Author's response to reviews

Title: A randomised controlled trial investigating motor skill training as a function of attentional focus in old age

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Author's response to reviews: see over
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Editor, BMC Geriatrics

A randomised controlled trial investigating motor skill training as a function of attentional focus in old age

Dear Editor,

Please find enclosed a copy of the substantially revised article we would like to offer BMC Geriatrics. The attached copy includes abstract, captions, tables and references.

In this revised version we have considered the specific comments of Reviewer 1 & 2. In this letter we outline the changes we have undertaken in our paper. We basically strived to write a more focused, clear and explicit paper, where everything is as short as possible while not losing informational detail.

We very much hope that these revisions satisfy the editor’s and reviewer’s comments and would like to thank you for getting the opportunity to substantially improve our manuscript. We very much appreciated the thorough comments and suggestions made.

Thank you very much in advance for your time and consideration.

With best wishes

Eling D. de Bruin
Reviewer: 1
Reviewer: Jorunn Helbostad

Reviewer’s comments

Manuscript:
A randomised controlled trial investigating motor skill training as a function of attentional focus in old age. Eling D de Bruin, Jaap Swanenburg, Elsbeth Betschon and Kurt Murer.
The manuscript assesses whether external focus during the motor learning phase of a dynamic postural task in older persons enhances learning, motor performance and fear of falling compared with internal focus. The results demonstrate no effect of focus during learning, but an overall effect of exercise on motor performance and fear of falling. The results are somewhat contradictory to finding in younger adult. The sample size is small, and the research design and methods are sound, and in general the manuscript is well written. The study is presented as a pilot study for a larger future study on the same topic. The groups in the present study behaved more or less the same when it comes to outcomes, and it is therefore not likely that a larger study will be able to detect changes in learning strategies between similar groups.

Discretionary Revisions:
1. Results, Functional performance variables. “…focus instruction” should be “focus of instruction”.
Our Answer:
“focus instruction” was changed to “focus of instruction”

Minor Essential Revisions
1. Abstract, last sentence: “different learning principles in older persons”: It should be added what this is compared to.
Our Answer:
We added compared to younger adults to the last sentence of the abstract.

2. Background, 1. paragraph, last sentence: The meaning of the sentence is not obvious.
Our Answer:
We tried to clarify the meaning of the last sentence by inserting the following text: “Older adults, however, constitute a heterogenous group of individuals exhibiting an infinite variety of cognitive and physical abilities. This variety causes learning abilities of the aged to be on a multidimensional continuum ranging from individuals with good learning abilities and good memory skills to individuals with poor learning capacities and impaired memory skills”
3. Background, 2, paragraph, 2. sentence: The authors state that decreased postural stability with increasing age is the results of slowing central mechanisms. Age related changes may also be related to diseases and change in life style.

Our Answer:

The reviewer is correct with her remark. We added this information to the text together with a new reference with detailed information on this topic. The new statement now reads: “Decreased postural stability with increasing age can result from impairment in sensory, motor and central integrative mechanisms”

4. Methods, Device and task training, 2. paragraph. It should be referred to Table 1 before Table 2. Thus, Table 2 should be named as Table 1.

Our Answer:

The reviewer is correct with her remark and we changed the tables accordingly.

5. Methods, Primary outcome variables, 2. paragraph: “…between the blue lines without touching the red boundary lines” should be better explained, or the authors should refer to Figure 2A.

Our Answer:

We amended the explanation and refer to figure 2a in the revised manuscript.

6. Methods, Primary outcome variables, 3. paragraph: “A combined value of 100%..” should be better explained.

Our Answer:

We added a more extensive description for more clarity. The following information has been added: “The LOS has been defined as the maximum angle a body can achieve from vertical without losing one’s balance. Once the LOS is exceeded a fall, stumble or step will ensue. LOS in normal adults is 12 degrees in anterior-posterior (AP), and 16 degrees in the medio-lateral (ML) direction. For the BSS, the percentage of normal LOS in the AP direction is calculated by dividing the subject’s AP stability index (maximum 20º) by a normal reference value of 12º and multiplying that number by 100. Similarly, subject’s ML stability index (maximum 20º) is divided by a normal reference value of 16º and multiplied by 100 to determine the percentage of normal LOS in the lateral direction [25]. A combined value of 100% means perfect control. Values below indicate problems with dynamic balance. Reliability for a dynamic balance protocol with decreasing stability levels on the BBS has been proven clinically reliable, with intraclass correlation coefficients ranging from .80 to .43 [26].”
7. Methods, Functional performance variables, 2. paragraph: Timing by a hand held stop watch down to one hundred second is too precise compared to what is possible to do. I suggest only to report down to 1/10 of a second.

**Our Answer:**
We adopted the suggestion of the reviewer and report down to 1/10 of a second.

8. Results, 1. paragraph: The text that is exactly overlapping with Figure 1 could be removed.

**Our Answer:**
The overlapping text has been removed.

9. Results, Participant description, 2. sentence: Results were not similar between groups, but there were no significant group differences.

**Our Answer:**
The text has been clarified.

10. Results, compliance: Was there any group differences in compliance?

**Our Answer:**
We added the following sentence: “There were no differences in compliance between the two groups.”

11. Results, Primary outcomes, 1. and 2. paragraph: Analysis strategy for missing data and how to deal with normality distributions should be reported in the method chapter.

**Our Answer:**
The text has been changed as suggested by the reviewer.

12. Results, Functional performance variables: t- and p-values for group differences for performance measures should be added even if they were not significant different.

