Author’s response to reviews

Title: Physical activity and motor skills in children attending 43 preschools: A cross-sectional study.

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Author’s response to reviews: see over
Reviewer: Maroje Soric

Methods

1. you state that sample size calculations were based on an earlier study. However, you did not present details about what analysis it is based on, what is the aimed level of power etc. it would be informative for the reader to see those details, please present.

I recognize your comment on this. The study was developed to identify correlates of physical activity so many possible correlates could not be included in a power calculation. Accelerometers were selected as an important variable. The selected number of preschools and preschool children were determined in consultation with a statistician experienced in working with accelerometers, and who besides the substantial intra-individual variation in PA included the knowledge on between-preschool variation from the earlier study in the estimate.

I have rewritten the paragraph by writing that that: Sample size estimations were determined in consultation with a statistician and based on data from an earlier Danish preschool study.

2. regarding the outcome measure for PA:
Notwithstanding the pitfalls in using cut-off points to quantify MVPA, it seem odd that the authors describe the prevalence of overweight and movement difficulties but choose to ignore the prevalence of insufficient PA. I would recommend presenting MVPA as a secondary PA outcome. Consequently, the prevalence of insufficient PA could be calculated and a clinical significance in the reduction of PA during the afternoon or during weekends could be presented more clearly.

We recognize reviewer’s comment that presenting MVPA results to some extend could improve the interpretation of the results between day-types and time periods. However, the article already addresses more questions. If we had to include MVPA as a secondary outcome as well, it would be logic that all the physical activity analyses should be carried out with MVPA. In the light of the pitfalls in using cut-off points especially in relation to insufficient physical activity according to the physical activity recommendations, and the extra space that this would take in the article, it was decided not to include MVPA.

3. You made extensive comparisons between children with and without PA data but did not compare these two groups regarding MABC2. How come? Please include this comparison.

I see your point. Usually this is only done on age, gender and BMI, so it was decided to include the gross motor skill variable expected to be most affected by physical activity. The MABC-2 measure for aiming and catching control skills has been added.

4. You report that there were more obese children among the group without PA data. What is the magnitude of the difference? Similarly, you found that obesity was not associated to PA level in your sample. Could this be attributed to the small number of obese children with PA data (at present, this number is not discernible from your description). Please specify in the revised manuscript.

Good observation! I have added the magnitude of difference in percent of obesity and the other variables in the text. In the group of children with valid physical activity data versus the group of children without valid physical activity the percentage is 1% and 4%, respectively, corresponding to 4 and 7 children. It is possible that the lack of association is due to the small number of obese children in the group of children with valid physical activity data, although the prevalence of obesity in the sample in general is low (2%), response rate 93%. We have decided to remove the paragraph with the association
analysis between physical activity and obesity, and include the risk of a possible selection bias in the limitation part of the discussion.

5. You used different monitors to assess PA – you should describe the agreement between these two types of monitors (which btw appears to be excellent in some activities eg. J Sports Sci. Sep 2012; 30(13): 1429–1435., but differ significantly in other - J Sci Med Sport. 2013)

That is correct. In the method section of physical activity I have added that "When using the GT1M and GT3X generations of ActiGraph’s activity monitors simultaneously, activity counts seem with the exception of one study (4) to be comparable if activity data from the vertical axis is used (1-3).”


Results
1. 'No difference was found in the weekly mean 274 (SD) PA level between boys and girls (785 [187] versus 818 [190], p=0.11). From figures 2 and 3 it seems that the average PA level is higher in boys- please check.

This is correct. Using a t-test comparing weighted means between genders showed no overall difference in total mean physical activity by gender – besides a relatively low p value (0.11). Similar in the physical activity analyses using mixed models, with the preschool and the individual child treated as random effects, sample weights on preschools, and adjusted for the country of birth of the child’s mother - gender differences was not present.

2. present p values for gender interaction for week and day variability analyses.

We would have to present gender interaction p-values for every weekday (between days), for the entire week and weekend day, for the time period between 8-16 and 16-20, respectively equal to 9 p-values. Thus, we have added the range of the p-values in these analyses, and hope that this is sufficient (p-value range 0.11-0.759)

3. regarding figure 4. Is preschool time defined from 8 AM to 4PM or from recorded arrival and departure times? Please clarify in the text.

In the result section I have added preschool attendance, and in the legend to the figure it has been added that preschooltime is calculated based on the preschool staff’s daily records of each child’s arrival and departure times.
Discussion
1. when discussing gender differences in PA you omitted the findings of a similar Danish study that contradict the hypothesis on cross-cultural difference in gender specific PA (Brasholt et al.). Please comment on the discrepant findings.

This is a good observation. I did not include the study by Brasholt et al. in the first place since they used Actical accelerometers, and the study of Grøntved et al since they only measured physical activity during preschool attendance. However, I have reconsidered this and have removed the paragraph were I suggested possible cross cultural differences.

Conclusions
1. one of the conclusions drawn from your data should be that outdoor activities should be encouraged to promote PA in inactive children.

