Author's response to reviews

Title: A psychometric appraisal of the DREEM

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Author's response to reviews: see over
Dear Dr Galeng,  

MS: 1139105605471241 - A psychometric appraisal of the DREEM

Thank you for the considered and constructive review of our paper. We would like to comment on a number of the points raised although our understanding is that none of these points was raised as an impediment to publication. We take the liberty of reproducing the reviewers comments verbatim in italics and responding to each in turn.

“This article is well written, the statistical analysis is simple but good enough to support their results. Methodology is appropriate to analyse the psychometric properties of this instrument (DREEM) and their conclusions are coherent with their findings. It is important to highlight that it’s not new their findings related to low reliability (Alpha coefficient <0.6) in the social domain, because it is consistent with other analysis carried out by several authors in different languages.”

This latter point is true and we acknowledge it in our paper. We deemed it important to add our results to this literature along with our, more directed, psychometric appraisal.

“The best way to assess reliability is Generalisability theory (D studies and G coefficient) which is currently preferred by several authors instead of Cronbach alpha and I encourage the authors to consider it to expand the analysis.”

This is a good suggestion although we might dispute whether there is ever a best way to assess reliability. However, our study is using a single facet design so the reviewer’s suggestion that we adopt a D-facet Generalisability study, while intriguing would, in our opinion, not add to the central thesis of the paper. Nevertheless a future study on reliability generalisation of the DREEM is certainly overdue but is beyond our current remit.

“Construct validity was well conducted but even when they found a predominant factor, it’s difficult to conclude that DREEM is uni-dimensional, because this main factor must explain more than 50% of the variance.”

We believe this comment reflects a misunderstanding of our analysis. We did not conclude that the DREEM is unidimensional but rather suggested the potential usefulness of a single underlying factor on the basis of the high correlations observed between the 5-subscale scores and not from an exploratory factor analysis. As such our comment related to the possibility of a higher-order structure. A full analysis of the hierarchical structure of the DREEM was beyond the scope of this paper and, in any case, the weakness of the 5 first order factors suggest that such an analysis would not be very useful.
“The original authors of the DREEM questionnaire, based the strength of this instrument in grounded theory followed by Delphi technique with universal validity and it was widely administered in several countries, cultures and languages in the last 10 years. It is difficult at this level to propose to reframe or delete some items of this instrument.”

We completely concur with this point. It would certainly be difficult to reframe and delete items, however, it may still be necessary. The developments that led to the DREEM entailed, in essence, the development of a model of educational environment. A psychometric device is simply a manifestation of an underlying measurement model. Therefore, when the model is found wanting we need to either a) discard the model altogether or b) adjust it to reflect empirical findings. Our paper advocates the latter and this does require a reconsideration of the items and structure upon which the DREEM is built.

“I recommend the authors to carry out other analysis to assess construct validity: as a complement of the traditional exploratory factor analysis like the Kaiser–Guttman criterion, in which all factors with an Eigen value >1.00 can be included (Field, 2000; 2005); and the Cattell criterion, where the inflexion point of the scree plot curve is the cut off, and all factors above are accepted (Cattell, 1966).”

We are less convinced by this advice and think it may result from a misunderstanding of the aims of the paper. We conducted a ‘confirmatory’ multiple group factor analysis in which we tested directly the validity of the putative factor structure of the DREEM. This was our intention. We did not set out to explore the underlying structure of the DREEM item pool as we were concerned with testing the specific measurement model implied by the device. We agree that such an exploratory analysis might be interesting and might form the basis of a reappraisal of the underlying model. However, the concerns of our paper were more pragmatic and centre around the utility of the instrument.

“In conclusion, their findings are consistent with other authors and it will be useful to include additional analysis to support their conclusions and to expand the information related to psychometric properties of the DREEM questionnaire.”

We hope that we have convinced the editor and reviewer that the further analysis they suggest, while interesting, are beyond the remit of the current paper. To add a D-facet generalisability analysis and an exploratory factor analysis would increase the size of the paper dramatically and diffuse its tight focus. That is not to say that such analyses might prove interesting but they are beyond the remit of this paper.

We hope that, in the light of these comments, you will be able to publish the paper as it stands.
Yours sincerely,

Dr Sean Hammond

P.S.
There are one or two technical issues raised by the reviewer that are actually tangential to the paper but are the grounds of an interesting debate. First it is asserted that for unidimensionality to apply this main factor must explain more than 50% of the variance. This is a rather deterministic statement and while it may be a reasonable rule of thumb it will not apply when the item pool is largely heterogeneous with only a small core of homogenous items to define the latent trait. We would argue that the only way to demonstrate unidimensionality is to carry out an analysis informed by Item Response Theory. However, since this was not our purpose this point is rather moot.

Second, the reviewer makes much of the eigen value > 1 (Kaiser-Guttman) and Scree criteria for exploratory factor analysis. The former is never advisable except as a means of identifying the upper bound of reasonable factors. Ironically, it was expressly argued by Louis Guttman that it not be used for interpreting factor solutions as it will always over-factor. The statistical approach that is now currently advised by psychometricians for factor analysis is parallel analysis but even this has less success than good old fashioned interpretability analysis. However, as our analysis was confirmatory rather than exploratory, these issues also seem rather moot.