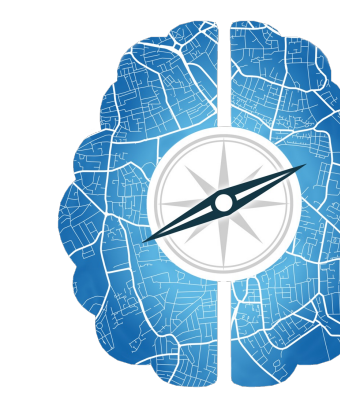


Individual differences in visual attention correlate with spatial navigation behavior in aging

Adam J. Barnas¹, Dawn Bowers^{2,3}, Natalie C. Ebner^{1,4,5,6}, & Steven M. Weisberg^{1,4}

¹Department of Psychology, University of Florida; ²Department of Clinical and Health Psychology, University of Florida; ³Fixel Institute for Neurological Diseases, University of Florida; ⁴Center for Cognitive Aging and Memory, University of Florida; ⁵Institute on Aging, University of Florida; ⁶Department of Physiology and Aging, University of Florida



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1. Motivation

Spatial navigation is an essential task, and it is common for spatial navigation abilities to degrade during normal aging¹

Older adults may also experience impairments in visual attention^{2,3}, which may further compound spatial navigation impairments by impacting the ability to attend to important navigation-related information, like arrows

Hypothesis: Deficits in visual attention contribute to spatial navigation detriments among older adults

2. Sample

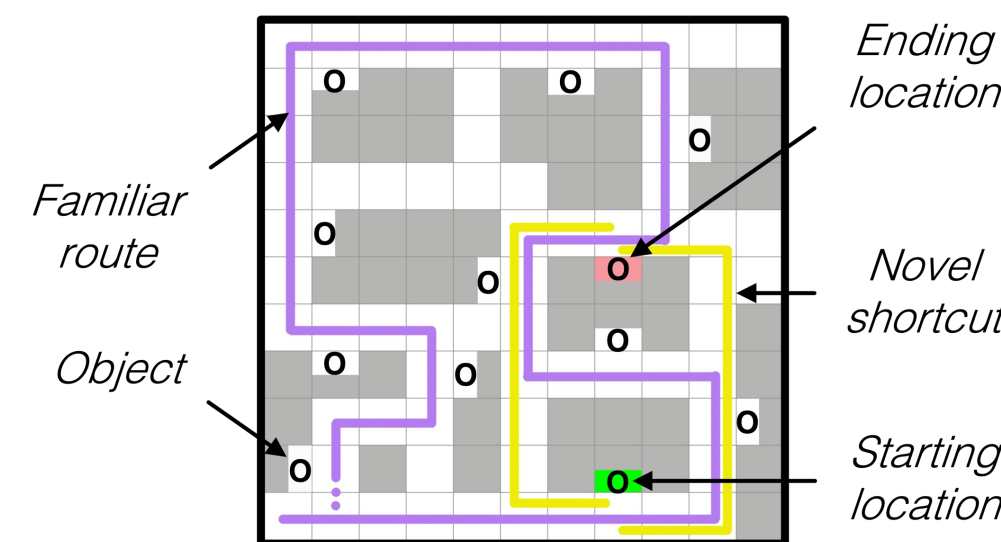
	Younger Adults	Older Adults
N	72	48
Age (yrs)	18-27 (<i>M</i> = 20.2)	55-86 (<i>M</i> = 69.8)
Gender	47 (65%) women	25 (52%) women
Education (yrs)	<i>M</i> = 14.0	<i>M</i> = 16.0
MoCA	22-30 (<i>M</i> = 27.6*)	21-30 (<i>M</i> = 26.9)

