Philipps Universität Marburg

Call for participants for a combined EEG and MRI study!
The networks they are a-changin'

How differently are speech, song and instrumental music processed?

We are looking for healthy participants for a pilot study aimed at investigating the neural processing of language, song and instrumental music in the clinic for psychiatry and psychotherapy of the Philipps university in Marburg.
In our study we intend to use combined measurements of functional magnetic resonance (fMRI) and electroencephalography (EEG) to investigate if left-handers and musicians use another strategy to process speech, song and instrumental music in comparison with right-handers without musical training. Both EEG and fMRI are non-invasive procedures, which are in no way harmful to the body.

Who can participate?
We are looking for participants between 18 and 29 years of age. For the different experimental groups we are explicitly seeking for left-handers and subjects who currently regularly play music (play an instrument/sing in a choir).

Who cannot participate?
Those who have metal objects in their body that cannot be eliminated (such as implants, piercings, metal plates, clips, contraceptive coils etc.) or big tattoos on their hed or around their shoulders are unfortunately not allowed to participate. Other exclusion criteria are strong hearing impairment, a diagnosed developmental speech disorder or reading and writing disorder as well as pregnancy.

Experimental procedure:
For a start we shall schedule a meeting for the EEG-MRI combined measurement. On this day the precise procedure of the study will be explained and all your related questions answered, before the experiment in the scanner takes place. The whole procedure shouldn't last longer than 2 hours and 45 minutes including preparation and wrap-up.

As a compensation for your participation you are going to receive MR images of your brain as well as course credits for the hours of participation or an allowance of €10 per hour, complemented by an insight in the exciting context of research.

If you are interested in participating or if you have questions, please write to:

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Handedness assessment

General Handedness Questionnaire (Waterloo, revised)

Instructions: Please indicate your hand preference for the following activities by circling the appropriate response.
If you always (i.e. 95 % or more of the time) use one hand to perform the described activity, circle **Ra** or **La** (for right always or left always). If you usually (i.e. about 75% of the time) use one hand circle **Ru** or **Lu** as appropriate. If you use both hands equally often (i.e. you use each hand about 50% of the time), circle **Eq**.

1. Which hand would you use to adjust the volume knob on a radio?	La	Lu	Eq	Ru	Ra
2. With which hand would you use a paintbrush to paint a wall?	La	Lu	Eq	Ru	Ra
3. With which hand would you use a spoon to eat soup?	La	Lu	Eq	Ru	Ra
4. Which hand would you use to point to something in the distance?	La	Lu	Eq	Ru	Ra
5. Which hand would you use to throw a dart?	La	Lu	Eq	Ru	Ra
6. With which hand would you use the eraser on the end of a pencil?	La	Lu	Eq	Ru	Ra
7. In which hand would you hold a walking stick?	La	Lu	Eq	Ru	Ra
8. With which hand would you use an iron to iron a shirt?	La	Lu	Eq	Ru	Ra
9. Which hand would you use to draw a picture?	La	Lu	Eq	Ru	Ra
10. In which hand would you hold a mug full of coffee?	La	Lu	Eq	Ru	Ra
11. Which hand would you use to hammer a nail?	La	Lu	Eq	Ru	Ra
12. With which hand would you use the remote control for a TV?	La	Lu	Eq	Ru	Ra
13. With which hand would you use a knife to cut bread?	La	Lu	Eq	Ru	Ra
14. With which hand would you use to turn the pages of a book?	La	Lu	Eq	Ru	Ra
15. With which hand would you use a pair of scissors to cut paper?	La	Lu	Eq	Ru	Ra
16. Which hand would you use to erase a blackboard?	La	Lu	Eq	Ru	Ra
17. With which hand would you use a pair of tweezers?	La	Lu	Eq	Ru	Ra
18. Which hand would you use to pick up a book?	La	Lu	Eq	Ru	Ra
19. Which hand would you use to carry a suitcase?	La	Lu	Eq	Ru	Ra
20. Which hand would you use to pour a cup of coffee?	La	Lu	Eq	Ru	Ra
21. With which hand would you use a computer mouse?	La	Lu	Eq	Ru	Ra
22. Which hand would you use to insert a plug into an outlet?	La	Lu	Eq	Ru	Ra
23. Which hand would you use to flip a coin?	La	Lu	Eq	Ru	Ra

