The role of cognitive functioning on everyday functioning among oldest old physically frail

Dupuy, L.; Consel, C.; N’Kaoua, B.; Dehail, P.; Sauzéon, H.
**Everyday functioning (EF) and aging**

- EF can be defined as including:
  - Instrumental Activity of Daily Living (IADL)
  - Basic Activity of Daily Living (BADL)

- EF performance is multi-determined:
  - Socio-demographic variables (age, gender, marital status, etc.)
  - Cognitive abilities (executive functioning, episodic memory)
  - Physical aptitudes (sensory and motor functioning)

Relations between these variables?
Relation between cognitive and physical functioning with aging

- Largely reported in the literature using dual tasks (e.g., Lindenberger et al., 2000)
  - Sensory deficit theory
  - Role of sensory decline in cognitive decline

- Compensatory role of cognitive functioning to perform EF:
  (SOC model (Selection, Optimization, Compensation), Lindenberger & Baltes, 1994)
  - Observed for sensory impaired older adults and associated with an increased EF complaint
  - Deliberate adaptive strategy to manage the sensory deficit
  - Extensible to physically impaired older adults?

Dennis & Cabeza, 2008
Lövden et al., 2005
Heyl & Wahl, 2012
Objectives

Study the compensatory role of cognitive resources in EF among cognitively healthy older adults, but with reduced physical functioning

- Two groups of participants depending on their physical performance (Low vs. High physical functioning)
- Compare their EF on:
  - Objective performance
  - Self-reported performance (EF complaint)
- Assess the mediating effect of cognitive functioning
Participants

- 50 cognitively healthy old participants (MMSE > 27)

- Assessment of cognitive functioning (CF) (max score : 174):
  - Dementia Rating Scale-2
  - Frontal Assessment Battery

- Assessment of physical functioning (PF) (max score : 24):
  - Body strength (Five Chair Stand, body mass)
  - Static Balance (Tandem stand)
  - Mobility (Timed Get Up and Go Test, gait speed)
  - Sensory Abilities

Low PF group:
- Age: 82.12 (1.30)
- 5 males and 20 females
- CF score: 146.20 (1.45)
- PF score: 14.40 (0.71)

High PF group:
- Age: 80.24 (1.10)
- 4 males and 21 females
- CF score: 148.61 (1.46)
- PF score: 20.14 (0.33)

*** : p < .001

Jurica, Leitten & Mattis, 2001
Dubois et al., 2000
Guralnik et al., 1994
Method

- Assessment of EF:
  - Objective measure: Timed-IADL
    - Ex: “Voici des ingrédients présentés sur une étagère. Pouvez-vous aller me chercher la boîte de soupe à la tomate et une boîte de raviolis ?”
  - Self-reported EF performance: Lickert-scale
    - Ex:

<table>
<thead>
<tr>
<th>9. Pour vous, faire les courses est-ce... ?</th>
</tr>
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<tbody>
<tr>
<td>Pas difficile</td>
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<td>------------------------------------------</td>
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Owsley et al., 2002
Lawton et al., 1982
**Results: Comparison of EF scores**

Performance-based and self-reported measures of everyday functioning compared between the two groups of older participants (High vs. Low PF groups)

<table>
<thead>
<tr>
<th>Assessment of EF</th>
<th>High Physical Functioning</th>
<th>Low Physical Functioning</th>
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<tbody>
<tr>
<td></td>
<td>6.24 (0.45)</td>
<td>6.24 (0.38)</td>
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<tr>
<td>p &lt; .900</td>
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<td>24.16 (1.28)</td>
<td>29.48 (1.42)</td>
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<tr>
<td>p &lt; .01</td>
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Although the two groups perform equally, older adults with physical impairment report more difficulties in everyday functioning.
**Results: Mediating effect of cognitive resources**

**ANCOVAs results controlling cognitive resource variable**

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<tr>
<th>Group</th>
<th>Cognitive Resources</th>
<th>Interaction Group*Cog resources</th>
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<tr>
<td></td>
<td>ns</td>
<td>p &lt; .001 (η² = .25)</td>
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<tr>
<td></td>
<td>p &lt; .01 (η² = .16)</td>
<td>ns</td>
</tr>
<tr>
<td></td>
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<td>p &lt; .01 (η² = .17)</td>
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- Cognitive resources mediate EF performance irrespective of group conditions
- Subjective EF performance is mediated differently by cognitive resources for the two group conditions:
  - **Negative** correlation between EF complaint and cognitive resources is observed for High PF group
  - **Positive** correlation between EF complaint and cognitive resources is observed for Low PF group
Discussion-Conclusions

① Objective EF performance is maintained in cognitively healthy old adults with low physical functioning, **But** an increased EF complaint is reported.

② Strong involvement of cognitive functioning is observed to maintain EF performance irrespective of physical conditions.

③ EF complaint is strongly correlated to cognitive functioning for older adults with low physical condition.

Overall, these results support the compensatory role of cognitive functioning in physically impaired old adults in the management of EF performance.
Discussion-Conclusion

Limitations

• Small sample size
• General measure of cognitive functioning
• Role of specific component (executive functioning, memory, etc.)

To conclude,

• The complaints and continuous cognitive efforts by Low PF old adults to manage everyday functioning deserve a clinical consideration
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References