*Note. *n* = 22

3. Dual Solution Paradigm

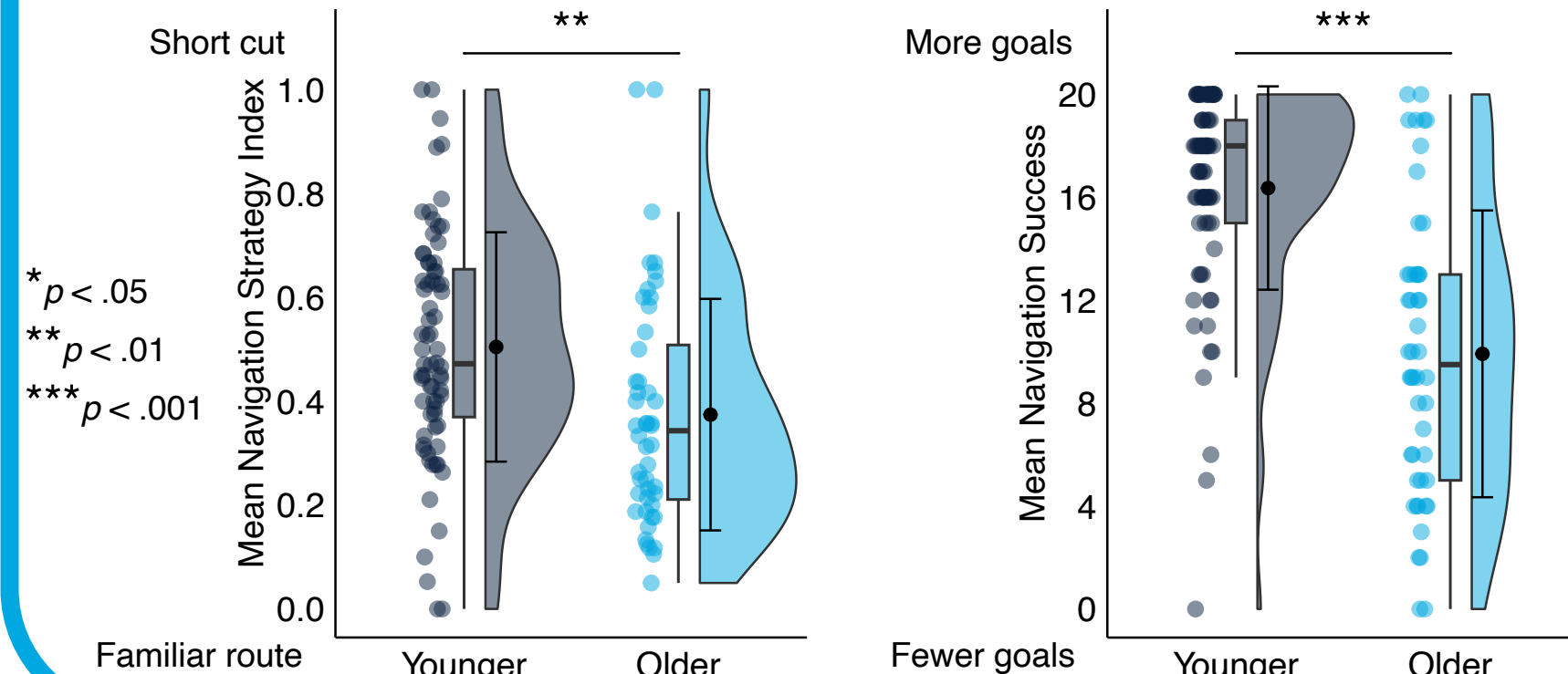
See posters 3092 and 3096 at Psychonomics!

Virtual navigation task that measures **navigation strategy** (degree to which a participant navigates via a novel short cut or the familiar route) and **navigation success** (number of goals found)

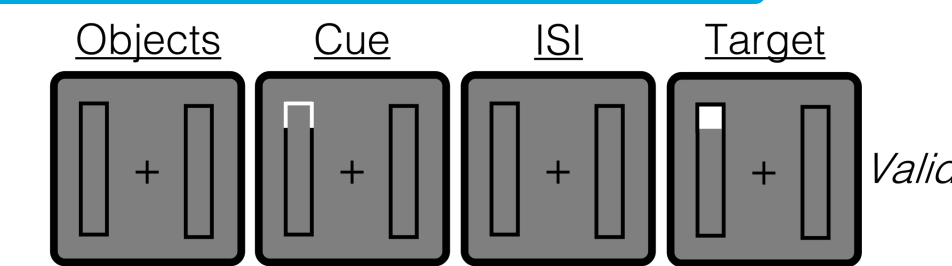


Navigation strategy index: $\frac{\# \text{ of shortcuts}}{\# \text{ of shortcuts} + \# \text{ of familiar routes} + \# \text{ of reversed routes}}$