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24. With which hand would you use a toothbrush?	La	Lu	Eq	Ru	Ra
25. Which hand would you use to throw a baseball?	La	Lu	Eq	Ru	Ra
26. Which hand would you use to turn a doorknob?	La	Lu	Eq	Ru	Ra
27. Which hand would you use for writing?	La	Lu	Eq	Ru	Ra
28. Which hand would you use to pick up a piece of paper?	La	Lu	Eq	Ru	Ra
29. Which hand would you use a hand saw?	La	Lu	Eq	Ru	Ra
30. Which hand would you use to stir a liquid with a spoon?	La	Lu	Eq	Ru	Ra
31. In which hand would you hold an open umbrella?	La	Lu	Eq	Ru	Ra
32. In which hand would you hold a needle while sewing?	La	Lu	Eq	Ru	Ra
33. Which hand would you use to strike a match?	La	Lu	Eq	Ru	Ra
34. Which hand would you use to turn on a light switch?	La	Lu	Eq	Ru	Ra
35. Which hand would you use to open a drawer?	La	Lu	Eq	Ru	Ra
36. Which hand would you use to press buttons on a calculator?	La	Lu	Eq	Ru	Ra

37. Were you re-educated to become a right-hander? YES/NO

38. Is there any reason (i.e. injury) why you have changed your hand preference for any of the above activities? YES/NO

39. Have you been given special training or encouragement to use a particular hand for certain activities, e.g. to play a musical instrument? YES/NO

40. If you have answered YES for either Questions 37, 38 or 39, please explain:

_____

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Oldfield Handedness Questionnaire

Please indicate your preferences in the use of hands in the following activities by putting + in the appropriate column. Where the preference is so strong that you would never try to use the other hand unless absolutely forced to, put + +. If in any case you are really indifferent put + in both columns. Some of the activities require both hands. In these cases the part of the task, or object, for which hand preference is wanted is indicated in brackets.
Please try to answer all the questions, and only leave a blank if YOU have no experience at all of the object or task.

	LEFT	RIGHT
1. Writing		
2. Drawing		
3. Throwing		
4. Scissors		
5. Toothbrush		
6. Knife (without fork)		
7. Spoon		
8. Broom (upper hand)		
9. Striking Match (match)		
10. Opening box (lid)		

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Handedness in the family - Questionnaire

Please tick the boxes referring to handedness in your family, if you have this information:

	Left-handed	Ambi-dextrous	Right-handed	re-educated left-hander (to right-handedness)	trained back left-hander (to left-handedness)
mother					
father					
grandmother (mother)					
grandfather (mother)					
grandmother (father)					
grandfather (father)					
siblings… how many?					
...sister(s)					
...brother(s)					
children… how many?					
...daughter(s)					
...son(s)					

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Screening questionnaire about linguistic and musical aspects

A) Inquiry in speech-related aspects

1. Please describe your language knowledge in a detailed manner:

Mothertongue(s): _____
Learned language(s): _____
In case you have learned (a) foreign language(s), please declare when you started learning and how many years you spent learning it/them:
_____
_____

2. Have you been brought up as a bilingual or multilingual?

□ Yes □ No
If yes, please explain: _____
_____

3. Were you ever diagnosed any of the following? (Please tick the box and explain)

□ disorder of speech development
If positive, please explain: _____
_____
□ language disorder
If positive, please explain: _____
_____

□ reading and writing disorders/dyslexia
If positive, please explain:_____
_____
□ otitis of the middle ear
If positive, please explain: (frequency, intensity): _____
_____

4. Was any of your family members diagnosed any of the following?
(If known, please tick the box and explain)?

□ disorder of speech development
If positive, please explain: _____

□ language disorder
If positive, please explain: _____
_____
□ reading and writing disorders/dyslexia
If positive, please explain:_____
_____
□ otitis of the middle ear
If positive, please explain: (frequency, intensity): _____
_____

B) Inquiry on musical aspects

1. Do you currently actively make music? (Please tick the box and explain)
□ no □ I play an instrument/more than one instrument
If positive, please explain which instrument(s) you play, how many years you have played and how often you practice (in hours per week) _____
_____
□ I sing in a choir
If positive, please explain since how many years you sing in a choir and how often you practice (in hours per week)_____
_____
□ other: _____

2. Did you use to make music earlier on? (Please tick the box and explain)
□ no □ I used to play an instrument/more than one instrument
If positive, please explain which instrument(s) you played, how many years you have learned and how often you practiced (in hours per week) _____
_____

□ I sang in a choir
If positive, please declare how many years and how often you sang in a choir (in hours per week)
_____
_____
□ other: _____

3. Are you currently taking private music lessons to learn to play an instrument (e.g. in a music school)?
□ no □ yes
If positive, please declare how many years how often (in hours per week)_____
_____

