INTRODUCTION
Impaired vision is a significant independent risk factor for falls among older adults [1]. Most interventions for fall prevention have focused on visual acuity and corrective eyewear [1]. Although cognitive processes such as divided visual attention have been correlated with mobility impairments [2], limited research has attempted to implement interventions or programs involving visual perception and cognitive training. Previous work from our laboratory indicated improved mobility, balance, and obstacle course performance in older adults trained by the Nintendo Wii [3], but failed to directly assess visual perception and cognition. Therefore, the purpose of the current study was to examine the changes in visual perception and cognition (as measured by attention) following a 12-week visual training program using the Nintendo Wii. We hypothesized that greater improvement in visual perception/cognition would be observed in older adults who were involved in a visual training program compared to older adults who were not involved in visual training.

METHODS
Thirty-four independent living older adults age 60 years or above participated in the study. Participants were randomly assigned to one of two experimental groups: Control (no visual training) and Visual (visual training). All subjects provided informed consent prior to participation in the study. Each experimental group was involved in a 12-week program focusing on cardio-, strength- and balance-training of two sessions per week, 90 minutes per session. Both groups performed the exact same exercises with the exception of the Visual group who spent 10 minutes of each session playing the Wii. The Control group spent the same 10-minutes with additional cardio training. Tests of obstacle avoidance and visual perception/attention were given at baseline (week 1 of program) and at final (week 12 of program).

Obstacle avoidance was measured using a functional obstacle course [3]. The number of collisions with obstacles was recorded during three trials. Visual perception/attention was measured using the Useful Field of View (UFOV) test [4]. This test gives scores of milliseconds on three variables: visual processing speed, visual divided attention, and visual selective attention. Therefore the lower the millisecond value the better the performance.

RESULTS
The visual group significantly reduced their number of obstacle collisions from baseline (p = 0.003). In contrast, the control group did not significantly improve their obstacle collisions (p = 0.26). Improvement in divided attention of the UFOV was also seen in the visual group (p = 0.05) but not in control (p = 0.41). Linear regression of obstacle collisions by divided attention revealed a significant relationship between these two variables (p = 0.03, R = 0.39). Greater divided attention performance relates to lower collisions with obstacles.

DISCUSSION
These results point to a relationship between visual training on the Wii and visual attention improvement. Improvements of visual attention also related to decreased obstacle collisions made in an obstacle course. The relationship between greater divided attention performance and lower risk of obstacle collision concurs with previously published data [2]. These data support the hypothesis that older adults involved in a visual training program improve their visual perception and attention and that this directly relates to improved adaptive locomotion.

REFERENCES