analyses:
  - “Stroop 3, 4: time to completion” as test variables & PRMQ classification in older adult group as state variable

(a) AUC = 0.79, \( p = 0.001 \), 95%CI: 0.66-0.92;
(b) AUC = 0.74, \( p = 0.01 \), 95%CI: 0.58-0.89;
Results

- ROC curves analyses:
  - ‘CFQ score’ as test variable & PRMQ classification in older adult (a), older-old adult group (b), and total sample except older-old group (c) as state variable,

  (a) AUC = 0.87, $p < 0.001$, 95%CI: 0.75-0.98; sensitivity: 80%, specificity: 82%
  (b) AUC = 0.95, $p < 0.001$, 95%CI: 0.87-1.00; sensitivity: 100%, specificity: 82% (cut-off = 36.5)
  (c) AUC = 0.89, $p < 0.001$, 95%CI: 0.84-0.94; sensitivity: 81%, specificity: 82%
Conclusions

The Cognitive Failures Questionnaire

It seems that the CFQ is a promising tool that can detect SCI in older adults:

(a) It relates with objective measures of cognition specifically in aging:
    simple & complex executive functioning seem to differentiate otherwise cognitively healthy community dwelling older adults reporting a low and a high level of cognitive failures.

(b) It relates with a subjective measure of episodic memory complaints:
    it is able to differentiate adults -in a broad age-range- with low and high levels of self-reported episodic memory failures.
Conclusions
The Cognitive Failures Questionnaire

(c) hence, a CFQ score $\geq 47$ may be indicative of an early stage of cognitive impairment in older age.

(d) this isn’t true for young and middle-aged adults, since their CFQ score may not relate to cognitive control but may be associated with affect or contextual factors.
Conclusions

The Prospective & Retrospective Memory Questionnaire

It seems that the PRMQ is also a promising tool that can detect SCI in older adults:

(a) It relates with objective measures of cognition specifically in aging: inhibition & cognitive flexibility (as inhibitory control plus rule switching) can differentiate otherwise cognitively healthy community dwelling older adults reporting a low and a high level of episodic memory failures.

(b) hence, a PRMQ score $\geq 43$ may be indicative of an early stage of cognitive impairment in older age.
Conclusions

Self-reported measures of ‘everyday’ cognitive and memory failures seem to be associated with some objective measures of cognition in aging.

Hence, they are useful tools for detecting early cognitive impairment at least in older adults.

Their administration together with objective measures – cognitive tasks of high difficulty could substantially help for Subjective Cognitive Impairment screening.
References

Reisberg B, Shulman MB, Torossian C, Leng L, Zhu W. Outcome over seven years of healthy adults with and without subjective cognitive impairment. Alzheimers Dement 2010;6:11–24


Thank you for your attention!