4. Have you ever had private music lessons to learn to play a musical instrument (e.g. in a music school)?

□ no □ yes

If positive, please declare how many years how often (in hours per week)_____

_____

Evaluation of the heard stimuli

A) Spoken sentences

1. How many of the sentences you heard did you understand the meaning of?

□ none

□ less than 10 (of 60)

□ at least 10, less than 20 (of 60)

□ at least 20, less than 30 (of 60)

□ at least 30 of the 60 presented stimuli

2. Please declare the language(s) that you understood in the spoken stimuli:_____

_____

B) Excerpts from songs

1. How many of the excerpts of songs you heard did you understand the meaning of?

□ none

□ less than 10 (of 60)

□ at least 10, less than 20 (of 60)

□ at least 20, less than 30 (of 60)

□ at least 30 of the 60 presented stimuli

2. Please declare the language(s) that you understood in the excerpts of songs:_____

_____

3. How many of the excerpts of songs you heard sounded familiar to you?

□ none

□ less than 10 (of 60)

□ at least 10, less than 20 (of 60)

□ at least 20, less than 30 (of 60)

□ at least 30 of the 60 presented stimuli

In case any piece was familiar to you, please explain: _____

C) Excerpts from melodies

1.How many of the excerpts from musical pieces you heard sounded familiar to you?
□ none
□ less than 10 (of 60)
□ at least 10, less than 20 (of 60)
□ at least 20, less than 30 (of 60)
□ at least 30 of the 60 presented stimuli

In case any piece was familiar to you, please explain: _____

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MRI safety screening questionnaire:

Name:
Date of Birth:
Weight:
Study:

	Question	yes	no
1	Do you have a pacemaker?		
2	Did you ever have a surgical operation? What was operated on?		
3	Are you pregnant or do you believe to be?		
4	Have you ever been wounded by a big metal object (bullet, shell splinter, metal splinter etc.)?		
5	Have you got or do you suspect you have a metal object in your eye (prosthesis, metal splinter)? Do you wear contact lenses (you are allowed to wear soft ones)?		
6	Do you have metal clips in your body following a vessel operation? If positive, where (brain, coronary vessel, aneurysma, transplanted kidney)?		
7	Do you have a cardiac valve? If positive, of which kind?		
8	Do you have any electric stimulation devices implanted (biostimulators, neurostimulators)?		
9	Do you have implanted drug pumps or infusion systems (infusion pumps, ports)?		
10	Do you have a middle ear prosthesis or a cochlear implant?		
11	Were any metal objects implanted in your vessels or in your digestive tract (stent implantation, cava-filters, coils)?		
12	Do you have any metal joint prosthesis?		
13	Was any osteosynthesis material implanted in your bone after bone breaking (metal plates, bars, screws)?		
14	Do you have a metal intrauterine contraceptive coil?		
15	Do you have non-removable metal dental prosthesis?		

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16	Have you ever worked as a metal worker?		
17	Do you have any tattoos, permanent makeup or piercings?		
18	Do you wear a metal brace or retainer? Do you have acupuncture needles in your body?		

I have answered the questions to my best knowledge and conscience.
I am aware that false statements could damage my health!

Marburg, the _____

Date, signature of the participant

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Participant information for a research project combining EEG and MRI methods as a preparation for the oral explanation by the research leader for the study:

The networks they are a-changin' - a pilot study for the investigation of neural processing of speech, song and instrumental music in lefthanders and musicians

Dear Madam, dear Sir,

We would like to invite you to participate in the pilot study “The networks they are a-changin’ - A pilot study for the investigation of the neural processing of speech, song and instrumental music in left-handers and musicians ”. In this context we will use electrophysiological (EEG) and imaging (fMRI) methods that allow statements about the functions and structures of the brain and should help to us understand the spatio-temporal interplay of neural systems in the processing of music, song and speech. In particular it should be made possible to identify potential differences in left-handers and in musicians.
In this information sheet we are going to describe the planned study, explain the potential risks connected to it and how we handle incidental findings, declare our use of the collected data and name the exclusion criteria for the participation in the study.

(1) Information about the research:

The aim of the study is to investigate the neural processing of speech, song and instrumental music in different experimental groups. Participants will undergo a combined measurement using electroencephalography (EEG) as well as functional and structural magnetic resonance imaging (MRI). During the presentation of speech, song and instrumental music their neural correlates and the spatio-temporal interplay should be observed in the MRI, in order to illustrate how these auditory stimuli are processed.