**Our Answer:**
The values were added to the text as suggested by the reviewer.

13. In general the discussion will be improved if the authors tighten it up.

**Our Answer:**
We have tried to tighten-up the discussion.

14. Discussion, 1. paragraph: The concept “learning pattern” is not presented before and is difficult to interpret.
Our Answer:
The reviewer is right. We changed the wording of this sentence for more clarity and added "differences in learning progress".

15. Discussion, 2. paragraph, 3. sentence: It is hard to understand the meaning of the sentence.

Our Answer:
The sentence has been changed to for more clarity: "It is assumed that through the adoption of an external focus unconscious, fast and reflexive processes are enabled to control the movements".

16. Discussion, 2. paragraph: The argumentation in the last part of the paragraph is not related to the authors' own findings.

Our Answer:
The reviewer is correct. For this reason we skipped the last part of the paragraph. This will also tighten-up the discussion.

17. Discussion, 3. paragraph: The argumentation is not related to the study aims of the present study.

Our Answer:
In order to tighten-up the discussion and to keep a focus on the study aims we deleted this paragraph.

18. Discussion, last paragraph: The authors argue about doing a larger study on the same topic. I cannot see that this is relevant, since there were no tendencies to a better effect in one of the groups, and a larger study will thus not could reveal significant group differences.

Our Answer:
Replication is in our opinion important for a number of reasons, including (1) assurance that results are valid and reliable; (2) determination of generalizability or the role of extraneous variables; (3) application of results to real world situations; and (4) inspiration of new research combining previous findings from related studies. The reviewer is correct when she states that there were no tendencies to a better effect in one of the groups, and a larger study will thus not reveal significant group differences. However, we can not exclude with 100% certainty not having made a mistake. Formally, therefore, it would be wise to check the findings with another group of older adults to gain more certainty. Replication involves the process of repeating this type of study using the same methods, different subjects, and different experimenters. It can also involve applying the theory to new situations in an attempt to determine the generalizability to different groups or locations. For
example, our study may be completed using people from nursing homes or people living independently. From a research perspective, therefore, our arguments should remain in the text.

19. Conclusion: The conclusion should be based on own findings and not continue the discussion of the results compared to other groups.

Our Answer:
The reviewer is correct with this remark. The discussion of the results compared to other groups has been deleted from the conclusion.

20. Table 1: The authors should be consistent in what they report. E.g., for left column (label column) Mean and SD are only reported for some of the variables.

Our Answer:
The table has been changed for consistency as suggested by the reviewer.

Major Compulsory Revisions
1. Methods, Primary outcome variables: It should be better explained how the outcome variables from the platform were calculated.

Our Answer:
The “primary outcomes section” has been revised and extended with information on how the outcome variables were calculated.
Reviewer: 2
Reviewer: Jennifer Nitz

Reviewer’s report:
This paper reports an interesting investigation of internal and external focus of attention for training dynamic balance in older people. The topic is of considerable interest and importance for those training dynamic balance in older people.
The research method is sound as is the reporting of data and discussion. There are some important points that require clarification and increased explanation to be included into the paper before it might be acceptable for publication.

Major compulsory revisions
1. The authors must show how the 3 measures, weight shift score, dynamic LOS performance time and dynamic LOS index are measures of the learning process. I assume that this is the case as they are the primary outcome variables. This needs to be included into the background so that the statement of hypothesis can be clarified.

Our Answer:
Information on how the three measures are measures that reflect the learning process has been added to the first paragraph. “Learning can be defined as a change in the capability of a person to perform a skill that must be inferred from a relatively permanent improvement in performance as a result of practice or experience. Learning of a motor skill can be assessed by recording practice performance during the period of time a person practices a skill. A performance characteristic that can be recorded as skill learning takes place is improvement of the skill over the time period”.

2. In table 2 in the ‘task’ column it is noted that some subjects performed the task seated or standing. The number of subjects in each position needs to be noted. In the ‘imposed constraint’ column you need to say how the stance position was manipulated and if all subjects were able to achieve the positions. All descriptions of constraint need to be more descriptive of exactly what was done. You also need to indicate if all subjects were able to progress through all stages of balance training or if only some could manage the challenges which appear extreme for such elderly subjects. If there was an imbalance in numbers of subjects able to train at the most difficult level between groups then this might pose a limitation to the results. These aspects need to be discussed or reported in the appropriate manner.

Our Answer:
All subjects were able to start the training in standing position. This information was added to the table. How we changed the standing position (through narrowing of the base of support) has been added as a picture of the foot positions to the table. The following sentence has been added to the compliance section: “There were no differences in compliance between the two groups nor were there group differences in the rates of progression through the training stages”. There was, thus, no imbalance in numbers of subjects able to train at the most difficult level.

3. The last sentence in the ‘device and task training’ section is unclear and needs revision so that the reader can understand if you mean that the subjects were happy to consent to participate without knowing the intent of the study.

**Our Answer:**
The last sentence in the ‘device and task training’ section has been revised for more clarity.

4. You cannot assume that readers know the equipment so more detail regarding the primary outcome measures and how they are obtained is needed.

**Our Answer:**
The “primary outcomes section” has been revised and extended with information on how the outcome variables were calculated.

**Minor essential revisions**

1. The word ‘underground’ in the last sentence of the first paragraph of the discussion is used in the incorrect context and should be replaced by ‘platform’.

**Our Answer:**
The word ‘underground’ in the last sentence of the first paragraph of the discussion has been replaced by ‘platform’

2. ‘resuming’ the first word of the conclusion should be replaced by ‘In summary’.

**Our Answer:**
‘Resuming’ the first word of the conclusion has been replaced by ‘In summary’.