Author's response to reviews

Title: Exploring the relationships between International Classification of Functioning, Disability and Health (ICF) constructs of Impairment, Activity Limitation and Participation Restriction in people with osteoarthritis prior to joint replacement.

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Author's response to reviews: see over
Please find below our point-by-point reply to the reviewers comments
We have indented our replies.

Reviewer 1

Minor essential revisions
This manuscript is much improved following revision. My major issue now lies with terminology, specifically the terms ‘independent’ and ‘uncontaminated’ in connection with the measures. I fully understand the sentiment behind this. However, I wonder if theoretical and statistical concepts are being confused here. As I understand it the three measures come from a theoretical understanding related to ICF concepts (as captured in the Aberdeen measure) refined through a process of confirmatory factor analysis (CFA) and other measurement techniques. This analysis showed that a three factor solution provided the best fit for the data. The appendix which described this is titled ‘Deriving statistically independent .... measures’, and the measures’ ‘statistical independence’ is referred to in the main text. However the I, A and P measures derived from the CFA are correlated with each other. How then can they be statistically independent? The factor analysis cannot give insights into whether the measures are ‘contaminated’ or not. That is in the eye of the beholder (i.e. theoretical concepts related to the ICF). Factor analysis can only point to groups of variables which are inter-related. I wonder here if the authors are confusing theoretically derived and statistically obtained concepts. Perhaps a more neutral terminology would be to use refer simply to the measures of I, A and P without qualification, or if an adjective is required perhaps ‘separate’ or ‘discrete’ would be more appropriate. (Issues of ‘contamination’ could still be discussed – it’s the labelling of the measures as ‘uncontaminated' that concerns me).

Thank you for this comment, we have changed the description of the measures as suggested to 'separate/separable' measures rather than 'independent or uncontaminated' throughout the manuscript.

The aim of the study as stated could be more precise. The aim surely is to explore the basic ICF pathways using structural equation modelling not unspecified multivariate techniques as currently stated..

Thank you for this comment, we have changed the aim as suggested.

I note the response options for the I, A and P questions in the Aberdeen measures are different for each of the three dimensions. For example, the I dimension has frequency-based response options, whereas the A and P have severity based response options. Might this have affected the CFA? If so, this should be noted as a limitation.

Yes, this may affect the CFA so this point has been added into the discussion.

Re: terminology in the discussion the authors refer to pathways FROM I to A or
FROM A to P. Given this is cross-sectional data would it be more appropriate to talk about pathways between I and A and A and P?

We have changed this as suggested to ‘between’ rather than ‘from’

Note: the PDF version of the final paper was difficult to read for minor problems with paragraphing, punctuation, or wording given the extent of the changes. In particular I think that the introduction might benefit from a review for editing purposes with the track changes removed.

We have reviewed the paper with tracked changes removed.

Impairment, activity limitation and participation restriction does not need to be capitalized except where it is part of the name of the Aberdeen measure.

We have removed capitalisation as suggested

**Reviewer 3**

Minor essential revisions:
Page 12. The Legend in Table 2 is incomplete since it contains both demographic and information about functioning within the I, A and P domains. Moreover you do not refer to table 2 in the result section at all, only in the discussion on page 17.

We have looked at other similar tables in the journal and they seem to also be labelled as patient characteristics (with demographic and functioning summary) so we have not changed this.

We have corrected the typo in the results where we referred to Table 1 where it should have been Table 2

Page 13 last sentence: All latent constructs were significantly correlated with each other, with the strongest correlation between A and P (r=0.75), then I and A (r=0.76) and finally I and P (r=0.59). This measurement model provides support for I, A & P being independent constructs rather than a single general concept.

Please explain, is it because the correlation is low(?), below 0.90(?), or what is the criterion for stating that correlations above 0.70 are indicators of I and A, and A and P being independent constructs?

We have clarified this by moving the explanation for suggesting I, A, P are separable constructs to a more appropriate position in the paper (i.e. because the CFA showed that the three factor model fitted better than any of the alternative 1 or 2 factor models and not based on the correlations between the constructs).