Author's response to reviews

Title: The functional magnetic resonance imaging (fMRI) procedure as experienced by healthy participants and stroke patients - A pilot study

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Author's response to reviews: see over
Dear Dr Anderson,

Dear Dr Krestin,

Please find attached a revised version of the above manuscript submitted to BMC Medical Imaging.

We would like to thank the reviewers who helped to improve the manuscript considerably. We addressed all issues raised by the reviewers. In particular, we revised the results section, moved part of the introduction to the discussion section, and discuss our findings in relation to further literature. Please find attached a detailed point-by-point reply to each issue raised.

Yours Sincerely,

Andre Szameitat
Reviewer: Iris Eshed

Reviewer's report:

The main objective of this study is to evaluate how volunteers accept and relate to the MRI procedure.

Main strength: The topic was not evaluated in this manner.

Main weakness: The manuscript is not well organized. Too long, repetitive, not concise and not dealing enough with the literature.

Major Compulsory Revisions:

1. Introduction is too long. Most of it should move to discussion

We considerably shortened the Introduction section and moved most of it to the Discussion section.

2. The description of "Studies" is too detailed and not relevant for the manuscript

In the first revision, a reviewer asked to describe the studies in more detail, as different set-ups may lead to „nonuniformity of the MR imaging experience“. In the paragraph, essentially the tasks and the scanning procedure (how many scans; type of scans; order of scans; duration of individual scans) are described, thus dealing with the comment of the reviewer. In our view, the presented information is necessary so that the reader can get an impression of the scanning situation. For example, we would like to keep the detailed description of how long each individual scan took, as it may make a difference whether participants have to work on a demanding task twice for 25 minutes with a 6 minute break from the task caused by the anatomical scan as compared to 50 minutes continuous task performance with the anatomical scan at the end of the session. Therefore, we would like to keep the level of detail in the text. However, if the reviewer wishes, we would consider removing Table 1 from the manuscript, which presents a brief overview of the text.
3. The results section is too long and impossible to read. Authors should shorten it substantially and insert most of the data into tables.

We heavily revised Table 2 which now shows all important findings from the study. We hope that the interested reader can grasp the main information easily and readily from this table. However, in the first revision, all reviewers asked for a considerable extension of the Results section, and all three other reviewers seem to be fine with the revised Results section. Therefore, we feel hesitant to shorten it again, as this may oppose the view of the other reviewers. In addition, there is information in the text which is hard to convey in a table, such as detailed statistics (p-, F-, t-values, degrees of freedom, parametric and non-parametric tests, number of participants instead of percentages, etc.) or the comments of the participants – unless we provide one huge (and probably hard to read) or several more complicated tables as the present Table 2. Therefore, we hope that the reviewer is satisfied with the present solution of keeping the text mainly as it is (with revisions to increase readability but without substantial shortening) and providing a table which informs the reader about all important findings.

4. There is no division between results and discussion. Most of the text in the results should be moved to the discussion.

Indeed, the presentation of the results regarding the response rates and Question 2 (“noted something strange”) contained some text which can be considered as discussion. Accordingly, we moved these two parts to the Discussion section. However, with respect to the remaining results section, we only present statistical data without interpretation. Therefore, we did not move any further text to the Discussion section. If the reviewer thinks that further parts of the text should be moved to the discussion we would be grateful if the reviewer could point us to the specific parts she had in mind.
5. The discussion is not comprehensive enough. There is no point on repeating the results rather the authors should regard the results and correlate them to the known literature. We revised the discussion section and extended the discussion of the relation of our findings to previous studies.

Minor Essential Revisions
1. "Sample: 70 neurologically healthy ... Although we do not have data on this, the authors.. "

If authors have no data then they should not insert it in the manuscript and should take this sentence out.

Although we do not have data on this, we believe that this information is still informative for the reader. We personally asked each participant whether they already had an MRI scan, but unfortunately we did not keep this information in written form. However, we think that we still can provide a good estimate of the number of participants who had an MRI scan. Even if the reader may not know whether exactly 33%, or instead 30%, 35%, or maybe even 20% or 50% had an MRI scan before, the reader can be assured that it was neither close to 0% nor close to 70, 80, or 100%. In other words, the reader knows the approximate proportion in our sample which may be relevant, for instance, for applications to ethical review boards.

2. "20 patients did not undergo MRI mainly due to…

a. What was the main cohort? 20 out of how many?

The original cohort was 42 patients. 22 participated in the present study and 20 did not. Original text: “These 22 patients were derived from a sample of 42 patients receiving motor rehabilitation in our laboratory. 20 patients did not undergo MRI mainly due to...”.

To clarify this, we changed the second sentence: “20 of the 42 patients did not undergo...”
b. **Diabetes in no means contraindication for MRI**

This is correct in a clinical setting. However, in basic research sometimes much higher precautions are taken. In the MRI facility we used for scanning (this facility is not operated by us directly, so we do not have a direct influence on the exclusion criteria) diabetes is an exclusion criterion since people suffering from diabetes may have a slightly higher chance of passing out in the MRI scanner (we presume due to unpredicted drops in sugar levels). Since there are no medical personnel present at the scanning site, this is taken as a potential danger, and therefore people suffering from diabetes are excluded as a precaution. This is the reason why we avoided the probably more medical term “contraindication” and instead explicitly referred to the context of basic research: “...due to other conditions (e.g. diabetes or heart diseases) which we took as exclusion criteria in the context of basic research.”