Older adults prefer **familiar routes** and find **fewer goals**



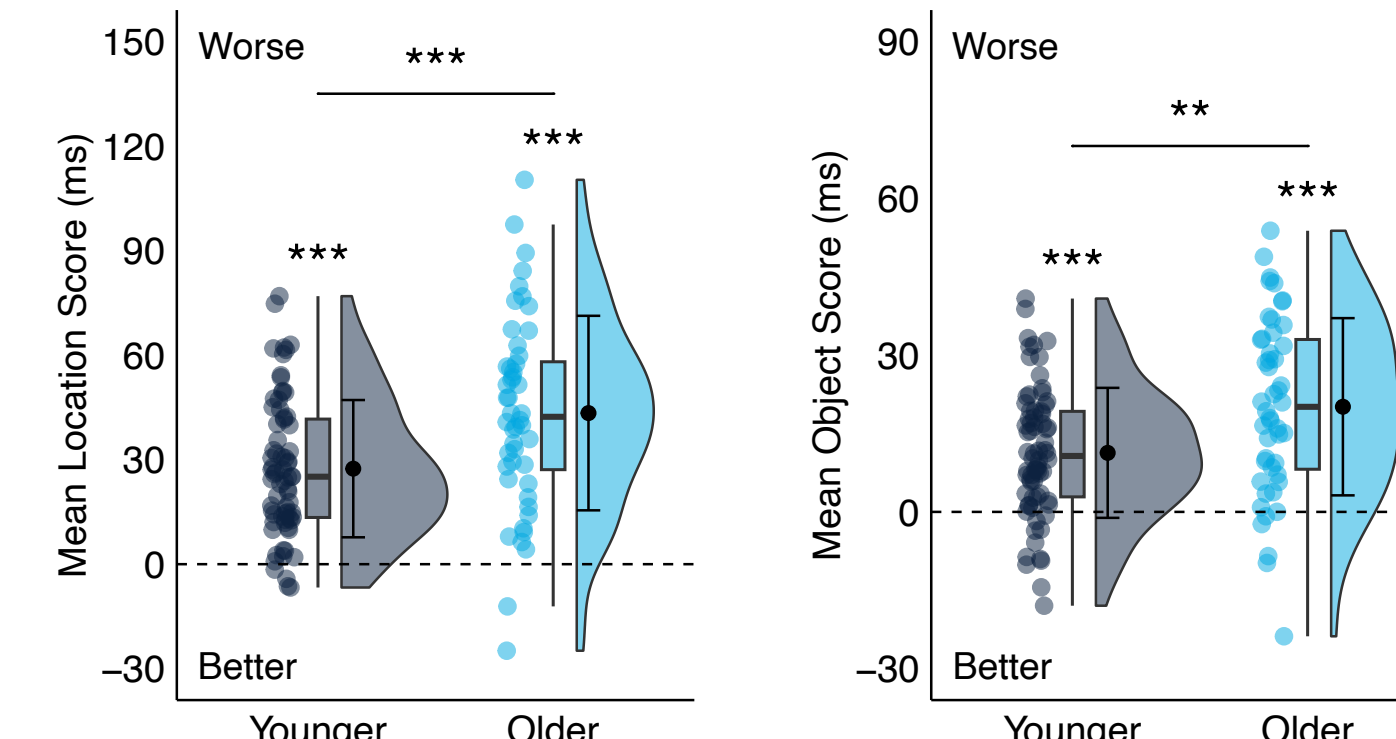
4. Double Rectangle Task



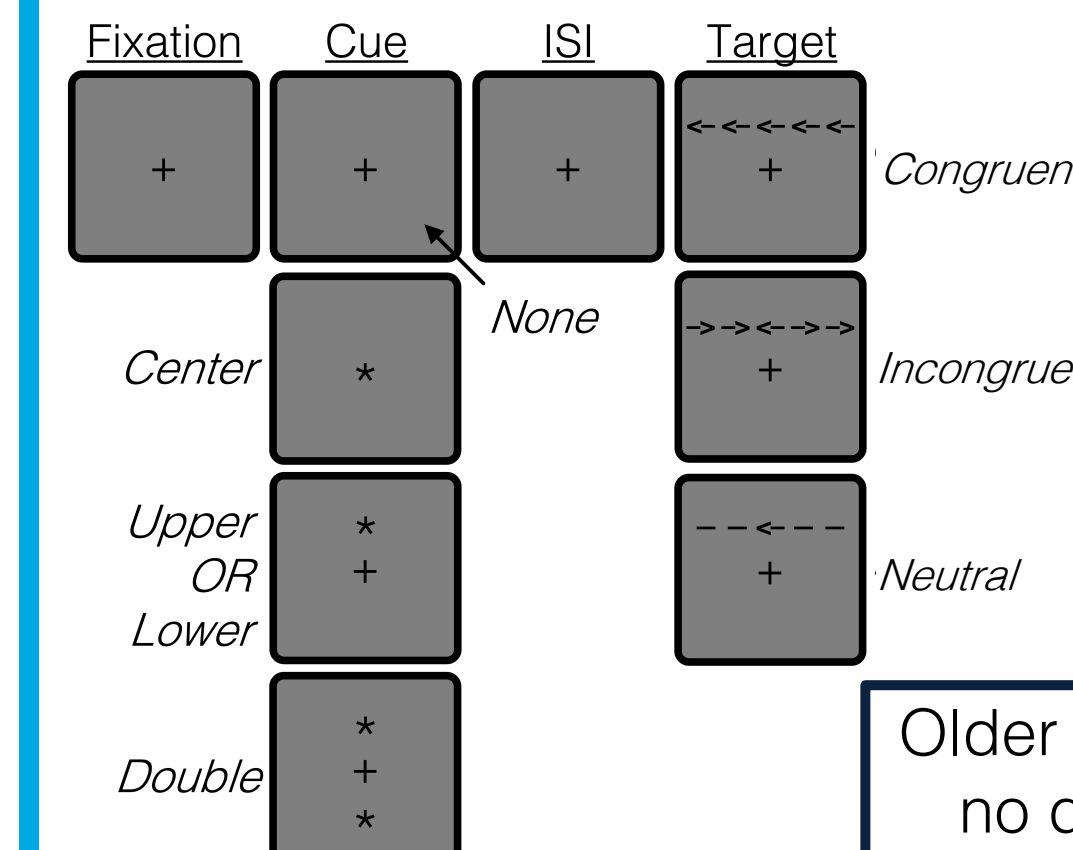
Measures attentional selection of **locations** and **objects**

