Author's response to reviews

Title: The developmental relationship between language and motor performance from 3 to 5 years of age: A prospective longitudinal population study

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

We are grateful for the opportunity to correct and improve the manuscript once again. We thank the reviewer for helpful suggestions. We believe that the manuscript has been much improved with the changes done based on her remarks.

All changes are marked in red throughout the text. Following is a point-by-point response to the comments provided by the reviewer.

We look forward to the evaluation of the revised manuscript.

Best regards,

Mari Vaage Wang
Corresponding author

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General comments

1. **The authors need to choose either word or number format for ages (for the small numbers used, words would be usual). It would also be more helpful (though I realise it is inconsistent) to give the youngest age mentioned from the previous study as 18 months, as if the age is indeed 18 months this indicates that it is exactly 18 months. Indicating “1 ½ years” implies that the age is only “about” 18 months, in the same way that indicating “3 years” may mean “3 completed years but not yet 4 years” or may mean “36 months precisely”. It would be helpful both to have consistency in the use of numerals/words and precision in ages.**

Response: We agree that this can be confusing and throughout the text 1 ½ years has been changed to 18 months.

Abstract

2. **“non-significant” not “insignificant”**

Response: We thank the reviewer for correcting this, and it has now been changed.

3. **I personally find it clearer to say “between three and five years of age” rather than “from three to five years of age”. Also, the ages should be spelled out in numerals consistently.**

Response: While we appreciate the reviewer’s perspective, we feel the current format is clear as it stands. We have therefore chosen not to change ‘from…to’ to ‘between’. Further, all numbers referring to ages have been changed from text to numbers, with the exception of small numbers which are consistently written in text form

4. **Final sentence – another verb/noun mismatch.**

Response: The finale sentence was changed to: “These results implicate stable and correlated developmental pathways at this age”.

5. **If language performance really explains 46% of variance in motor skills, this does not seem to be weak prediction at all.**
Response: We are sorry this point was not well explained. As is thoroughly described below (in regard to comment 16.) particular attention has been paid to correct this apparent contradiction in the presentation of our results.

Introduction

6. **The authors still start by saying the only research done in this field is clinical and there is little research in this field. This is despite their notes that they have acknowledged non-clinical work (e.g.Iverson, Alcock).**
Response: We have now changed the sentence stating that there is little research to «a growing literature investigates the interrelatedness of these developmental domains».

7. **They then go on to quote Descartes and Piaget. This reads like an undergraduate essay; it looks like they have taken these names from a textbook. These are not current mainstream theorists in motor language links (or really in any field). Churchland is also quite out of date and non-specific. This has not been altered from the previous version, it appears, despite this being one of my major problems with the paper.**
Response: This section has now been removed from the manuscript.

8. **They then briefly touch on (again) clinical findings in motor/language links but once again fail to mention the huge field of theory in typical motor/language links which, as I said in my previous review, is well discussed in several of the references they cite. If the authors are not aware of current theoretical debates in typical motor-language links they should be consulting with someone who is aware of these.**
Response: We appreciate the reviewer’s valuable suggestions to include theories on typical motor-language links. As was also our response to the previous revision (where we argue – we are aware of this literature, but find that our study is of limited value to shed light on the suggested theoretical views. We hope for the future that we will be able to include measures of gestures, working memory and other possible mechanisms that will make it easier to address these interesting debates. But for the time being a discussion of these theories seems to beyond the scope of this manuscript, and we argue that the results of this study still are interesting both for language development researchers and developmental psychologists in general.

9. **The review of links between motor and language abilities in clinical populations, and the discussion of the previous study by this group, are now clearer.**
Response: We agree that the reviewer’s suggestions improved these sections.

Methods, Results

10. **These are now clearer, and much improved.**
Response: Thank you for good suggestion for improvement.

11. **P 14, 1st Para – starts Also – this is not particularly good style. Try “In addition”.**
Response: This sentence was changed in accordance with the reviewer’s suggestion.

12. **Gender differences – the authors should state up front whether the differences were significant or not, and while I appreciate that despite non-significant differences it might still be interesting to look at potentially differing patterns of prediction, the raw differences need explanation too. From this paragraph I’m still not clear if they were. The last sentence here**
states “No gender differences proved significant, except for a decrease in shared variance with language for gross motor skills in boys.” but does this mean that no differences in variance were significant, or no raw differences?

Response: the following changes were done -

- Paragraphs between sections have been inserted to separate more clearly the different topics dealt with in the results part of the manuscript.
- “significant” was added to the first sentence in the second paragraph.
- “model” was added to the same paragraph.
- The last part of the second paragraph in the description of gender differences was replaced with the following text: “In contrast to the model including both genders, the regression coefficient for early language skills on later gross motor skills was not significant for boys. The difference between boys and girls on this parameter was, however, not significant.”

