Longitudinal Associations between Physical Activity, Cognitive Status, and Brain Function in Older Adults at Genetic Risk for Alzheimer’s Disease

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specific emotional memories without explicit retrieval instructions. Neur­
ral activity during young and older adults’ positive and specific autobi­
ographical memories were compared, focusing on regions preferentially
engaged in older adults’ memory retrieval. Preliminary analysis sug­
gests that young and older adults rely on distinct cognitive and neural
mechanisms during retrieval of autobiographical memories. Under­
standing how healthy aging influences older adults’ autobiographical
memory retrieval provides valuable insight into how memory represen­
tations change with time, experience, and cognitive manipulations. As
autobiographical memory is particularly important to older adults’ daily
functioning and sense of well being, this information may be invaluable
for the aging population.

B45
LONGITUDINAL ASSOCIATIONS BETWEEN PHYSICAL ACTIVITY,
COGNITIVE STATUS, AND BRAIN FUNCTION IN OLDER ADULTS
AT GENETIC RISK FOR ALZHEIMER’S DISEASE
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College of Wisconsin, 3Wayne State University, 4Marquette University, 5Rosalind Franklin University of Medicine and Science, 6Cleveland Clinic —
The apolipoproteinE epsilon4 allele is associated with cogni­
tive decline in old age and is a risk factor for Alzheimer’s disease (AD). Physical activity (PA) is associated with a reduced risk of incident cogni­
tive impairment, particularly among APOE-4 carriers. We recently
reported greater semantic memory related brain activation in cognitively
intact physically active (High PA) APOE-4 carriers compared to physi­
ically inactive (Low PA) 4 carriers and non-carriers (Smith et al., 2011).
Here, we compared longitudinal changes in semantic memory-related
brain activation in High PA and Low PA APOE-4 carriers. Thirty-two
older 4 carriers completed neuropsychological testing and a fMRI
semantic memory task (famous name discrimination) at baseline and
after 18 months. All participants were cognitively intact at baseline and
were classified as High PA (n = 16) or Low PA (n = 16) based on self­
report. After 18 months, 5 of 16 High PA and 13 of 16 Low PA were clas­
sified as cognitively declining by at least 1 SD decrease in neurocognitive
performance (Group difference, p = .011, Fisher’s exact test). A fROI
analysis of the fMRI data and repeated measures ANOVAs revealed sig­
nificant Group by Time interactions for intensity of semantic memory­
related activation. Significantly greater activation at baseline in the High
PA group was attenuated over time (no change in Low PA) and resulted in
no group differences at the 18-month follow-up. These findings sug­
gest that greater PA at baseline is associated with greater cognitive sta­
B46
CEREBRAL AND VASCULAR FACTORS MAY PREDICT MEMORY
PERFORMANCE IN HEALTHY AND PATHOLOGICAL AGING
Jill Humann1, Anouk Vermeij1,2, Arnda H.E.H. van Beek2, Ondine de la Rest2, Jurgen A.H.R.
Claassen1,2, Roy P.C. Kessels1,2, 1Radboud University Nijmegen, Donders Institute for Brain, Cognition and Behaviour, The Netherlands, 2Radboud
University Nijmegen Medical Centre, Alzheimer Centre Nijmegen, The Netherlands — Aging is associated with several changes to the structure
and function of the brain and vasculature. This study aimed to investi­
gate the relationship between cerebral and vascular factors that may play
a role in the development of Mild Cognitive Impairment (MCI) and
Alzheimer’s disease (AD), and associated cognitive impairments. Particip­
ants were 27 healthy older adults (76 ± 4.1 years), 21 MCI patients
(71.8 ± 9.2 years) and 22 AD patients (73.0 ± 6.8 years). We rated the degree
of medial temporal lobe (MTL) atrophy on coronal T1-weighted MRI, and
white matter hyperintensities on transverse T2-FLAIR MRI images.
We measured blood pressure (BP) and cerebral blood flow velocity
(CBFV, Transcranial Doppler) under resting conditions, and calculated
cerebrovascular resistance (CVR). Additionally, participants performed
the Dutch equivalent of the Rey auditory verbal learning task. Prelimi­
inary results showed that both structural and vascular measures predict
memory performance. Specifically, when corrected for age and educa­
tion, low performance on the memory task was associated with high
rates of atrophy (r = - .588) and white matter degeneration (r = - .450) as
well as higher CVR (r = - .314). AD patients compared to healthy controls
exhibited higher rates of both MTL atrophy and white matter lesions.
Furthermore, CVR was higher in patients (both MCI and AD) than in
controls. Since we did not observe differences in CBFV between groups,
this seems to be related to heightened mean BP in the patient group.
These results suggest reciprocal interactions between structural pathol­
ogy, vascular changes and cognitive performance during aging and sup­
port the idea that cerebrovascular dysfunctions may cause AD.