Selection of locations: Invalid – Valid
Selection of objects: Invalid-diff. – Invalid-same

Older adults exhibit **greater costs** shifting between locations and objects



5. Attention Network Task



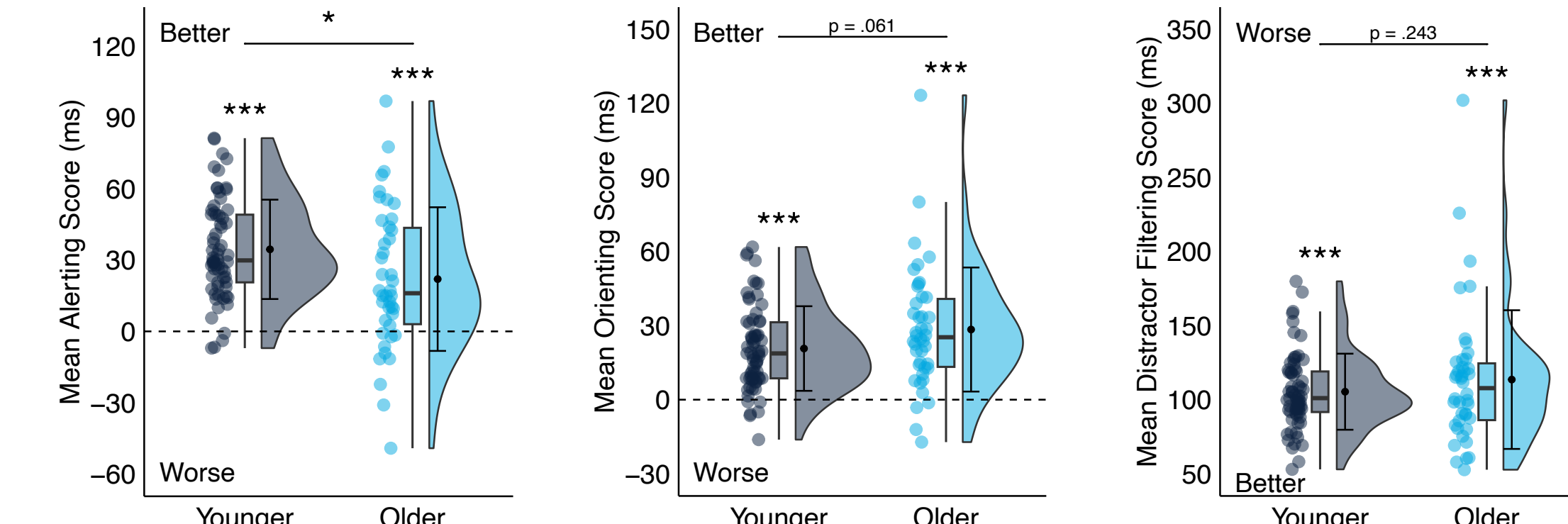
Measures attentional mechanisms of **alerting**, **orienting**, and **distractor filtering**

Alerting: Achieving and maintaining an alert state (None – Double)

Orienting: Selection of information from sensor input (Center – Upper/Lower)

