Author's response to reviews

Title: Increasing children’s physical activity through a teaching-assistant led extracurricular intervention: Process evaluation of the Action 3:30 randomised feasibility trial

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Author's response to reviews: see over
OVERALL COMMENT

We would like to thank the Editor and reviewers for their careful review of our paper. Please find below a point by point response to each change made along with a reference to the appropriate line number in the paper. We have also highlighted in yellow all of the changed sections.

Editorial comment

We have confirmed at the end of the qualitative methods section (line 236) that the analysis is reported in accordance with the RATS guidelines.

Reviewer 1 - Reviewer’s report:

This article reports the process evaluation results from the cluster randomised intervention Action 3:30 intervention, which was effective in boys but not girls.

Major Compulsory Revisions: None

Minor Essential Revisions:

1. Due to the results of the intervention, illustrating higher levels of moderate to vigorous intensity physical activity among boys but not girls, it would be nice to have the quantitative findings from the process evaluation presented by gender (Table 1, the Supplemental Table, Figure 1 and 2) – if possible. Analyses by gender could potentially shed some light on why no intervention effects were found for girls.

Response: To do. We have re-done Table 1 and both figures by gender. Overall there are no clear differences between the boys and girls. We have however, amended the text on lines 242-243 and 249-253 to show the results by gender.

2. How was it decided which 13 reasons to include for non-attendance?

Response: The 13 reasons were based on conversations held between project staff, school staff and pupils on reasons why children did not attend. These conversations led to the formation of the 13 questions. The following text has therefore been added to page 190-192.

“The content of the thirteen items was informed by conversations held between project staff, school staff and pupils on reasons why children did not attend.”

3. Regarding reasons for non-attendance: The mean value for “The activities were too easy” was 2.7. This finding could be highlighted in the paragraph at page 9 (line 224-233), as it correspond well with the findings that the activities was most appropriate for the children in year 5 (page 17) and the children wanted more challenging activities (page 20). This illustrates how the quantitative and qualitative findings confirm each other.

Response: Thank you for this suggestion. We have added the sentence below to the discussion (lines 646-649 on page 26) which highlights that the age appropriateness of the programme was reflected in both the qualitative and quantitative data.

“The age appropriateness of the programme was highlighted in both the qualitative findings and the reasons children gave for non-attendance. The mean value for the item “the activities were too
“easy” was relatively high thereby suggesting that age appropriateness affected both attendance and perhaps also enjoyment and participation.”

4. How was the gender distribution of the TAs in the intervention schools participating in the semi-structured interview?

**Response:** There were 16 female TAs and 2 males. This has now been clarified on line 199 with the text reading:

“The two TAs in each of the ten intervention schools were invited to participate in a semi-structured interview and 18 (16 female) of the 20 agreed to take part.”

5. Page 18, line 456: There is no Table 4 in the manuscript. Do the authors mean Table 3?

**Response:** Yes, you are correct – thank you. The text has been amended to say Table 3.

6. Table 1: What is meant by the foot note “Any organized youth group including Brownies and Cubs”?

**Response:** These are the name given to junior Girl Guide and Boy Scout groups. We should have made this clearer for non UK readers and we have therefore amended the text so that it now reads as follows.

“Any organised youth group including junior Girl Guide / Boy Scout groups (Brownies and Cubs)”

7. The Supplemental Table may be easier to interpret for the reader if the answer categories are merged into three, as in Figure 2.

**Response:** We have provided both sources of information as the data in the supplemental table has more detail than the Figure. As we have now re-drawn the figure by gender we have opted to keep the overall table and have referred to both in the text.

**Discretionary Revisions:**

1. Line 191 page 7: “The focus group participants were purposively sampled to recruit a boy and girl based on thirds of attendance per school”. This sentence was difficult to understand, please clarify.

   **Response:** The revised sentence (on page 9, lines 216-217) now reads as:

   “The focus group participants were purposively sampled to recruit a boy and a girl from each third of attendance per school (i.e. a total of 3 boys and 3 girls per school).”

2. Line 199-200 page 8: “All transcripts were read and re-read by multiple members of the research team and an initial coding frame constructed by others”. This sentence was not easy to understand; is a word missing?

   **Response:** Thank you for catching. This should have read “by four authors”. Please see line 228.
Reviewer 2
This is an interesting paper relevant for the field. It is well written and easy to read. However, I do have some comments and suggestions.

Response: Thank you for the very kind words. Please see a point-by-point response (in italics) to all issues raised below.

1. My major concern, which comes back in some of the other comments listed below, is that it is stated that the intervention was based on the SDT framework, however, it is not explained what specific components of the intervention were used to improve the three concepts of the SDT (autonomy, relatedness, competence), what was exactly done to improve these three aspects. Next, the process evaluation could then evaluate whether the intervention was implemented as intended, had good reach etc, and relate this all to the proposed mediators of PA according the SDT. There is no clear link between the theories and concepts mentioned in the introduction (i.e. concepts of the SDT and concepts of the process evaluation) and the next sections: in the methods it is not clear how concepts of the SDT and process evaluation are operationalized and assessed, therefore it is hard to relate the findings to the original aim. As see it now, it is mostly about how activities are appreciated or not appreciated and what could be improved.

Response: We welcome an opportunity to address this comment as it highlights a long discussion we had among authors when designing this paper. The intervention was based on SDT and in the interviews and focus groups there is a considerable amount of data that outlines the extent to which the intervention was effective at changing key SDT constructs. However, in order to adequately address this comment we would need to make massive additions to the data that are presented and the discussion. This would inevitably double the length of an already long paper. We therefore feel that the SDT-related results need to be prepared for publication as a separate paper. However, in the interests of transparency we have added the following statement to the end of the qualitative data analysis section on page 6, lines 128-135.

