**Response to the Reviews**

**Re:** "Head motion in children with ADHD during resting-state brain imaging" (#2013:03:335:0:1:REVIEW)

We thank the editor and reviewers for their comments. In response to the concerns raised we have revised the manuscript accordingly. Below we address the comments in turn. Editor and Reviewers’ comments are in bold, and our responses are immediately below.

**Editor's comments**

**E1. In particular, the rationale for the study will need to be clearly stated, and the data acquisition procedures clearly described.**

Thanks very much for editor and reviewers’ suggestion. In this manuscript, we have rewritten the rationale for the study to make it more concise. Specifically, the key point of this study is to show the potential information in the head motion parameters during scanning. So, first, we have removed some footy content (i.g., gender difference) from this original version. Second, to show the predictability of in-scanner head motion parameters about children’s status (i.e., ADHD or not), we have added a classification analysis.

In terms of data acquisition, we have added some details about it on the *page 4*. (*“The resting-state fMRI images were collected using a T2\*-weighted gradient-echo EPI (GRE-EPI) sequence: TR = 2 s, TE = 30 ms, flip angle = 90°, FOV = 220 mm, matrix size = 64 × 64, 30 axial slices, slice thickness = 4.5 mm. Participants were instructed to keep their eyes closed and to relax during scanning. The total scan time lasted 8 min. Foam padding was used to restrict head motion within the scanner.”*) Since the data is published, if necessary, more details can be obtained from the ADHD-200 website (http://fcon\_1000.projects.nitrc.org/indi/adhd200/).

**E2. The appropriateness of the acquisition protocol and the statistical methods must also be related back to the rationale.**

The rationale and methods have been rewritten in this manuscript (see also E1.). What we want to study is the difference in head motion during scanning between children with ADHD and without. The data acquisition protocol and statistical methods are for the rationale now.

**E3. You should strongly consider the point regarding inclusion of rs-fMRI data as well.**

Thanks for this great suggestion. It is absolutely important to study the effects of head motion on rs-fMRI outcome metrics. However, In consideration of the rationale of this study (i.e., the group difference in head motion during scanning) and unclear causal relationship between head motion and fMRI metrics (head motion brings noises in fMRI signals or neural metrics cause different head motion during scanning), we haven’t include any fMRI metrics in this manuscript. But we added this as one of the limitations in *page 8*. (“*Second, in consideration of the coupling effect of head motion in the fMRI signals, we didn’t include fMRI metrics in this study. Using independent scanning runs to get the fMRI metrics and head motion may be a possible approach to explore the neural basis of head motion.”*) In the future, we would like to show the results in a separate study.

**E4. Finally, It would be very helpful to have the revised manuscript carefully proofread and edited for grammar, spelling, and typography prior to resubmission.**

 Proof reading has been made by a professional English writer.

**Reviewer Comments**

**Reviewer 1**

**Basic reporting**

**R1.1 This is a report on the measurement of head motion during functional MRI scanning. The head motion is measured rather indirectly (and at very low temporal resolution) using coregistration of each volume in the time series with the initial one. The author wanted to know whether there is a difference in the head motion of people with ADHD and healthy controls.The data acquisition is not properly described.**

We have added some details about it on the *page 4*. See E1 above.

**R1.2 Strangely, there are very clear inter-gender differences in the degree of motion. No tentative explanation is provided.**

We have rewritten the manuscript and remove the part of inter-gender differences in head motion. See also E1.

**Experimental design**

**R1.3 Clear question and reasonable sample size but the description of the methods is sketchy. Since there was no prior specific hypothesis, all stats should be corrected for multiple comparisons.**

Thanks very much. We have made the rationale and method more clear. And we have also added information about multiple comparison correction in the text.

**R1.4 Validity of the findings**

**Questionable in view of the above.**

See also R1.3.

**R1.5 Comments for the author**

**The text must be revised by a native English writer or professional translator.**

 Proof reading has been made by a professional English writer.

**Reviewer 2**

**Basic reporting**

**The study is aimed at characterizing possible differences in head motion between children with ADHD and a healthy control group during a resting-state fMRI (rs-fMRI) scan. The results show the expected group difference (patients move more than controls) and the author points to the fact that motion is worse in some movement directions than others.**

**R2.1 I do not understand why the the effects of head motion on rs-fMRI outcome measures are not reported by the author. I believe that those results would make the paper a lot more relevant for many readers.**

Thanks for this great suggestion. Please see E3 in the above.

**R2.2 Figures could be more concise: For instance, the results of motion in 6 directions (fig 1A and B) and results of the RMS (fig 2) can easily be reported in one figure.**

 Thanks. We have merged these figures.

**R2.3 Asterisks are included to denote some significant results in figures, but not all.**

 Thanks and in this manuscript we have checked this problem in this manuscript.

**R2.4 There are many grammatical errors throughout the text.**

Proof reading has been made by a professional English writer.

**Experimental design**

**R2.5 Analysis steps and reported results do not always follow each other logically. For instance there is a section that reports on within group analysis of 3 variables (thus 2 groups and 3 variables means that there were 6 tests performed) but only two results are reported: "Among the translation parameters, motion along the x-axis (left-to-right) was significantly less than motion along the y- and z-axis for both groups (ADHD: t(66) > 8.40, p < 0.001; TDC: t(139) > 10.00, p < 0.001)" (section 3.1). If the rest was not significant it should be stated and supported with statistics as well (it is relevant, for instance, if non-significant p values were around 0.1 or 0.8).**

Thanks very much for this suggestion. we have added the non-significant p values in the text.

**R2.6 There were initial groups of subjects but many were excluded due to not meeting inclusion criteria (medication use, excessive head motion). Demographics of the initial groups are reported but the demographics of the actually analyzed groups are not included. I believe the latter are much more relevant to report.**

 Thanks. We have added the demographics of the actually analyzed groups in the *page 5*. (*“Our analyses were based on the data from remaining 207 participants: 67 ADHD (9 female; mean age = 12.26 ±2.04 years) and 140 TDC (59 female; mean age = 11.43 ± 1.85 years).”*)

**R2.7 Validity of the findings**

**Strange that only scatter plots of the significant results of section 3.3 are shown but not of the non-significant results.**

Thanks. We should have shown all significant and non-significant results. But to make the rationale more concise, we have rewritten the manuscript. And section 3.3 in the original version has been discarded.