Author’s response to reviews

Title: IN-HOME PHYSICAL FRAILTY MONITORING: RELEVANCE WITH RESPECT TO CLINICAL TESTS

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Author’s response to reviews:

Response to Reviewer #1 (Mr. Qian Li Xue, Ph.D):

We would like to thank the reviewer for careful and thorough reading of this manuscript and for the thoughtful comments and constructive suggestions, which help to improve the quality of this manuscript. Our response follows (the reviewer’s comments are in italics).

1- The authors are encouraged to add this additional information into the manuscript by calculating, for example, Cohen's kappa.

Reply: We thank the reviewer for his useful and focused remark about the correspondence between discrete frailty states from using the two approaches. In this manner, we followed the reviewer suggestion, and we applied Cohen's kappa statistics. Cohen’s kappa coefficient was calculated to determine the agreement between the two approaches giving a $k = 0.7613$; (k) showed good agreements between the two approaches. The number of subjects classified as frail and non-frail for each of the two approaches is shown in the table below.

"The authors' response letter has been included as a supplementary file"
2- In addition, this manuscript would benefit from including a table that summarizes the baseline characteristics of the study sample

Reply: We added the table below

"The authors' response letter has been included as a supplementary file"

3- It would also be interesting to compare the correlations between the healthy subjects and the patient sample in the study.

Reply: We removed the eight patients who are classified as frail, and then we recalculated the correlation coefficients. There was no significant change: The correlation coefficients have become respectively for measurements of weight (0.99), grip strength (0.88) and walking speed (0.80).

These small variations are due to the number of patients, which represents 4.1% of all the subjects recruited

Specific comments:

Page 7, line 164: what is PA? Should it be PT instead?

Reply: PA is the pressure applied by the user (the pressure measured by the sensor minus the initial pressure inside the ball)
We would like to thank the reviewer for his thoughtful comments and efforts towards improving our manuscript, which help to improve the quality of this manuscript. Our response follows (the reviewer’s comments are in italics).

1- The authors need to add an additional analysis to assess the ability of the tool to classify participants as frail/pre-frail/robust using the Fried frailty phenotype.

Reply: We added an additional analysis based on the Cohen's Kappa statistics; to evaluate the capacity of the tools to classify participants using the two approaches (Fried's scale and ARPEGE). The table below shows the distribution of subjects as well as the coefficient of kappa display the agreement between the two approaches.

"The authors' response letter has been included as a supplementary file"

Cohen's kappa coefficient (k) = 0.7613;

2- The CES-D depression scale items for exhaustion are the same as Fried, so it would be expected that the same result would be obtained. In this way, the accuracy of classification as frail/pre-frail/robust could be evaluated.

Reply: Exhaustion assessment was made by a French adaptation of the two questions used by Fried et al and those derived from the CES-D scale. The obtained results were not expected when we initiated this study. Indeed, the number of people classified as frail was much more than expected. However, as we did not have a Gold standard to measure exhaustion, we extracted the results produced by the few items more or less related to a depression state from mini-GDS. Correlation coefficients was calculated between ARPEGE and mini-GDS scores giving an r=0.340.

According to our confident outcomes, we suggest that this weak correlation is not necessarily the fault of the measuring instrument. However, it is possible that it is due to the conversion of the two questions from an English to French version; despite that these questions were translated by a professional translator.

As future perspectives and work, we aim to repeat our experiments while taking into account the involvement of a new translator with expertise in the geriatric field.
This work will be done since we are highly convinced by the fact of how language can affect the way we think as presented by Dr. Lea Boroditsky “HOW DOES OUR LANGUAGE SHAPE THE WAY WE THINK?”

3- In future work, the authors should consider the use of a single walking trial for both systems, ideally with the use of timing gates to automatically assess gait velocity.

Reply: we have taken notice of this suggestion and we will integrate it into our new future work.

ADDITIONAL REQUESTS/SUGGESTIONS:

4- The manuscript has some errors in English throughout. It would benefit from being proofread by a native English speaker.

Reply: The manuscript has been reviewed by a professional native English speaker.

5- It would also be worth expanding the discussion to include the large variability between different frailty tools with respect to the prevalence of frailty identified in a given population.

Reply: A substantial addition has been made to the discussion related to the variability between different frailty tools.

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