(2) We hereby require you to agree to participation in the study:

First part: combined EEG-MRI measurement
Before the measurement in the scanner begins, you will receive an introduction and explanation outside of the scanner, which will illustrate the procedure and your tasks in detail. Following this part, the MR-compatible EEG system is applied and the measuring phase can start with the recording of an anatomical image of your brain and localiser-scans will be obtained. We will ask you to keep still in your current position for approx. 6 minutes. You don’t need to complete any task in this phase.
Subsequently the functional images of your brain will be recorded. For this part of the scan you will receive auditory stimuli through headphones consisting of spoken sentences,

excerpts from songs and melodies in blocks lasting 10 seconds, which are intervalled by small breaks. While the stimuli are presented you will fixate a fixation cross on a screen. You don't have to complete any other task, but you should just try and stay still and reduce movements.
The processes of preparation and measuring will last each approx. 45 minutes.

Second part: post-processing
After the combined measurement we request you to complete 5 tests or questionnaires (time needed approx. 70 minutes):

1. Evaluation of the presented stimuli: test on the familiarity of the heard stimuli.

2. Montreal Battery of Evaluation of Amusia (MBEA): test for the exclusion of amusia (inability to recognise and reproduce tone series and rhythms).

3. Musical Ear Test (MET): assessment of hearing abilities.

4. Handedness questionnaires: inform on the degree of left-handedness of a participant.

5. Screening questionnaire: describes linguistic (mothertongue/learned languages) and musical (degree of musical training) aspects.

Participation in the study ist voluntary. You can decide to withdraw at any time and without justification without any consequences. For the participation in the tests you will receive an allowance of €10 per hour or course credits; if you wish, you can obtain a CD with the structural images of your brain.

(3) MR investigation procedure and possible risks

The human brain consists of a multitude of molecules, which have specific magnetic properties (nuclear spin resonance). These can be measured by applying a strong magnetic field to the body in the coil and the concentration of various molecules can be defined. In this way it is possible to determine the blood flow in the brain and more precisely the continuous changes in the quantity of oxygen contained in the blood in a timespan of a few seconds. These changes reveal specific patterns according to which sensorial stimuli the participant processes during the scan. In such a manner it is possible to make various brain functions visible; this is called functional magnetic resonance.

Procedure:

During the scan you are going to lie on a table, which shifts you into the scanner in the opening of the MR tomograph. Additionally, a magnetic coil form similar to a helmet is laid around your head.
The MR-tomograph produces various loud noises, which arise from the electric transitions of the magnetic field. In order to contain this effect, you will wear hearing protection over the headphones. At any point in time during the scan you have the possibility to contact the investigators via an intercommunication system. Additionally, you will receive a special alarm button for emergencies, so that you can be brought out of the MR scanner at any time at your wish.

Possible danger:
According to present knowledge is MR technology harmless. It is based on more than 20 years' experience and it is used daily in all big hospitals. Known risks are only related to the presence of metal objects or materials in the body. These can heat up and lead to burns. Loose metal parts can also be attracted by the magnetic field and lead to wounds, therefore people with electric devices (e.g. pacemakers, drug pump) or metal parts (e.g. screws following the breaking of bones or a contraceptive coil) in their body cannot participate in the study. Risks other from the above listed are not known. Apart from the possible inconveniences which can arise from lying very still in the fMRI and from the loudness of the tomograph, no other problems should occur during the scan. We would also like to point out that there are no scientifically proven results concerning long-term risks in case of repeated MRI scans.

(3.1) The implementation of electroencephalography in MRI

Electroencephalography (EEG, from the ancient Greek work "encephalon" for brain and "graphein" for writing) is a method for medical diagnosis and neurological research for the measurement of the sum of the electrical activity of the brain through the recording of voltage fluctuations on the surface of the head. For the combination of EEG with MRI, a specially developed EEG-system was designed to be compatible with the MR tomograph. The system has been tested on multiple comparable studies and leads to no other known risks. However it is possible that the additional headcap with the electrodes makes the lying position more uncomfortable. Furthermore,for a successful use of the EEG equipment it is necessary to establish good contact between the skin and the electrodes: for this purpose an electrode gel is applied, which is skin-compatible and can be washed away with water. Therefore it is necessary to wash your hair after the experimental procedure.

(4) Dealing with incidental findings

This study is a research project. No neuroradiological investigation of the MR images or a clinical interpretation of the EEG data in a clinically oriented diagnostic framework is going to take place. However it is possible that anomalies in the MR images and the EEG data are

discovered, which could potentially have a clinical relevance (“incidental findings”). If this were the case, you will be informed personally and advised to undergo a neuroradiological investigation.
In case you don’t want to be informed about a possible incidental finding, this constitutes an exclusion criterion for the participation in this study.

