in its pre-dementia stages and stratification of individuals for future interventional therapies aimed at slowing the progression of disease. The demonstration that EC cells have spatially related firing patterns (head direction cells and grid cells) underpins the role of this region in spatial navigation. To test the hypothesis that navigation is impaired in pre-dementia AD, we studied a novel immersive virtual reality (iVR) platform to test navigation within a simulated environment. The vestibular and locomotor feedback associated with the real world movement required for this iVR task delivers a more naturalistic paradigm than traditional “desktop” VR tasks. Methods: Patients were recruited from the Cambridge Mild Cognitive Impairment Clinic. All patients underwent volumetric MRI scanning and CSF amyloid/tau biomarker studies as part of their diagnostic workup. The iVR environments, programmed in Unity, consist of arenas with boundary cues projected to infinity. Navigation is tested using a path integration paradigm in which participants sequentially walk up to, and “collect”, three objects before being asked to return to the location of object 1. Three different environments are presented, with three different conditions for the return path (boundary cues present, boundary cues absent, removal of environment textural information to disrupt optic flow). Performance is measured in terms of the distance between the estimated and actual location of Object 1. Results: We will present initial behavioural data from MCI biomarker positive and negative patients and from age-matched controls. Behavioural measures will be correlated with EC and hippocampal subfield volumes. Conclusions: The diagnostic sensitivity and specificity of the iVR test for pre-dementia AD will be compared with a battery of neuropsychological tests used to diagnose early AD. 1) Braak H, Del Tredici K (2015). Brain 138:2814–2833. 2) Hafting et al (2005). Nature 436 801-806.

**P3-282** WITHDRAWN

**P3-283** NEUropsychological testing improves the diagnosis of mild cognitive impairment

Eero Vuoksimaa1, Linda McEvoy2, Carol E. Franz3, William S. Kremen2, 1University of Helsinki, Helsinki, Finland; 2University of California, San Diego, La Jolla, CA, USA. Contact e-mail: eero.vuoksimaa@helsinki.fi

Background: There is room for improvement in the diagnosis of mild cognitive impairment (MCI). Core clinical criteria for MCI include impairment in one or more cognitive domains. Impairment on only one neuropsychological test is commonly used, but relying on only a single neuropsychological test often over-estimates abnormality, resulting in sub-optimal specificity. Here, we tested if an additional episodic memory test improves diagnosis of amnestic MCI bettering identifying those with prodromal Alzheimer’s Disease (AD). Methods: We studied baseline brain (entorhinal cortex and hippocampus) and cerebrospinal fluid (CSF) biomarkers (beta amyloid and tau), atrophy in entorhinal and hippocampal volumes over time, and conversion to AD in 394 individuals with MCI and 230 cognitively normal (CN) individuals from the Alzheimer’s Disease Neuroimaging Initiative (ADNI). Based on external age-adjusted norms for delayed free recall on the Rey Auditory Verbal Learning Test (AVLT), we used a cutoff of >1 SD below normative means to group individuals with ADNI MCI diagnoses into AVLT- (AVLT below -1 SD) and AVLT+ groups (AVLT above -1 SD). Results: The three groups (CN, AVLT+, AVLT-) were significantly different in all baseline brain and CSF biomarkers (p’s <.05), with biomarker levels for the AVLT-group being most abnormal. The AVLT-group had significantly steeper decline in entorhinal and hippocampal volumes compared to CN group (p’s<.001) over a 3-year period, but trajectories of brain atrophy did not differ between AVLT+ and CN groups. AVLT- individuals had significantly higher risk of conversion to AD at the 3-year follow-up than AVLT+ individuals: hazard ratio=4.20 (95% confidence intervals=2.61; 6.75). Conversion rates were 50.9% for the AVLT-group, but only 16.5% for the AVLT+ group. Conclusions: Requiring more than one episodic memory measure can substantially improve the conventional diagnosis of MCI, and avoids the logical inconsistency of having amnestic MCI with normal AVLT performance. Although just how extensive testing needs to be for optimizing the core clinical criteria for MCI remains to be determined, our results suggest that the addition of just one cognitive test would be quite practical and cost-effective in both clinical and research settings.

**P3-284** THE MONTREAL COGNITIVE ASSESSMENT: NORMATIVE DATA FROM A LARGE SWEDISH POPULATION-BASED COHORT

Emma Borland1, Katarina Nägga2, Peter Nilsson3, Lennart Minthon4,5, Erik D. Nilsson6, Sebastian Palmqvist7,8, 1Clinical Memory Research Unit Malmö, Malmö, Sweden; 2Clinical Memory Research Unit, Department of Clinical Sciences, Lund University, Lund, Sweden; 3Clinical Research Unit, Department of Clinical Sciences, Malmo, Lund, Sweden; 4Memory Clinic, Skåne University Hospital, Malmö, Sweden; 5Clinical Memory Research Unit, Department of Clinical Sciences, Lund University, Malmö, Sweden; 6Clinical Memory Research Unit, Department of Clinical Sciences, Malmö, Lund University, Malmö, Sweden; 7Skåne University Hospital, Lund, Sweden; 8Clinical Memory Research Unit, Lund University, Malmö, Sweden. Contact e-mail: emmaborland@me.com

Background: The Montreal Cognitive Assessment (MoCA) has a high sensitivity and accuracy for detecting cognitive dysfunction. Swedish normative data does not exist and international norms are often derived from populations where cognitive impairment has not been screened for and thoroughly assessed to exclude subjects with dementia and mild cognitive impairment. Methods: MoCA was administered on 860 randomly selected elderly people from a population-based cohort from the EPIC study. Cognitive dysfunction was screened for and further assessed at a memory clinic. After excluding cognitively impaired participants, normative data was derived from 758 people, aged 65-85. Results: MoCA cut-offs (-1 to
Conclusions:
Significant predictors for MoCA score were age, sex and level of education. Conclusions: We present detailed normative MoCA data and cut-offs according to the DSM-5 criteria for cognitive impairment based on a large population-based cohort of elderly individuals, screened and thoroughly investigated to rule out cognitive impairment. Level of education, sex and age should be taken in account when evaluating MoCA score, which is facilitated by our online regression-based calculator that provide percentile and z-score for a subject’s MoCA score.

