Author’s response to reviews

Title: Postural Awareness and its Relation to Pain: Validation of an innovative Instrument measuring Awareness of Body Posture in Patients with Chronic Pain

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Author’s response to reviews:

Dear Dr Macedo, dear reviewers,

Thank you very much indeed for your efforts while reviewing this manuscript and your helpful comments we addressed accordingly. Changes are highlighted in grey.

Reply to Dr Macedo:

1: Additionally, following guidelines for the conduct of validation studies you should include specific hypothesis for each one of your concurrent validity testing with direction of the association and expected size of the association. Then statistical analysis should be conducted using hypothesis testing procedures other than parameter estimation and results should be presented accordingly.

RESPONSE: We have added specific hypothesis with expected directions and size of the associations. We now present the results according to the hypotheses and discuss them accordingly. Changes: introduction page 6, results page 12-13, discussion page 17.

2: Finally, your conclusions and discussion should be reflective of your results. In this case you suggest on the first paragraph of your discussion that you have found acceptable psychometric properties which is not reflective of your validation results.

RESPONSE: Based on current conventions of e.g. reliability, the psychometrics properties actually are at least acceptable. Nevertheless, we now discuss the importance of further
validation studies before the PAS can be used in routine clinical practice and research. Changes: discussion page 17, page 20.

Reply to Dr Saragiotto:

1: I miss a first paragraph introducing the terms posture and postural control as well as a general introduction of the topic to the readers.

RESPONSE: We have added a respective paragraph on definitions. Changes: introduction page 5.

2: Page 5, line 8: It is very controversial in the literature that 'bad' posture and 'poor' postural control are major contributors to back pain. I think this should be addressed and authors should be cautious about these statements.

RESPONSE: We changed the introduction in order to reflect the controversial discussion and the controversial findings in prior studies. Changes: introduction page 5-6.

3: "It can be expected that the current use of smartphones and other hand-held electronic devices will increase the prevalence of maladaptive spinal posture habits and associated pain conditions" According to a recent article it doesn't seem to happen (https://doi.org/10.1007/s00586-017-5444-5), so authors can be more cautious on this statement and comment on this recent publication.

RESPONSE: Based on your comments and those of the second reviewer who explicitly asked to delete this sentence, the sentence now has been deleted. Changes: introduction page 5.

4: I think the rationale for the scale is interesting and somehow important. However, the introduction needs to be revised to correctly address the current literature that doesn't really support the idea of postural awareness or influence of posture in pain conditions. It doesn't mean that the question is not important, but that it should be presented as a complex and controversial relationship.

RESPONSE: We now changed the introduction to reflect that this topic is controversially discussed and that our approach is not supported by all studies. Changes: introduction pages 5-6.

5: It would be good to mention the aim of the two observational studies or some more details about the studies (ie, link to protocol).
RESPONSE: We have added the aims of the two studies. We already had linked to the clinicaltrials.gov registration and now explicitly state that the study protocols can be found there. Changes: methods page 7.

6: Data analysis: it makes more sense to me that the items are a bit correlated. In this case, an oblique rotation (ie, oblimin) would be more appropriate instead of orthogonal (ie, varimax). Did the authors perform a correlation? That would be the best way to decide between both rotation - if factor correlations are not driven by the data, the solution remains nearly orthogonal.

RESPONSE: Thanks for pointing this out. We tested for intercorrelations and since several of the items were correlated, we repeated the analysis using oblimin rotation. The results changed only marginally. Changes: methods page 9, results page 28.

7: One concern I have is that this scale was developed to be used to a wide range of conditions. Perhaps authors should address that in the discussion/limitations of this manuscript.

RESPONSE: We already had included this point in the limitation section.

8: One thing that should be taken into account is that EFA are prone to find factors no matter what. So, the next step is an assessment of dimensionality (Rasch analysis maybe) and CFA with the 2-factor solution. This should be acknowledged in the paper as well as directions for future research. This means, the scale may not be ready yet. It should also be clear that, alongside with the limitations, the questionnaire needs more validation.

RESPONSE: We have added these implications for further research to the discussion. Changes: discussion page 17.

9: Conclusion should be clear and concise, answering the aim of the study and covering the main implications. It should be clear that further validation is necessary.

RESPONSE: We have changed the conclusions accordingly. Changes: conclusions page 20.

Reply to Dr Ward:

1: There are a few additional steps sometimes taken with the initial development of a questionnaire. if these steps were included could the authors please include information on external expert review language level considerations pilot testing on a patient sample including assessment of comprehensibility, time burden and completeness of content

RESPONSE: Those steps were not done. We added this to the limitations section. Changes: discussion page 20.
2: I think the introduction needs work. I think the last sentence of the first paragraph should be deleted, unless some evidence can be presented to support this claim. I think the introduction would benefit from a clearer definition of what the authors mean by postural awareness. Some of the references given don't convincingly fit with the current narrative.

RESPONSE: We have revised the introduction and deleted the respective sentence. We also added a definition of postural awareness. Changes: introduction page 5.

3: methods measures section: when discussing the BAQ you could delete one of the two mentions of the translation in preparation

RESPONSE: We deleted one of the mentions and also added the citation of the now published validation study of the BAQ and BRS. Changes: methods page 8.

4: In the limitations section of the discussion I am not sure what you mean with regard to the forth item (the MAIA).

RESPONSE: We have now deleted the respective sentence. Changes: discussion page 20.

Once again, we would like to thank the editor and the reviewers for their efforts, encouraging comments and constructive criticism.

Sincerely yours,

Holger Cramer (on behalf of the authors)