Unfortunately, and besides a general statement from the educational leader on average daily outdoor play on the playground during spring/summer preschool time, we do not known the time periods of the day where the children where outside on the playground during the physical activity measurement period. Although you might be right, we cannot conclude this based on this data. In the discussion we refer to a study in which no difference in the PA level between the highly and least active children was observed during outdoor preschool time.

2. Explicitly state that the afternoon period is characterised by a reduced amount of PA in the period studied (spring). – this is probably not the case during the other periods of the year.

We have added that the finding on physical activity patterns is limited to the season studied.
Reviewer: Glen Nielsen

TITLE
Discretionary revision:
I think the title should include motor skills as this is a central part of the manuscript/study; E.g. “Physical activity and motor skills in children attending 43 preschools”

We agree. This has been changed.

ABSTRACT
Minor essential revisions:
Proofreading is needed.
Especially:

L 21-22. You need to correct the syntax and grammar of the sentence “Therefore the objective was to describe study population’s gender in relation to ……
You are not studying the population’s gender. You are studying gender differences.

This wording has been suggested by a proofreading company, but we agree on your comment and the sentence has been rewritten.

“The objective of this study was to describe the gender differences in relation to body...”

L 29- 30. “Descriptive statistics was a applied for

This has been deleted from the abstract.

Major Compulsory revision:

44-46. In the conclusion part of the abstract, in line 44 to 46 you conclude:
1 the weekend could be a target for PA intervention.
2. Promotion of PA in less physically active children cannot be restricted to single settings.
3 The preschool has a significant impact on children’s PA level.
These three conclusions are somewhat contradictory.
Furthermore conclusion 1 and 2 are not based on your data/study. They might be true, but your data does not provide any evidence for this.
Regarding conclusion 3: the study shows that children are less active during leisure time (time outside preschool) and that the least active children are especially less active during leisure time. However you do not show why they are less active in leisure time. It might be for reasons that are extremely hard to intervene on (in fact other studies point to that it often is). Just because activity levels are low in one setting does not alone mean that this setting would be a good setting to intervene in.
On the contrary you have shown activity levels in preschools to be relatively high but dependent on which preschool they go to. This implies that some preschools provide better conditions for the children’s PA than others. Improving the different conditions for PA in the preschool and making the children even more active in this setting might be a much more effective way to increase the activity levels - also of the least active. We simply do not know from your data. From what we know from other studies I would say it seems like PA interventions targeting the children’s leisure and family time are very ineffective whereas more
“structural” or institution based interventions seems more effective - especially at reaching previously inactive children. On the theoretical level there are good explanations for why this is so (larger units, under public control, professional staff, inequality in family resources and priorities etc.)

In short I strongly disagree with conclusion 3. It can’t be deducted from the data.

It should be deleted and perhaps replaced with just stating that children where more active in preschool than leisure time and that the least active children where especially less active during leisure time.

Conclusion 2 might be an important point to bear in mind (and as such it could be placed in the discussion section). However I don’t see how it is supported or produced by your findings. I would argue that it depends on how much more active you want the less active children to become combined with how much you are actually able to increase their activity level in one setting e.g. in preschool.

You do not describe the first or test the latter.

This is a good observation and you are right that the proposed implications are not supported in the data! We understand your suggestions for improvement, but I am not sure if we based on the analyses we have carried out can divide the results into leisure and preschool time. In the results section in the abstract we have described our findings, why we cannot repeat them in the conclusion section. Based on your comment to the overall conclusion of the study we have written what we mean are the important findings in this study.

Thus we have rewritten the conclusion section in the abstract:

“Results of this study could provide a valuable reference material for studies monitoring future trends in obesity, MS and PA behaviour in Denmark and other countries. Knowledge about sources of variation in PA among preschool children is scarce and our findings need to be replicated in future studies. A potentially important finding is the large between-preschool variation in PA, indicating that especially girls are very susceptible to the environment offered for PA during preschool attendance.”

BACKGROUND

Major Compulsory revision:

L 54-56. Please explain the context/ institution “preschool” in more detail. Non-Danish readers will not know that these children go to a sort of daycare institution with children aged 3-6. That these institutions are not located at schools. That most Danish children go. The general purposes, aims and activities of preschools in DK. All these details are essential to understanding one of the articles main findings; that children are more active during kindergarten time than in leisure time. In fact I am not sure whether preschool is the best word. Kindergarten or perhaps preschool daycare institution might be better. It might be good to introduce some synonyms to help the reader understand the context of the study i.e. preschools

We recognize that it is important to describe the Danish preschool system and this has been elaborated in the background paragraph. The purposes of the preschools are described in the act of daycare (Dagtilbudsloven). It is only in Danish and the purposes described very broad, so we have decided to refer to articles describing the understanding of the pedagogical practice, which we found more relevant to elaborate.
“In Denmark, 97% of all children aged 3–5 years old spend a high proportion of their waking hours at preschool, often also referred to as a kindergarten. The preschools are placed within the school districts but are not an integrated part of the schools. The day-to-day pedagogical practice is characterised by engagement in structured activities and unpredictability. Furthermore, focus is on child-to-child relations, dialogue and embodiment, and also on outdoor time, as participating in both calm and vigorous activities is of high priority. In the Danish preschools, there is equal focus on children’s independent play, planned learning by activities and practicing everyday life. Since 2004, the aspect of learning through theory-based curricular strategies (learning plans) has been signed into the Danish legislation, and motor development and physical activity have been topics of focus. “

We choose to use the wording preschool due to the similarity in the age group studies 3-5/6 years of age, and since the majority of studies including studies from Sweden, USA, England and Belgium, but especially two other Danish studies (Brasholt et al 2013, Grøntved et al 2009) – all studies that I refer to - applied the wording preschool and/or preschool teachers.