P3-285 PRE-MILD COGNITIVE IMPAIRMENT: CAN MEMORY PREDICT WHO RAPIDLY CONVERTS TO MILD COGNITIVE IMPAIRMENT?
Eun Hyun Seo1, Hoowon Kim1, Kyu Yeong Choi1, Ji-Eun Lee1, Kun Ho Lee1, Il Han Choo1, Chosun University, Gwangju, Republic of South Korea; 2Chosun University/Chosun University Hospital, Gwangju, Republic of South Korea; 3National Research Center for Dementia, Chosun University, Gwangju, Republic of South Korea. Contact e-mail: chwila@hanmail.net

Background: For the early detection of Alzheimer’s disease (AD), The clinical course of pre-mild cognitive impairment (pre-MCI) would be of a large interest. We followed pre-MCI and cognitively normal (CN) elderly to assess the conversion rates from pre-MCI to MCI and to compare clinical and neuropsychological characteristics between pre-MCI converters and nonconverters. Methods: We included 188 CN elderly and 77 individuals with pre-MCI at baseline, and followed them up for a mean 14 ± 2.29 months. All participants underwent comprehensive clinical and neuropsychological assessment. We compared clinical characteristics and neuropsychological tests scores between pre-MCI converters and nonconverters by using one-way univariate analysis of variance. Logistic regression analysis was performed to examine the ability of neuropsychological tests to predict conversion to MCI in individuals with pre-MCI. Results: Of 265 participants, 142 (54%) were eligible for the follow-up study (102 CN, 40 pre-MCI). The reasons for drop-out were loss of contact (19), refusal (63), poor medical condition (19), and others (22). Among those who completed follow-up assessment, 13 (33%) and 7 (7%) were converted to MCI in pre-MCI and CN groups, respectively, and pre-MCI group were significantly more converted to MCI (χ²df=1 = 15.61, p<0.001). Compared to pre-MCI nonconverters, the converters were older (p=0.048), and showed lower verbal word list recognition score (p=0.018), and lower visual memory delayed recall score (p=0.042). When these two memory scores were entered in the logistic regression model, only verbal word list recognition score was significantly predicted the conversion to MCI (χ²df=1 = 5.95, p= 0.026, odds ratio = 0.35). There were no significant differences between converters and nonconverters in subjective memory complaint, subjective depressive symptoms, everyday functioning, and other neuropsychological tests assessing attention, frontal/executive function, visuospatial ability, and language. Conclusions: Our findings indicate that although objective neuropsychological performance is within normal, individuals with pre-MCI are more likely to convert to MCI than CN. Especially episodic memory score at baseline in pre-MCI can predict MCI conversion. Our study suggests that identification of individuals with pre-MCI provides useful prognostic information.

P3-286 A MEDIATIONAL MODEL OF STRESS IN HIPPOCAMPAL NETWORKS IN MILD COGNITIVE IMPAIRMENT
Kelsey E. McDermott, Feng Yankee Lin, Ping Ren, University of Rochester, Rochester, NY, USA. Contact e-mail: yankee_lin@urmc.rochester.edu

Background: The hippocampus regulates learning and memory formation and storage, while also playing a significant role in the regulation of the Hypothalamic-Pituitary-Adrenal axis and stress responses. AD-associated neurodegeneration is known to affect all of these aspects. However, it is still unclear how stress modulates hippocampal network for learning and memory, especially in AD associated neurodegeneration. Methods: Here we examined a mediational model suggesting that both chronic and acute stress mediate the hippocampal role in top-down regulation of learning and memory in a group at high risk for AD (amnestic MCI). This study combined neuropsychological testing, resting state functional MRI, structural MRI, and acute stress tests to compare MCI subjects (n=18) to healthy controls (HC, n=21). Results: We found that the MCI group had significantly smaller right hippocampal grey matter volumes (t = 2.50, df = 30, p = .018) compared to the HC group, while there was no difference in left hippocampal volume. In functional connectivity analysis, we found that the connectivity between the right hippocampus and the inferior frontal gyrus (Rhipp-IFG) was significantly positively related to acute and chronic stress for the entire sample. We tested our mediation model for the two groups separately, controlling for age and sex. Acute and chronic stress showed significant mediating effects in the association between Rhipp-IFG and learning (before: t = -2.56, p = .022; after: t = 0.21, p = .84) in the HC group, but not in the MCI group (before: t = -0.70, p = .51; after: t = 0.70, p = .50). Conclusions: The results suggest that chronic and acute stress act as mediators for the right hippocampus-involved neural network for learning and memory, and this mediating effect may be disrupted in the AD-associated neurodegeneration process.

P3-287 CHECKLIST FOR COGNITIVE BLACKOUTS (CCB): EVALUATION OF A SCREENING INSTRUMENT FOR THE EARLY DETECTION OF MILD COGNITIVE IMPAIRMENT AND MILD ALZHEIMER'S DEMENTIA
Georg Adler, Jana Binder, Agnies Marczak, ISPG, Mannheim, Germany. Contact e-mail: adler@ispg-mannheim.de