**Editorial comments:**  
  
\*If you are re-using figures from a previous publication, you must obtain explicit permission to re-use the figure from the previous publisher (this can be in the form of a letter from an editor or a link to the editorial policies that allows you to re-publish the figure) and you must cite the figure appropriately in the figure legend, i.e. "This figure has been modified from [citation]."

>> We have obtained permissions from the publisher for Fig. 4, and cite it accordingly.

**Reviewers' comments:**  
  
**Reviewer #1:**   
*Manuscript Summary:*   
This is a comprehensive paper explaining with certain details all the procedures which should be considered in an fMRI-EEG-TMS study. This kind of methodological papers are necessary in order to standardise the procedures of data acquisition and analyses across different laboratories.   
  
*Major Concerns:*  
N/A  
  
*Minor Concerns:*  
p. 4. 90. It is written: "However, this requires methods for removal of artifacts generated by the magnetic stimulation on the EEG signal. Very few offline mathematical solutions for TMS artifact removal have been proposed 16-17". There is at least another paper that should be added here: "Off-line removal of TMS-induced artifacts on human electroencephalography by Kalman filter. Morbidi F, Garulli A, Prattichizzo D, Rizzo C, Manganotti P, Rossi S. J Neurosci Methods. 2007 May 15;162(1-2):293-302.

>> We added the above citation (Morbidi et al., 2007). Several other citations were added in the revised form of the manuscript most are listed throughout this reply (see also changes in red fonts in the main text).  
  
p.6. 205 "3.2.3) Use a high sampling rate for better representation of the noise artefact". Here you should write an example of high sampling rate (i.e. 1000, 5000 Hz).

>> We now specify a minimal recommended sampling rate (1kHz) on section 3.3.4. Please note that in addition, and following the comments of all three reviewers, we have made a general attempt to flesh out the manuscript with more details, instructions, examples, and values where possible (see protocol).

p.9. 311 and in the main body of text is written: "C. The interpolated segment allows filtering without creating edge artifacts. In this figure, a 40Hz low-pass filtered ERP (red) is plotted against its non-filtered version (grey); D. Alternatively to interpolation, the free ends remained after pulse removal can be joined together (see for example 25 , and point 4.1.2 in the text).". The method used to avoid the TMS artefact in the reference 25 by Fuggetta, G., Pavone, E. F., Walsh, V., Kiss, M. & Eimer, M is very intuitive. However in the current version of the paper is not clear how to create the interpolated segment. It is very important especially for a methodological paper to offer the possibility to replicate the same methods employed by the authors. It is important to add a paragraph in the text where you explain in practical terms how to perform the "interpolation" of missing EEG data between 2ms before first TMS pulse to 16ms after second TMS pulse.

>> Following this comment and other comments below, we now explain in precise and straightforward terms the options for accomplishing this step (section 4.1.2).

We thank the reviewer for the comments.

*Additional Comments to Authors:*  
N/A  
  
  
**Reviewer #2:**   
*Manuscript Summary:*   
The paper "Extracting visual evoked potentials from EEG data recorded during fMRI-guided Transcranial Magnetic Stimulation" shares a technical achievement in combining 3 neuroscience tools with the research community. It allows other researchers to use TMS while recording EEG without risk of data loss or distortion of the EEG data by the TMS pulse or by filtering. It offers a straight forward method (making a response template based on blank screen trials), easy to operate and compute, which solves the artifact issue as well as a variety of side issues such as the noise effect of the TMS on the ERP. I therefore find the paper to be useful to other researchers and well worth publishing.   
*Major Concerns:*  
N/A  
  
*Minor Concerns:*  
1. The first reference to figure 1 in the text appears in line 214, after the reference to Fig. 2 (p.72). Please change figure numbers accordingly. Also note the missing period in line 214, ("Fig 1").

>> Thank you for the remarks, we corrected both issues.

2. Line 48 and line 67: the reference indices are sequential and can be written as (e.g. 2-7) instead of (e.g 2,3,4-7).

>> The problem is now fixed (lines 49 and 69).

3. Line 65: I suggest describing the possible causal links in more detail. As it is written now a reader not in the field might understand that there might be a causal relation between the two measurements, implying that the fMRI signal evoked the ERP signal or vice versa. It should be therefore stated that the TMS is used to test causality in the sense that the same brain region which causes the fMRI signal to change also causes the ERP modulation. For example, the sentence "a directional relation between EEG and fMRI cannot be determined" can be restated similarly to line 350 discussing the affirmation of the causal relation ("fMRI defined brain areas...").

>> We thank the reviewer for bringing this up, causality is a term that should indeed be treated with caution. We revised the part in the introduction where the elements in the causal relation were not stated clearly. It is now stated that TMS helps to establish a causal link between functionally defined cortical areas and scalp-recorded ERPs (rather than between the 2 signals) (lines 67 – 71).

4. Line 163: PsychToolbox is referred to in the text and references but not in Table 1, without specifying that it is a Matlab toolbox. Matlab is included in Table 1 without reference in the text.

>> We now cite Matlab and Psychtoolbox (and also SPM and MarsBar) in the text and in the material table.

