Reviewer's report

Title: Dual-Tasking and Gait in People with Mild Cognitive Impairment. The effect of Working Memory

Version: 2 Date: 23 May 2009

Reviewer: Keith Hill

Reviewer's report:

This is a well written paper in an emerging area of research interest. The research aims are well described, and a sound method has been utilised to address these. In particular, the detailed series of cognitive and executive function assessments are well selected. The method of testing, with practice trials, and counterbalancing of order of trials is good.

A limitation of the paper (though relatively minor) is that the thoroughness utilised in determining the suite of cognitive and executive function assessments is not matched with the assessments of the other key domain of assessment - that being gait. Gait velocity is certainly a widely used indicator of mobility, and the two dual task conditions are well justified in the paper. However, there are a range of other temporal-distance measures of gait that can be derived, some of which may provide as good or better discrimination of gait performance changes in MCI, with and without dual task conditions. Several computerised systems (eg GaitRite) are available that provide quick quantification of a range of temporal and distance gait parameters. In particular, measures of double support duration and step width as indicators of stability during gait may be as good or better indicators. This is a limitation of the study and direction for future research, that should be included in the discussion.

Major compulsory revisions:
Nil

Minor essential revisions:
1. don't use abbreviations that have not been defined in the abstract - spell out GV (Methods, line 2)
2. Abstract - Method - add sample profile (mean age, gender) to the abstract.
3. Abstract - Results - first sentence - reword - change text to read "Participants experienced a reduction in GV while ENGAGING IN dual-task challenges ..."
4. Abstract - Conclusion - last sentence - change text from "...that cortical control of gait is affected by decline ..." to "that cortical control of gait is associated with decline ..."
5. Throughout the paper: referencing throughout needs to be corrected to have a space consistently before the square brackets.
6. Method, page 7, gait assessment section, line 4 - change "centiseconds" to
"milliseconds".

7. Method - Describe how falls data was collected.

8. Results section, page 8, line 4 - describe how the speeds were selected for the three walking speed groups - were these based on other reported literature, if not, what was their basis? The slow group only had n=4, which limits the usefulness of this grouping in any analyses.

9. Results section, pages 8-9 - Comment is made about the scores on various cognitive / executive function tasks relative to normal scores, but this comparison is not made for gait velocity. Make a comment about how the single task gait velocity for this sample relates to gait velocity for a healthy older sample.

10. Discussion: Include a comment under the limitations section of the discussion that gait velocity is only one of a range of temporal-distance gait measures that could be investigated using this study design, and that future research could evaluate whether other temporal-distance gait measures might be as discriminative or more discriminative in early MCI of gait changes associated with dual task.

11. Table 1 - the proportion of the sample reporting falls is low relative to the general population aged greater than 65, suggesting self report of this measure is likely to be poor in this group. Given that this measure is used in the linear regression, there should be mention in the discussion as this being a potential limitation, with future studies considering prospective recording of falls with falls diaries, with carer validation of falls data, to overcome this.

Discretionary revisions:
1. Abstract - conclusion - change the term "elderly" to "older people" (also elsewhere in the paper where the term "elderly" is used.
2. Methods, page 5, 4th last line - consider adding "and cognitive impairment" to the statement that depression may affect gait performance.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests