Reviewer's report

Title: Psychometric properties and confirmatory factor analysis of the Jefferson Scale of Physician Empathy

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Reviewer: Kevin Wolfe

Reviewer's report:

This IRB approved study examines the psychometric properties and construct validity of the Jefferson Scale of Physician Empathy (JSPE) for use in measuring levels of empathy in UK medical students. The scale was administered to 853 medical students at a UK medical college. The data were analyzed to examine the dimensional structure of the form using Principle Components Analysis (PCA), and then to confirm this dimensional structure using Confirmatory Factor Analysis (CFA). A three component structure was identified by PCA representing the emotional intelligence, perspective taking, and emotional detachment. Three items with loadings < 0.45 were dropped from the scale. Results of CFA confirmed that the three factor model based on the PCA results demonstrated good fit for the total sample, and both males and females when examined separately.

• The paper is well written and provides adequate explanation of theoretical concepts and statistical analyses.
• The sample size was adequate to conduct the analyses, which appear to have been conducted appropriately.
• The authors gave a good description of indices of fit and discussion of the sensitivity of chi-square to sample size.
• The results of the exploratory analyses in this study provide support for the construct validity of the JSPE for assessing UK medical students’ levels of empathy.
• The results also indicate that levels of empathy are higher for females than males, providing additional evidence for construct validity
• The introduction of CFA is a welcomed addition to the field of medical education research.

The authors adequately responded to my previous recommendations and revisions. Therefore, there are no major or minor compulsory revisions, but I will make the following comments as discretionary considerations.

• The authors explained that they chose to conduct exploratory analyses because they did not have an idea of the underlying components of the JSPE in UK medical students. I would argue that a stronger approach would have been to forgo the exploratory analyses, at least initially, and to test the factor structure identified in previous studies using Confirmatory Factor Analysis in UK medical
students. Then, if the hypothesized model did not have acceptable fit for the data, EFA could be used to identify the model that best fits UK medical students. However, the authors’ approach was reasonable.

• The authors chose to conduct Principle Components Analysis in the exploratory phase of the analyses. Though PCA is fundamentally different than EFA, I'll concede that the resulting models, more often than not, are similar. I feel that the manuscript would have been strengthened if the authors had included a statistically based rationale for their decision to conduct PCA rather than EFA.

• The authors proposed to strengthen the evidence for construct validity by also performing Confirmatory Factor Analysis to test if the three component model identified using PCA had adequate fit for the same data set. I feel the use of CFA is a strong addition to the field of medical education research. However, the results of the CFA as conducted in this study, while confirming that the model had adequate fit when tested using the same data, offer little additional support for construct validity above that already yielded by the results of the PCA. Since PCA identifies the best fitting model for the data, there is little reason to expect that this model would not have adequate fit for the same data when tested using CFA. This issue was briefly addressed by the authors in their discussion of the limitations.

• The CFA results that demonstrate that this model fits adequately in both males and females offers some additional support for construct validity, as it suggests that the instrument measures similar constructs across males and females. However, these analyses were conducted on data that were included in the PCA on the entire sample, which increases the likelihood that the model would have adequate fit for males and females when tested individually.

In summary, the results of this study support the construct validity of the JSPE for measuring three dimensions of physician empathy in UK medical students, as evidenced by results of the PCA and observed differences in males and females. The CFA results that demonstrate the three factor model fit well in both males and females individually may lend some additional support for construct validity. However, CFA is most appropriately utilized to assess construct validity by testing a proposed model based on theory or on a model identified in previous exploratory analyses in another sample. I think the use of CFA is a strong addition to this line of research and I look forward to future work, either by the current authors or others, that examines the construct validity of the JSPE by using the CFA approach to directly test this three dimension model of empathy in another sample.

Major Compulsory Revisions:
None

Minor Compulsory Revisions:
None

Level of interest: An article of importance in its field
Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
I declare that I have no competing interests