Author's response to reviews

Title: The signed Kolmogorov-Smirnov test: why it should not be used

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Author's response to reviews: see over
Dear Editor,

Once again, I would like to thank you and Desmond D Campbell for your feedback on the manuscript. According to your suggestion, I have changed "This makes the signed KS test a tool of p-hacking", to "This makes the signed KS test a potentially a tool of p-hacking". I do not intend to offend or accuse anybody, but only to raise awareness of the issue. On second reading, I realized that my previous formulation was involuntarily accusatory.

I address the comments of the referee below. As before, I have highlighted the comments of Desmond D Campbell (referee 2) in purple, my own comments in green, and the changes in the text in bold green.

Referee 2
My main point was I thought the recommended replacement test was wrong and this has now been corrected.

Otherwise I have the following comments:

Paper>> Acknowledgements
Paper>> I would like to thank ***Garrett Jenkinson**** and Desmond D Campbell for their helpful and constructive comments.
Should be
I would like to thank ***Garrett Jenkinson**** and Desmond D Campbell for their helpful and constructive comments.

The typo has been corrected.

Some awkward English:
e.g.

Paper>> However, this argument makes an implicit assumption that does not need to hold.

However, this argument makes an implicit assumption that does not necessarily hold.

The text has been corrected according to the suggestion.

Paper>> In other words, it is in general not true that the sign of the sKS statistic is linked to the statistical dominance of one sample over the other

Dominance is also a statistical term, so shouldn’t be used here. I would delete this sentence.

The sentence has been deleted.

I think a sentence to the effect that it is not that the authors of [1] Figure 4C did not find a significant difference between the two groups, they did. However their interpretation of what that difference is, is wrong. They interpret it as a difference in means, whereas KS just identifies a difference in distribution. That in itself might be interesting, something becoming more variable might be
the response to the treatment

I have added the sentence "In summary, the distributions are different, but the interpretation that their means differ is wrong (note that the increased variability may still be relevant from the biological point of view)." at the end of the paragraph describing Figure 4C of reference [1].