RESULTS
Discretionary Revisions:
L. 245. Do you mean KTK subtest? Please clarify.
Yes, this has been clarified.

L 245. And the KTK score: do you mean total KTK score?
Yes, this has been clarified by writing total KTK score

L.261-264. This sentence is a bit confusing. I had to read it several times to understand it. Please rewrite in a more simple and easy to understand sentence structure. Perhaps divide in to several sentences.

This paragraph has been changed to “The percentage of children in the Danish sample who were classified as below average versus above average according to the MABC-2 aiming and catching component norm-referenced score was 9% and 16%, respectively. The equivalent percentages according to the KTK norm-referenced score was 23.5% and 9%, respectively”.

L. 268-269. This is another confusing sentence. What does it really mean; “with respect to eligible data”? You should by now have described how much data were eligible and perhaps gender differences in the amounts of eligible data. The rest of the analyses are obviously done on eligible data only. Or am I missing the point. Perhaps delete; “with respect to eligible data”.

You are right. This has been deleted

272. PA INCLUSION criteria

This has been added

279. “Physical activity between weekend and weekdays”. This Heading does not make sense. Do you mean Sunday night? # I think not. The manuscript would benefit from proofreading. The heading could read: Differences in Physical Activity on weekend and weekdays.
Thanks. The heading has been changed to “Physical Activity Patterns”

284-291. Great analysis!

300-301. Perhaps this should be placed earlier in the text?

We have decided to remove this since using “counts per minute” as the total physical activity measure already take wear time into account.

DISCUSSION

Discretionary Revisions:

356 delete “could”. There sentence has already been made vague by one “could” There are without a doubt cross-cultural variation in gender specific PA. Gender differences in children’s daily activities (praxis) is by large a cultural construct.

This was deleted, but now the whole sentence is deleted, since the other reviewer reminded me of another study on Danish preschool aged children reporting a gender difference in total physical activity.

377-381. A bit speculative perhaps?

We agree that this might be speculative. However, we only offer a possible explanation to the reader, why it has been decided not to delete this.

L 419. I agree with this point but would like to add that the most important finding to state here is that it seems that some preschools are poor at providing good conditions for girl’s physical activities while others are better. It is important to look further into why and how some are poor and others good at including girls in the physical activities.

The inter class correlation as we understand it does not directly provide information about the children´s physical activity level. ICC only provides a measure of how similar or homogeneous the children´s physical activity levels are within the preschools. So we cannot conclude that some preschools are good or poor at providing good conditions for the girls´ physical activity behavior - only that for the girls´ the large ICC indicate a large degree of homogeneity in the physical activity behaviors within the preschools and/or a large heterogeneity across the preschools.

We have added that: “Thus it important to reproduce and look further into possible explanations for this large between-preschool variation especially identified for the girls´ physical activity levels, and to what extent these influences can be modified in the promotion of physical activity.”

CONCLUSION

Major Compulsory Revisions:

My comments to the conclusion in the abstract also apply here. L. 443-444 and 451-454 are ok. The rest should be carefully revised. Actually I think you should spend some time thinking through what this study really shows. What is the essence? As of now the conclusion is very fragmented. I feel that some important and interesting findings are not presented in the conclusion. Instead you describe some very speculative practical perspectives that are not based on thorough analyses (combining data with other studies and/or theory). I suggest you leave these perspectives out of the conclusion as they can not be concluded from this
study.

We recognize your comment. We have changed the conclusion to:

“Results of this study could provide a valuable reference material for studies monitoring future trends in obesity, MS and PA behaviour in Denmark and other countries. The study did not reveal any significant gender difference among Danish preschool children in the prevalence of overweight, MS risk classification and weekly PA levels and patterns. Irrespective of gender, Danish preschool children perform well in aiming and catching, but, similar to other countries, poorer in motor coordination compared to norm-referenced data.

Similar patterns of PA across day type and during selected time periods of the day were observed for the total sample and the least active children during the season studied. However, a relatively larger decrease in PA from preschool to weekday leisure time was observed in children in the lowest PA quartile compared to children in the highest PA quartile. Knowledge about sources of variation in PA among preschool children is scarce and our findings need to be replicated in future studies. Moreover, a large between-preschool variation in physical activity was observed indicating that the preschool has a significant impact on the preschool children’s PA level, especially in girls. Future studies are needed in order to reproduce this finding and to identify which factors within the preschool setting that can explain this clustering behaviour.”