processing speed factor of interest. We preprocessed BOLD scans using fmriprep, Ciftify, and XCPEngine algorithms. We used 4 different sets of connectivity-based parcellation: 1)MBAR data used to define nodes and Power (2011) atlas used to determine node network membership, 2) Younger adults data used to define nodes (Chan 2014) and Power (2011) atlas used to determine node network membership, 3) Older adults data from a different study (Han 2018) used to define nodes and Power (2011) atlas used to determine node network membership, and 4) MBAR data used to define nodes and MBAR data based community detection used to determine node network membership.
Segregation (balance of within-network and between-network connections) was measured within the association system and three well-characterized networks: Default Mode Network (DMN), Cingulo-Opercular Network (CON), and Fronto-Parietal Network (FPN). Correlation between processing speed and association system and networks was performed for all 4 node sets.
Results: We replicated prior work and found the segregation of both the cortical association system, the segregation of FPN and DMN had a consistent relationship with processing speed across all node sets (association system range of correlations: r=.294 to .342, FPN: r=.254 to .272, DMN: r=.263 to .273). Additionally, compared to parcellations created with older adults, the parcellation created based on younger individuals showed attenuated and less robust findings as those with older adults (association system r=.263, FPN r=.255, DMN r=.263).
Conclusions: This study shows that network segregation of the oldest-old brain is closely linked with processing speed and this relationship is replicable across different node sets created with varied datasets. This work adds to the growing body of knowledge about age-related dedifferentiation by demonstrating replicability and consistency of the finding that as essential cognitive skill, processing speed, is associated with differentiated functional networks even in very old individuals experiencing successful cognitive aging.

Categories: Aging
Keyword 1: aging (normal)
Keyword 2: neuroimaging: functional connectivity
Keyword 3: cognitive neuroscience
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62 Repetition priming of novel geometric shapes is associated with cortical arousal in young adults but spatial attention in older adults

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Objective: Repetition priming is a form of implicit memory in which prior exposure to a stimulus facilitates the subsequent processing of that stimulus. While explicit memory has consistently been shown to decline with age, the effect of age on implicit memory remains unresolved. Most studies examining age-related effects on priming have utilized words or pictures of real objects with pre-existing representations that may differentially involve implicit and explicit memory processes across age groups. Repetition priming may also be influenced by attentional processes during encoding that are differentially affected by age. In a previous study using word-stem completion, we found that individual differences in cortical arousal, but not spatial attention, influenced the magnitude and temporal dynamics of conceptual priming in healthy older adults. The objective of this study is to investigate whether cortical arousal and spatial attention play differential roles in the magnitude and temporal dynamics of repetition priming in young and older adults using novel shapes that do not have pre-existing representations within memory.
Participants and Methods: Healthy young (n=25, M age=19.4) and older adults (n=54, M age=70.0) completed a perceptual repetition priming task that was followed by a recognition memory test and an alerting/spatial orienting task from which behavioral measures of cortical arousal and spatial attention were derived. Older adults also completed a battery of neuropsychological tests. In the perceptual priming task, participants made a speeded judgment on whether novel nonverbal shapes had “closed” or “open” perimeters. Each shape was presented twice: half following the first presentation (immediate repetition) and half after three intervening items (delayed repetition).

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Participants were then shown closed and open versions of each shape and asked to identify which version was presented in the previous task. In the alerting/orienting task, participants made a speeded response to the location of a visual target; on a subset of trials, either nonspatial alerting or spatial orienting cues were presented 300ms prior to the target.
Results: Response times were slower and judgment accuracy greater in older adults (*p*s<0.05). However, the groups showed comparable levels of immediate and delayed repetition priming along with chance levels of recognition memory accuracy. Cortical arousal was reduced ($p<0.001$) and costs associated with spatial attention were larger ($p<0.01$) in the older adults. Despite comparable priming, cortical arousal and spatial attention were differentially related to priming across groups. In the young group, lower cortical arousal was associated with greater delayed priming (r=-.47, $p=0.017$) and slower decay rate (r=.44, $p=0.03$). In the older group, higher cost of spatial orienting was associated with greater immediate priming (r=.40, $p=0.003$) and faster decay rate (r=.29, $p=0.03$). Better category fluency performance was also associated with greater immediate priming (r=.32, $p=0.035$) and faster decay rate (r=.34, $p=0.025$) in older adults.
Conclusions: These findings suggest that different attentional systems support repetition priming across age groups. Priming is modulated by the efficiency of cortical arousal in young adults, but by the costs of spatial attention in older adults with reduced cortical arousal, consistent with a shift from bottom-up to top-down attentional processes and broader attentional scope with age.

Categories: Aging
Keyword 1: memory: implicit
Keyword 2: attention
Keyword 3: arousal
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63 In vivo Tau ([18F]-MK-6240) is Associated with Retrospective Change on Memory and Speed, but not Reasoning in Cognitively Healthy Older Adults

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Objective: Additional research is needed to better understand the relationship between early tau accumulation and cognitive decline in cognitively healthy (CH) older adults. The tau PET tracer 18F-MK-6240 has shown favorable imaging characteristics and is an ideal candidate to identify early tau accumulation in CH older adults. In the present study, we evaluated the associations between in vivo tau levels and retrospective 5-year cognitive change.
Participants and Methods: Using 18F-MK-6240 PET, we evaluated tau accumulation in 41 CH participants from Cognitive Reserve (CR) and Reference Ability Neural Network (RANN) studies. We investigated the relationships between regional PET signal and retrospective cognitive change, focusing in three cognitive domains well-established to change with aging: episodic memory, speed processing and reasoning. Latent change score analysis was applied to generate latent variables estimating the change in these domains from baseline to follow-up. Regarding tau data, we created meta-ROIs based on 16 AD-vulnerable subregions selected a priori. The tau SUVR of the subregions were averaged to create four meta-ROIs: 1) Total-AD ROI comprising all 16 areas; 2) Medial Temporal Lobe-ROI (MTL-ROI), 3) Lateral Temporal Lobe-ROI (LTL-ROI) and Cingulate/Parietal Lobe (C/P-ROI). The associations between regional tau levels and retrospective cognitive change over 5-years were investigated through regression models adjusted by age, sex, education, and baseline cognitive performance.
Results: The mean age of the sample was 67.5 years (SD=5.8, range 55 to 77 years), 53.8% were male, 63.4% White, 26.1% Black, and 7.3% Latinx. Overall, the sample was highly educated (16.20 ± 2.26) and presented high IQ scores (118.97 ± 7,76) based on American National Adult Reading Test. All participants were CH and showed cognitive decline over 5 years in all cognitive domains analyzed. Most participants were classified as Braak stage 0 (82.9%), some as Braak stage 1 (14.6%) and one participant as Braak stage 2 (2.4%). The regression models showed that higher [18F]MK-6240 SUVR was associated with steeper decline

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