Introduction: Our previous research revealed a robust effect of APOE ε4 (ε4) on spatial navigation in amnestic mild cognitive impairment (aMCI) patients in the real-space human analogue of the Morris Water Maze (hMWM).

Aims: The aim here was to contrast results from a computer version of the hMWM with the real-space test and to examine the utility of the computer test to discriminate ε4+ and ε4- aMCI subgroups.

Methods: Blood samples of 34 aMCI patients were collected to determine APOE genotype. The aMCI-ε4- (n=23) and aMCI-ε4+ (n=11) subgroups were compared to controls (n=28) and Alzheimer's disease (AD) patients (n=16). The aMCI subgroups did not differ in basic characteristics or in any neuropsychological tests (p's>0.110). We used a 2D computer version of the hMWM to examine spatial navigation either dependent on individual’s position (egocentric) or independent of it (allocentric-hippocampus dependent).

Results: The results in the computer and real-space versions were strongly correlated (egocentric: r=0.822, p< 0.001; allocentric: r=0.835, p< 0.001). Overall, the aMCI-ε4+ group performed poorer on spatial navigation than the aMCI-ε4- group in both egocentric (p=0.003) and allocentric tasks (p=0.037), especially in the latter trials, where the aMCI-ε4+ group did not exhibit any learning effect. Finally, the HaMCI group performed similarly as the AD group (p>0.408).

Conclusions: The computer version of the hMWM yielded findings similar to those found with the real-world version and it reliably distinguished aMCI ε4 carriers from non-carriers. This test may be a useful, relatively inexpensive screening tool for evaluation of pre-symptomatic individuals at risk of AD.