Author’s response to reviews

Title: KIDS OUT! Evaluation of a brief multimodal cluster randomized intervention integrated in health education lessons to increase physical activity and reduce sedentary behavior among eighth graders

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Version: 1 Date: 28 Feb 2019

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Response to Reviewers

We thank both reviewers for their valuable comments, which have indeed improved the manuscript. According to the reviewers’ suggestions the manuscript has now undergone language editing by a fluent English speaker. The language corrections are in red in the revised manuscript. Other revisions, which are described point-by-point below, are highlighted in yellow.

REVIEWER #1

I commend you on the design of the school-based research, which included the RE-AIM evaluation framework. This does fill a gap in the school-based health promotion literature. The paper reads reasonable well, although there are some tense and English grammatical errors throughout. Below are the list of minor essential revisions:

Abstract
Missing end bracket on Line 43.
- The missing bracket has been added.

Paper
Page 4, Line 93 Change impacts to 'would impact'.
- The wording has been changed from “impacts” to “would impact”.

Methods section
Need to provide a rationale for the Health Action Process Approach that was used to underpin the design of the 3 HE lessons.
- We understand the reviewer’s point. However, the rationale has been described lesson by lesson in the protocol article (Table 1, page 5), which has been published in the same journal in 2015. The reference to the table in the protocol is in line 121: “In INT a new content on PA guided by the Health Action Process Approach -model [25] was integrated into three routinely scheduled HE lessons (Lessons #1-3) [23: Table 1].” To avoid replication, we did not include the table in this manuscript but are ready to do so, if it is considered appropriate.

Reference [23]:

Implementation section
Quality should be included as a measure of fidelity. The quality of delivery would definitely have an impact on the learning experiences that students would receive and perhaps the outcomes they would achieved.
- We definitely agree with the reviewer but unfortunately, no quality measures beyond the ones reported in fidelity, responsiveness and safety were included in the study. However, we admit that qualitative information about how the teachers implemented the lessons and what the students learned and experienced during the lessons would have provided more profound explanations to the effectiveness. We have therefore added this point to the end of the discussion section, lines 646-652: “Assessing the quality of implementation on how the teachers implemented the lessons and what the students learned and experienced during the lessons would have provided more insight and explanations to the minor impacts of the intervention. Qualitative data e.g. via interviews or videotaping would also have shown how the elements of Health Action Process Approach, which was the theoretical background of the intervention, actualized in each lesson. Now the gap between high fidelity and modest effectiveness can only be speculated to relate mostly to the briefness of the intervention and partly to the subjective evaluation methods.”

Limitations section
You highlight the weaknesses of not being able to use robust objectives measures of physical activity data (accelerometers and activity diaries). You also acknowledge the challenge of reaching parents and the oversight of not using a whole school approach. This is well known in the school-based literature. Perhaps these factors should be discussed further in the discussion.
- The reviewer is right. We have now added sentences in lines 488-489, 624-628 and 641-643 to emphasize these issues.

In addition, why was only 3 HE lessons used as the intervention? The introduction of the paper clearly stated that multi-faceted/multi-pronged school-based interventions with appropriate dose have been shown to have positive effects on students physical activity levels?
- Our choice was purely pragmatic. We were well aware of the real-world challenges such as limited staff and time resources in integrating new elements into existing school-curriculum. Knowing the
challenges, we were convinced that three lessons would be the maximum for feasible implementation. We acknowledge that this should have been brought out more clearly and have now added a sentence in lines 639-643.

REVIEWER #2

The submitted paper, reporting on a cluster randomized intervention aimed at promoting physical activity and reducing sedentary behavior among youth, has a relevant focus which should be of interest to the readers of the journal. For the most part the paper is well-ordered, straightforward and substantiated by relevant tables and figures. Nevertheless, it is recommended that the authors make use of a professional text editing service to heighten the quality of English.

The paper highlights a theme termed 'safety' which, ostensibly, is related to intervention implementation. However, at least for this reviewer, it is not clear what the 'safety' issue is about.
- We agree with the reviewer. The questions used in assessing safety have now been written out more clearly in lines 273-275.

The authors should be commended for their systematic and considered use of the RE-AIM framework to secure a broad-based evaluation of the presented intervention. The RE-AIM framework is widely applied to ensure a holistic assessment of intervention and implementation outcomes. The framework has been utilized extensively to assess school-based PA interventions and to guide process evaluations. The framework is made up of five key dimensions: Reach, Effectiveness, Adoption, Implementation and Maintenance. Through the years RE-AIM has also been employed to support intervention designs, planning and implementation. Apparently, this is not the case in the present paper.
- We thank the reviewer for the commendation. Yes, in this study, RE-AIM was only used in planning and conducting internal and external evaluation, not in designing the contents of the intervention lessons, which was based on a specific behavioral theory, Health Action Process Approach.

The design of the reported intervention has been informed by specific theoretical approaches. However, the articulations of how the intervention, more precisely, was hypothesized to promote the stated primary and secondary outcome measures are rather vague. The intervention only had minor, albeit positive, effects at the student level. At the same time, the fidelity rate among the chief providers of the intervention (i.e. the teachers) was very high. Thus, the intervention was delivered as planned. The authors are recommended to discuss, in more detail, explanations for this interesting finding: A well-delivered, theory-informed intervention having only minor impacts on primary and secondary outcomes. By doing this the authors may be able to highlight the potential gaps between, on the one hand, how the intervention initially was assumed to achieve final outcomes via key components and, on the other, actual intervention results. This would strengthen the merit of the evaluation.
- We have tried to bring out these issues in the discussion section but can ultimately only speculate the reasons for the gap between high fidelity and modest effectiveness. As the other reviewer points out, collecting qualitative data about the implementation may have helped to explain the outcomes. However, no qualitative measures beyond the ones used in assessing fidelity, responsiveness and safety were included in the study (e.g. interviews, videotaping). To draw attention to the fidelity-effectiveness gap and to provide future solutions for explaining the gap we have now added a separate paragraph in the end of discussion, lines 646-652: “Assessing the quality of implementation on how the teachers implemented the lessons and what the students learned and experienced during the lessons would have provided more insight and explanations to the minor impacts of the intervention. Qualitative data e.g. via interviews or videotaping would also have shown how the elements of Health Action Process
Approach, which was the theoretical background of the intervention, actualized in each lesson. Now the gap between high fidelity and modest effectiveness can only be speculated to relate mostly to the briefness of the intervention and partly to the subjective evaluation methods.”