B47
ROLE OF RECOLLECTION IN EPISODIC FEELING-OF-KNOWING
ACCURACY IN YOUNG AND OLDER ADULTS
Michel Isninrini1, Audrey Perrottin1, Celine Souchay1, Laurence Taconnat1, Mathilde Sachet1, Badiaa
Bouazzaoual1; 1University of Tours, France — In feeling of knowing (FOK)
studies, participants predict subsequent recognition memory perfor­
mance on items initially encoded but that cannot be recalled. This study
examined the hypothesis that FOK accuracy may be influenced by the recol­
clection of contextual information related to the unrecalled target by
asking participants to indicate whether the information on which they
based their prediction of future recognition was related or not to the con­
textual episode of learning. Such procedure enabled to distinguish two
类型 of episodic FOK accuracy, associated to the recollection of the con­
text information (R-FOK) or not (NR-FOK). In addition, we tested
whether the episodic FOK accuracy deficit demonstrated by older adults
could be reduced. Results confirmed that R-FOK accuracy was signifi­
cantly higher than NR-FOK accuracy confirming that the recollection of
contextual information enhanced episodic FOK. However, this was not the
case for older adults indicating that, contrary to the younger adults, they
do not benefit from this recollection effect. This suggests a lack in
older adults in the quality of contextual details retrieved pertaining to
the unrecalled target that are required to make accurate FOK judgments.

B48
SLEEP-DEPENDENT MEMORY CONSOLIDATION IN OLDER ADULTS — A
PILOT STUDY
Kathryn Atherton1, Christopher Butler1, Anna C Nobre2; 1University of Oxford — There is now a large body of evidence demonstrat­
ing that sleep plays a role in memory consolidation. The overwhelming
majority of these studies have used young adults as participants. There
is evidence to suggest that there may be a decline in sleep-dependent
memory consolidation with age. Here we present data showing that
sleep is very beneficial for memory even in older adults (mean age
59±1.65). Participants learnt new arbitrary associations between pairs of
word stimuli. Memory was tested twelve hours later following a night of
sleep or a day of wake. Interfering pairs of words were learnt ten min­
tutes before the memory test. This interference learning has been shown
in previous studies with young adults to ‘unmask’ the benefit of sleep
for memory. Each participant took part in both conditions and the order
was counterbalanced. Retention was significantly better in the sleep
condition than the wake condition. Learning was not significantly differ­
ent in the two conditions, arguing against a circadian interpretation of
the data.

B49
AGE-RELATED AND GENETIC EFFECTS ON FUNCTIONAL
REORGANIZATION OF MEMORY SYSTEMS
Nicolas Schuck1,2, Peter Frensch1, Shu-Chen Li3, Hamburg-Universität zu Berlin, 3Max-Planck Institute
for Human Development, Berlin — Aging research shows that some forms
of memory are more affected by aging than others. Intriguingly, this
research has revealed a mismatch between age-related behavioral and
neuropsychiological decline for the habitual/procedural and declarative
memory systems: behaviorally the former exhibits smaller age-related
decline than the later, while negative effects of aging on the associated