Author's response to reviews

Title: Estimates of adherence and error analysis of physical activity data collected via accelerometry in a large study of free-living adults

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Author's response to reviews: see over
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Dear Editor of *BMC Medical Research Methodology*,

On behalf of my co-authors, I would like to take the opportunity to address suggestions to our manuscript “Estimates of adherence and error analysis of physical activity data collected via accelerometry in a large study of free-living adults” (MS# 4803636301525387) made by the reviewers. We appreciate the time it took for them to provide such thorough and helpful suggestions.

Please let me know if you have any questions.

Thank You,

Dave Paul

Reviewer#1:
The authors have made a reasonable attempt to address the reviewers comments either in their supporting letter or directly in the text of the article.

Minor Essential: The only issue that I remain unconvinced and feel the authors should re-address, is the discrepancies between the computer estimated waking and sleeping times. When compared to the self reports the differences are a reasonable 12 and 41 minutes: in response to my original query that these may differ from visually/manually determined times, they have re-examined this, but they have stated that the comparison between the computer and manual times (6 and 35 mins) are not very different from the original 12 and 41 mins. However, it is not the comparison between the computer and self report, nor the computer and manual times that are so relevant (the authors here simply seem to show that both methods show a consistent error: by itself, that is not a good argument) - what should have been compared is the self-report and the manual times. It would appear that there may be good congruence between these, hence the computed values may indeed carry a reasonable error (sure they claim it is faster etc, but I would suggest that precision may be of more importance in this type of study). It is not surprising the mean PA counts/min do no vary too much, but if the duration of activity is incorrectly estimated by the computer, even though the mean value may not vary much, the accumulated total activity (mean counts x time) is perhaps significantly different due to the error in estimating the awake and sleep times.

We have re-analyzed the data, as requested by this reviewer. The data were compared on relative (average difference scale, including positive and negative differences) and absolute (positive and negative signs ignored) scales. Comparing the visual inspection of the data versus the computer program was -6.0 (16.0) minutes for waking and 34.6 (36.0) minutes for waking times. The differences between the visual inspection and reported times were -5.4 (32.3) for waking times and 2.1 (41.0) minutes for sleeping times. The differences between visual inspection and reported times were -5.4 (32.3) for waking times and 2.1 (41.0) for sleeping times. There was a typo in the original differences between the self-reported waking and sleeping times; this discrepancy was corrected.
Overall, it appears as though the differences between the different methods of estimating waking and sleeping times were not very different from each other. The average difference of 2.1 minutes for estimating sleep times between the visual inspection and reported sleeping times was pretty small, but this was simply because the positive and negative differences “cancelled each other out”. When removing the direction of the differences (positive and negative differences), the differences were actually larger than the average differences indicated (41.0 minutes).