Discussion

13. First para, sentence starting “More precisely” has another verb-subject agreement error. Please can the authors check the paper for these again.

Response: Thank you for pointing out these grammatical mistakes. It has now been corrected. For other corrections see “other changes and corrections” below.

14. There are also a few more clumsy phrases (e.g. P18, first full para “for getting children to perform” is slightly clumsy, “it seems like” on P19).

Response: Both sentences have been changed. The sentence including the phrase “for getting children to perform”, was changed to “….due to reliance on verbal instructions on the motor tasks”. The phrase “it seems like” was replaced with “our results suggest that”.

15. Last sentence of this first para is unclear, I think the added phrase is in the wrong place.

Response: The sentence was deleted.

16. If it is really true, as I said above for the abstract, that 46% of the variance in motor skill is explained by language, the conclusions seem a little odd. Surely this is a strong, not a weak relationship – the sentence at the end of the first paragraph on page 15 (“the relationship for gross motor skills was especially weak”) makes no sense if the proportion of variance in 5y gross and fine motor skills explained by language was exactly the same – how can the relationship be weaker? On page 19 the authors state “we found an increase in the variance motor skills share with language skills over time” and yet this is the opposite of their general conclusion.

Response: We agree with this important comment and the manuscript has been changed throughout to correct and improve the manuscript in accordance with this comment. More precisely, the following changes were made:

Abstract:

- “Unique/uniquely” was added twice in the results section, and once in the conclusion of the abstract to improve understanding of interpretation of the cross-lagged models.
- “Explained by” was changed to “specific to” in the results section of the abstract.
- The sentence “This implicates specific rather than general developmental pathways at this age” was changed to “These results implicate stable and correlated developmental pathways at this age”.
Introduction:

- Some of the hypotheses were changed from “performance at three years of age predicts performance at five years of age both within and across domains – change in language performance predicts change in motor performance, and change in motor performance predicts change in language performance” to “language and motor performance are both stable from 3 to 5 years of age, language performance at 3 years of age predicts change in motor performance from 3 to 5 years of age, and in motor performance at 3 years of age predicts change in language performance from 3 to 5 years of age”

Discussion:

- A sentence in the first paragraph was changed from “... the hypothesis that motor and language development form two separate but associated developmental pathways” to “... the hypothesis that motor and language development are associated developmental pathways”. In the following sentence, we deleted “more precisely” and now start with “We found...”. In the last sentence in this section, we added “...when controlling for stability within each domain.”
- The first sentence in the second paragraph was deleted. This sentence was phrased as follows: “Our results challenge the assumption that difficulties in these domains are general rather than specific.”
- The sentence “A possible explanation of this finding is that few have controlled for stability within each domain when investigating prediction from one domain to the other” was also deleted.
- The two last sentences “However, the association is not very strong, and the relationship for gross motor skills was especially weak. This finding can also be indicative of a more general and common underlying developmental process.” was deleted.

Conclusion:

- First sentence was changed from “Our results are consistent with the idea of two separate but associated developmental pathways, and is in contrast to the hypothesis of delays in these domains being general in nature rather than reflecting separate disorders” to “Our results are consistent with the idea of stable and associated developmental pathways for language and motor performance from 3 to 5 years of age.”
- The sentence “...the association between early language skills and later gross motor skills does not seem to be very strong” was changed to “...for boys, early language performance does not significantly predict later gross motor skills”
- The sentence “...is necessary to uncover the true relationships across these two domains” was changed to “...uncover a different relationships across these two domains, than when considering unadjusted correlations”.

17. P18 “This might impact...” how?
Response: The sentence was changed to “Since children’s language and motor performances usually develop between 3 and 5 years of age, what we measure are slightly different phenomena at the different ages. This might lead to underestimation of stability across age”

18. P19 – can a picture be “nuanced”??
Response: “Picture” was changed to “finding”

Other changes and corrections:

Title page:
Affiliation for Ratib Lekhal was changed to Hedmark University College, Centre for Studies of Educational Practice, PO Box 400, 2418 Elverum, Norway

E-mail addresses for RL and SS were corrected.

p.15

- grammatical errors were corrected in the following sentence: “Similar to what has been found by others [32, 29] we find significant developmental associations across domains.”

p.16

- used adjustment for -> also adjusted for
- predicts -> predict

p.18

- For clarification the sentence “…possible consequences of including only two measures...“ was changed to “…possible consequences of including only two items for measures...“.
- “High association” was changed to “strong association”