3. "**resulting in durations between 24 min and 65 min**" authors should add mean standard and deviation.

These numbers are approximations of the total time spend in the scanner, which are based on adding 5-10 min to the pure scanning time for scanner setup, breaks between scans, etc. Therefore, we cannot meaningfully calculate the mean and standard deviation for this estimate. The mean of the scan duration is given the paragraph before and in Table 1 (39.5 min). However, indeed the standard deviation (10.51) was missing, which we now added to the text and table.

4. **The reason for this lower response rate is not clear… of the questionnaire, or that subjects were undecided."** This sentence belongs in the discussion and not the results,

We initially moved this sentence to the Discussion section. However, it is such a minor point that it diluted the Discussion section. As the response rate even for this item was still rather high and in our view not problematic, we removed the discussion of it.
5. Several relatively recent manuscripts related to claustrophobic relations in MRI units and that are relevant to this study are not cited: for example:

During revision of the Discussion section we included further work into the manuscript (e.g. Sarji et al. 1998; Thorpe et al., (2008); Bangard et al. (2007)). Please note that the Dewey et al. study was already cited, but not discussed in detail. This is changed now as well.

Level of interest: An article of limited interest
Quality of written English: Acceptable
Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Reviewer: Frank MacMaster
Reviewer's report:
The authors have addressed previous concerns. However, given the weaknesses of the study, the authors should explicitly frame the study as a pilot study.

We now explicitly frame the study as a pilot study. For this, we changed the title of the manuscript, the last paragraph of the Introduction section, and the Conclusion section.

Level of interest: An article whose findings are important to those with closely related research interests
Quality of written English: Acceptable
Statistical review: No, the manuscript does not need to be seen by a statistician.
Reviewer: Marc Dewey

Reviewer's report:

Major Compulsory Revisions

The authors should add a limitations section, which could include among other items the fact that established questionnaires about perception of MR imaging, especially including claustrophobia such as the CLQ, were not used. We now included a section on the limitations of the study which includes a discussion of the fact that we did not use standardized questionnaires.

There is clearly an influence of age on the rate of claustrophobic reactions as shown in the thus far largest study including over 55,000 patients (see Figure 2 of Dewey et al. JMRI 2007 and the accompanying logistic regression analysis with an OR of 2.1 (CI: 1.8-2.4) for middle-aged persons) and by Sarji et al. Australas Radiol 1998 in 3324 patients. Please revise your discussion accordingly.

We would like to note that we did not assess claustrophobia but instead the comfort of the MRI procedure. Although both measures are somewhat related (patients experience claustrophobia will probably experience low comfort) they may not be related very closely. In particular, since we only had a single case of slight claustrophobia the findings of Dewey et al. and from the present study may be rather unrelated. Nevertheless we added this point to the discussion.

In the same context, you should consider discussing and comparing your gender results with those in our multivariate analysis in over 55,000 patients (results: OR of 1.7 (CI: 1.5-1.9)) with women having a greater likelihood of developing claustrophobia. Thank you.

Please also note the reply to the previous comment regarding whether the perception of comfort and the occurrence of claustrophobia can be directly compared.
Our gender effect is in line with the findings of Dewey et al. In particular, females experienced the procedure as less comfortable, which we explained by the possibility that females have a higher incidence of claustrophobia and anxiety. Among other studies, the Dewey study was referenced. Regarding the patients, we observed a reversed pattern, i.e. females experienced a higher comfort than males. These findings can be explained by observations of Wollman et al. (2004) that in the elderly (patients had a mean age of 54 years) males find some parts essential to the MRI procedure (e.g., lying flat) more uncomfortable than females. Since these aspects were already discussed in the last revision of the manuscript, we did not change this part.

There is no comparison with other psychology studies performed. Thus, it might be not on solid grounds to draw comparisons here in the final paragraph.
We agree and removed this sentence from the concluding paragraph.

Still, a strong and well-founded closing sentence would be good.
We revised the concluding paragraph.

A comparison of the results shown in Figure 2 is still missing in the figure legend.
Indeed the statistical results of the comparison were provided only in the main text. We added the following to the figure legend: “Healthy subjects as well as patients rated the procedure on average as being comfortable (ps < .01 when compared to the middle category of 4). Mean ratings of healthy subjects and patients did not differ significantly.”

Also this figure is not referenced in the manuscript making it hard to relate it to the main text.
There was a typo in the document; the figure was references as Figure 1 and not as Figure 2. We corrected this.
Minor Essential Revisions

Please explain abbreviations at first use (TR, TE, MPRAGE, FOV).

We checked the whole manuscript for missing abbreviations, but except for a missing abbreviation of DTI in the abstract we did not find any. All abbreviations, in particular the mentioned ones, are explained at their first use. Please note that some of them are already explained in the introduction section (DTI, MRI, MPRAGE). We would be grateful if the reviewer could point us more specifically to the not explained abbreviations.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Reviewer: Claire A Hale

Reviewer's report:
The article is much improved and much clearer. The authors have addressed my concerns adequately. The study does still have some weaknesses but in most cases these cannot be remedied because the opportunity for doing so has passed. Despite these limitation it will provide some evidence in an area which has little research evidence and will hopefully satisfy the concerns of the Ethics Committees

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.