5. Line 205: please specify the lowest sampling rate you would consider or refer to a TMS-EEG work where this issue is discussed.

>> A recommended sampling rate (1kHz or above) is now given in 3.3.4. Please note that many other technical details were added in order to facilitate comprehension and replication, see changes in the corrected manuscript marked in red fonts.

6. Line 259: The term linear-interpolation should be made clearer. If the two end points were connected by a straight line then this can be put in these terms without using "linear interpolation" which might imply fitting a straight line to a curve. Alternatively, if this term was used to describe the substitution of missing data by a straight line in another work this work can be referred to.

>> A clear and more precise explanation of the interpolation now replaces the previous one (4.1.2). Please see also reply to reviewer #1 in the same topic. Indeed, our interpolation consists of connecting the two ends with a line, which eliminates filtered-related ripples created when sharp edges exist in the data (see for example Fig. 1).   
  
*Additional Comments to Authors:*  
N/A  
  
  
**Reviewer #3:**   
*Manuscript Summary:*   
The authors outline the principles and methodology regarding their recent fmri-guided TMS-ERP paper. The method is important and the account is clear and this could be a valuable resource, but as it stands it requires more detail about how the data was collected and why it looks the way it does.   
  
*Major Concerns:*  
In general the descriptions tend towards the qualitative rather than the quantitative. For example, using a 'high' sampling rate is recommended, and that the reference electrode should be placed 'far' from the coil, and that 'High-resolution' fMRI scanning is recommended. Replication here needs more detail - what Hz, how many mm, what resolution.

>> We thank the reviewer for this comment. We revised several sections concerning data analysis and experimental procedure, including the ones mentioned by the reviewer hereby, to include more details and concrete information (see also comments and replies to reviewers 1 and 2). Where applicable, we now provide precise values. In some of these places we also give references to other works. These modifications can be found in the text in red fonts.

Safety information would also be important.

>> Some major safety points were added, such as pre-TMS screening and a couple of points related to EEG preparation. We also refer the reader to two documents about safety, for further reading (Rossi et al. (2009), and the Magstim safety review (<http://joedevlin.psychol.ucl.ac.uk/tms/docs/magstim_safety.pdf>). We think, however, that in the scope and goals of this work we cannot provide a complete review of TMS safety.

The data looks unusual: the raw EEG shown in Fig 2 especially in Fig 2 b and fig 2c contains unusual high-amplitude high-frequency noise. Is this due to the TMS? A cleaner section of data should be presented if available.

>> We had initially chosen particularly noisy channel data (now changed, please see below) to demonstrate that the reviewed technique is suitable even for electrode sites that are located right under the coil (which are often also the electrodes of interest), what may cause an increase of line noise amplitude in some cases. This is a main advantage of the technique, and we now added a note in the text regarding this (lines 367-373). We did, however, prepare a new figure as per the reviewer’s request (now Fig. 1, after renumbering) with data of another subject at the same electrode site, which is less noisy.

Which of the several sources of the secondary artifact listed on pg 3 lns 76-78 are responsible for the TMS artifact shown e.g. at p8 in fig 3a which seems unusually large and long. What is the basis in the literature for such TMS artifacts?

>> Pulse-related artifacts and/or baseline shifts lasting for prolonged durations that can get up to a few hundreds of milliseconds, are discussed, for example, by Virtanen et al. (1999), Thut et al. (2005), Julkunen et al. (2008), and briefly in the consensus paper by Siebner and colleagues (Siebner et al., 2009). Such artifacts were also mentioned or inferred from the results in other works (such as Bender et al., 2005, Litvak et al., 2007, Iwahashi et al., 2009). Although we cannot conclude that these artifacts represent all the exact same sources of interference, their major cause is claimed to be currents induced by the pulse and their decay process (see for example Julkunen et al., 2008, Siebner et al., 2009), and may also depend on amplifier structure. But physiological components can also constitute parts of the overall recorded interference depending on the stimulation site (e.g. Thut et al., 2005). Even if smaller than the mechanical artifact, any other potential not directly related to the experimental manipulation, may confound the results. Please also note that the artifacts from physiological origins are also not equally distributed across electrode locations. For example, in the figures presented in the current work, auditory and somatosensory potentials are probably negligible if at all existent, but other electrodes may include them in a more pronounced manner. We now revised the introduction of the artifact to briefly explain these possible contributors, and added relevant references (lines 78-83).

We would like to add that one of the reasons many studies did not report such residual artifacts may be that they are very large only in electrodes placed in the direct vicinity of the coil (Virtanen et al., 1999), and these electrodes are often removed or excluded from processing (e.g. Komssi et al., 2004, Kahkonen et al., 2005). They may also differ across amplifiers. We now make clearer in our manuscript that a major advantage of the techniques discussed here is the ability to eliminate artifacts even in electrodes located directly below the coil (lines 367-373). This is of crucial importance since often the desired ERPs are produced in or near the cortical tissue being stimulated. Having full head coverage is also recommended if source estimation algorithms are applied.

*Minor Concerns:*  
N/A  
  
*Additional Comments to Authors:*  
N/A

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