“The strategies that underpinned the delivery were based on the self-determination theory (SDT) principles of building confidence, autonomy and a sense of belonging [22]. Specifically, the sessions were designed to increase the children’s interest in and enjoyment of physical activity and enjoyment was designed to have been facilitated by the TAs adopting a friendly, engaging communication style, in order to boost the children’s skills, confidence, and self-esteem. Due to space constraints, the degree to which the intervention was delivered in a way that was consistent with SDT will be presented in a separate paper and a link to the publication posted on the project website (http://www.bristol.ac.uk/sps/researchprojectpages/action330/).”

2. Major
The intervention is said to be based on the SDT and aims to improve autonomy, belonging (or relatedness) and competence. However, I do miss information on how the intervention addressed these important concepts of the SDT. What activities were done to improve autonomy, belonging and competence? And did the outcome evaluation also assess if changes in these concepts were
achieved? This is important to know. If for example the process evaluation shows that specific activities that addressed autonomy were not implemented, then the researchers know why some aims in terms of behaviour and mediators were not achieved. Other details about the intervention could be added. E.g. were all children from the intervention school obliged to attend the sessions? Or could they choose?

Response: As noted above we have removed the focus on SDT from the paper. In terms of the intervention the sessions were provided twice per week for 20 weeks and the children were encouraged to attend. This has been clarified in the revised paragraphs on pages 5-6 (see above).

3. Major
General concepts in process evaluation are: context, reach, dose delivered, dose received, fidelity, implementation (and recruitment). It would be good to introduce these concepts and operationalize them in the methods section.

Response: We thank the reviewer for raising this issue. We have now outlined in the background section (lines 103-107) the key features of a process evaluation. On lines 139-146 we have then shown how we have already reported information on reach and dose in the paper which reported the results of the main study. We have then highlighted (lines 147-149) that this paper will report on the intervention fidelity, implementation, context and how the intervention could be improved. These headings are then used throughout the results and are summarised in the discussion and the revised abstract. Thus, we have completely rewritten the methods and results in light of this piece of feedback.

Methods
4. Major
There should be a clear link between the aims and the methods. It would be helpful to operationalize the concepts of the SDT and the concepts of the process evaluation, so that it is clear what is measured by which questions.

Response: As noted above in response to question 1, we have removed the focus on SDT.

5. Why was chosen for heterogeneous groups with respect to gender? As the researchers were interested why the intervention was not effective among girls, they might get more information for homogeneous groups. Please clarify.

Response: To gain input from participants who were representative of the study sample we opted to include boys and girls with varying levels of attendance in the focus groups. We have clarified this on lines 216-218 that now reads as:

“To ensure that data were collected from a range of participants the focus group participants were purposively sampled to recruit a boy and a girl from each third of attendance per school (i.e. a total of 3 boys and 3 girls per school).”

6. In the topic list for the focus group interviews with the pupils it reads ‘impact of the intervention on the individuals’. What was meant with this? Does this refer to impact on the three important concepts of SDT or only on PA?

Response: Thanks for the opportunity to clarify. This has been amended (lines 221-222) and now reads as follows:
“...the impact of the intervention on the individuals’ physical activity and interest in physical activity”

Results
7. Minor essential
Line 217-218 (Thus...) is already an interpretation of the results, and should be moved to the discussion section, the same for lines 228-229.

Response: As noted above all results have been presented in a different way.

8. Minor essential
Please introduce in the methods section how you are going to present the findings from the qualitative part.

Response: This has now been added. Please see lines 226-236.

9. Major
Can the findings from the qualitative part be linked to concepts of the SDT and process evaluation? E.g. impact on skill level, can that be linked to competence? Then there will be a clear link between the theory and concepts mentioned in the introduction, methods and results sections.

Response: Please see our response to point 1 above.

Discussion
10. Major
At the end of the first paragraph the authors state that ‘...it is possible to train TAs within a strong SDT framework to deliver enjoyable...’ It is still not clear how the SDT framework was translated in practical activities and how these activities improved autonomy, relatedness and competence. Please be more specific how assessments, and results relate to SDT concepts.

Response: As we have tightened the focus of this paper to the process evaluation of the intervention and removed the SDT content we have reworded the sentence (lines 597-598) as follows:

“Thus, the data presented in this paper have shown that it is possible to train TAs to deliver enjoyable and effective physical activity programmes after school period but the programme could be improved.”

11. Major
Similarly, in lines 592-595 it says that ‘...underpinned by self-determination theory.....that these aspirations were partly met’. I still don’t see this. How was autonomy improved, how was relatedness improved? Again make clear throughout the manuscript how these SDT principles were translated in the intervention, how they were assesses and how they were affected by the intervention.

Response: Please see the response above. This section has now been removed.

12. Major
Most of the results and discussion are about how the intervention was appreciated and about how to improve the intervention and not really about how the intervention was implemented and received. Nevertheless, the authors restate that the aim of the paper was to identify ways in which the intervention may work and examine possible mediators of behaviour change. Please related the
mediators identified (enjoyment, choice et) to the concepts of the SDT, so for example, was improving enjoyment related to improvements in relatedness? Was choice related to feelings of autonomy? Etc.

Response: Please see the response above. This section has now been removed.

13. Major
I miss results and discussion about implementation fidelity etc, i.e. results related to general principles of a process evaluation.

Response: Please see response to item 3 above.

14. Major
What do the different lines represent, what do the labels mean? Is it intervention school number? Please clarify

Response: The lines represent the average for each of the 10 schools. This has now been clarified in the footnote. Please see revised Figure 1a and 1b.