Distractor filtering: Resolving conflict among responses (Incongruent – Congruent)

Older adults exhibit **greater impairments** in alerting; no differences in orienting and distractor filtering

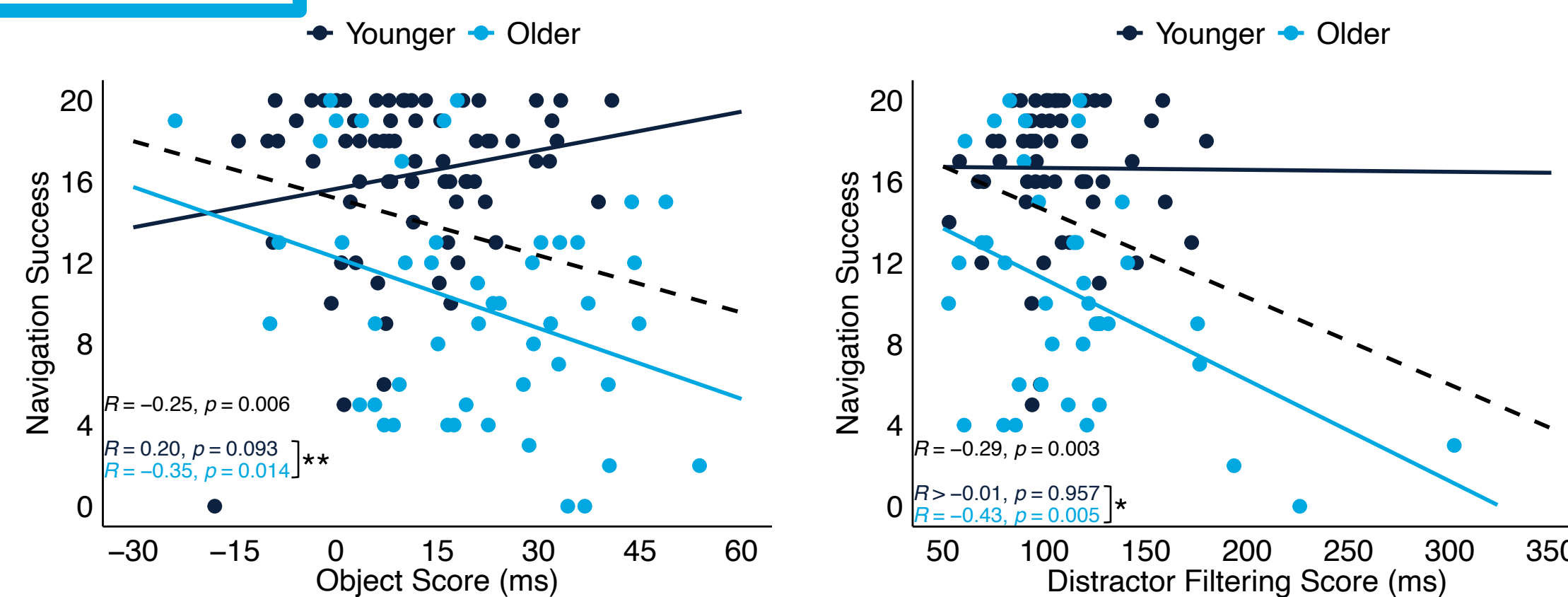


6. Attention and Spatial Navigation

Navigation strategy: Attention measures did not correlate or interact with age group

Navigation success: All attention measures correlated across age group

Object selection and distractor filtering significantly interacted with age group



Older adults with greater cost shifting attention between objects and poor distractor filtering found fewer goals

No significant correlations in younger adults

7. Conclusion

Impairments in visual attention (deficit shifting attention between objects and greater susceptibility for distraction) correlate with spatial navigation impairments in older adults

These findings point to a cognitive mechanism that may contribute to severe spatial navigation decline in Alzheimer's disease and related dementias

Future research will examine how navigational aides, like GPS, can support more effective navigation behavior and prevent older adults from getting lost

8. References

- Allison et al. (2016). *J Alzheimers Dis*. PMID: 26967209
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- McDonough et al. (2019). *Yale J Biol and Med*. PMID: 30923472

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10. Contact

Email: abarnas@ufl.edu Web: scannlab.psych.ufl.edu; adamibarnas.com
BlueSky: [@adamibarnas](https://bsky.app/profile/adamibarnas) Twitter: [@ScannLab](https://twitter.com/ScannLab); [@a_a_d_d_a_a_m_m](https://twitter.com/a_a_d_d_a_a_m_m)