Age Differences in Neuropsychological Predictors of Everyday Problem Solving

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Introduction
- Everyday Problem Solving (EPS) tasks are important markers of real-world functioning.
- Models propose EPS is comprised of components that are differentially impacted across age:
  - Fluid abilities that decline with age
  - Crystallized abilities more robust to aging
- Little is known regarding extent that neuropsychological components account for EPS across age.

Objective:
To investigate whether fluid and crystallized abilities predict EPS differently in young and older adults.

Participants
- Older non-demented community-dwelling adults (51-91 yrs) recruited through community ads.
  - Dementia screen ≥ 24 on Mini Mental Status Exam (MMSE)
- Young adults (17-30 yrs) recruited through undergraduate psychology classes.

Table 1. Select Demographic Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Older Adults</th>
<th>Young Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>74</td>
<td>64</td>
</tr>
<tr>
<td>Age (yr)</td>
<td>66.2 (8.5)</td>
<td>19.5 (2.2)</td>
</tr>
<tr>
<td>Education</td>
<td>14.7 (2.6)</td>
<td>13.2 (1.2)</td>
</tr>
<tr>
<td>% female</td>
<td>80</td>
<td>67</td>
</tr>
</tbody>
</table>

* Values are presented as M (SD).

Measures

Traditional Neuropsychological Measures

<table>
<thead>
<tr>
<th>DOMAIN</th>
<th>MEASURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Episodic memory</td>
<td>California Verbal Learning Test- II</td>
</tr>
<tr>
<td>Speed</td>
<td>WAIS-III Digit Symbol Coding</td>
</tr>
<tr>
<td>Executive Function (DKEFS)</td>
<td>Trail Making (letter-# switch)</td>
</tr>
<tr>
<td></td>
<td>Color-Word Interference (C-W inhibition, inhibition/switch)</td>
</tr>
<tr>
<td></td>
<td>Verbal Fluency (category, category/switch)</td>
</tr>
<tr>
<td>Semantic knowledge</td>
<td>ETS Vocabulary 1+2</td>
</tr>
</tbody>
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Mental flexibility = composite z-score
- Trails, C-W inhibition/switch, VF category/switch

Everyday Cognitive Measure
- EPS Task
  - Participants wrote down as many solutions as possible to 16 everyday problem vignettes.
  - Outcome measure: # safe & effective solutions
  - Inter-rater reliability = 0.85

Results
- Separate regression analyses determined which cognitive variables accounted for EPS ability.

YOUNG ADULTS
- Better executive function, as measured by tasks of mental flexibility, was a significant predictor.

OLDER ADULTS
- Younger age, female sex, higher education predicted higher EPS.
- Better semantic knowledge only cognitive predictor.

Discussion
- Important neuropsychological predictors of EPS differ across age:
  - Younger adults may rely on fluid abilities that tend to peak in early adulthood.
  - Older adults may rely on crystallized abilities more robust to aging.
- Strong crystallized abilities may compensate for age-related declines in fluid abilities when solving everyday problems.
- In older adults, EPS tasks requiring crystallized and fluid abilities may augment batteries of traditional cognitive tests when predicting real-world function.

Select References

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