(4) Data protection

Your personal data will be electronically saved and processed. The transmission, storage and analysis of the data relative to the study is carried out without a reference to personal identity according to the legal dispositions and implies your voluntary agreement before participating in the study. For the pseudonymisation of your data we request you to choose 6 digits including numbers from 0 to 9 combined with the first and last capital letters of your hometown (e.g. 340692 MN). This combination, which you will write down on each questionnaire you fill in, can only be attributed to a person thanks to a key list. This key list is stored separately from the collected data in a closed cupboard in the clinic for psychiatry and psychotherapy for two years after end of the project and then deleted.

(5) Exclusion criteria

The application of magnetic fields in the MR investigation excludes people with electric devices (e.g. pacemakers, drug pump) or metal parts (e.g. screws following the breaking of bones) in their body from participation. Women using a contraceptive coil or who are pregnant are not allowed to participate. Experimental subjects who do not want to be informed on possible incidental findings cannot be included either. Likewise, persons with a diagnosed developmental language disorder or a reading and writing disorder are not accepted in this study.
In case you have any questions, you can contact our research leader.

Contact persons:
• XXXXXX
• XXXXXX

Project leader:
• XXXXXX

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Informed consent statement for the participation in the research project:

The networks they are a-changin' - a pilot study for the investigation of neural processing of speech, song and instrumental music in lefthanders and musicians

If you are willing to participate in the study, we request you to fill in the informed consent statement completely and to sign it.

I hereby confirm that I have been correctly informed by the research leader, Mr/Mrs…….……. about the nature, the meaning, the risks and the consequences of the planned study and had enough time to think over my decision.
I have read the participants' information sheet, I feel correctly informed and I have understood what the study is about. The investigator has given me the possibility to ask questions, which have all been answered satisfactorily. I had enough time to make my decision.
It was pointed out to me that this study is part of a research project and that no neuroradiological interpretation of the MR images and EEG data in a clinically-oriented diagnostic framework will take place. However it is possible that anomalies in the MR images and the EEG data are discovered, which could potentially have a clinical relevance ("incidental findings"). If this were the case, I am aware of the fact that the investigator would inform me personally and advise me to undergo a neuroradiological investigation.
I have understood that in scientific studies personal data and medical findings are collected. The transmission, storage and analysis of these research-related data is carried out in accordance with the legal dispositions and implies my voluntary agreement before participating in the study.
I agree to the fact that data collected in the context of this study are recorded in the questionnaires and electronic data carriers and are going to be analysed without personal identification for the sole purpose of of scientific examination.
I have received a copy of the participant information and of this signed informed consent.
I am participating voluntarily in this research project. I was reminded that I can retrieve my consent at any time and without justification without any consequences.

I hereby agree to participate as experimental subject in the research project "The networks they are a-changin' - a pilot study for the investigation of neural processing of speech, song and instrumental music in lefthanders and musicians". Participation includes the completion of five questionnaires/tests as well as an EEG-MRI combined investigation.

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TO BE FILLED IN BY THE PARTICIPANT:

Name: .....
Date of birth: .....
Date: .....
Time: .....
Place: .....
Signature: .....

TO BE FILLED IN BY THE RESEARCH LEADER:

I have given an oral explanation about the nature, meaning, the reach and the risks related to the research project.

Date: .....
Time: .....
Place: .....
Investigator: .....

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Participants' information - Open Brain consent

The data and samples from this study, might be used for other, future research projects in addition to the study you are currently participating in. Those future projects can focus on any topic that might be unrelated to the goals of this study. We will give access to the data we are collecting, including the imaging data, to the general public via the Internet and a fully open database.
The data we share with the general public will not have your name on it, only a code number, so people will not know your name or which data are yours: for the pseudonymisation of your data you are required to choose 6 digits including numbers from 0 to 9 and to combine them with the first and last capital letters of your hometown (e.g. 340692 MN). The connection between the collected data and your identity can only be made through a key list, which is kept separately from the data in a secured locker at the clinic for psychiatry and psychotherapy in Marburg and is to be deleted two years after the end of the project. Furthermore, we are going to delete data which could in any way provide information on your identity (such as facial features or the date of participation). For this purpose, the so called "defacing" process is implemented, in which your face and its recognizable features are cancelled from the fMRI data. In such a way the attribution of your data to your person through the recognition of face and teeth is made impossible.
If you change your mind and withdraw your consent to participate in this study (you can call XXXXXX to do this), we will not collect any additional data about you. We will delete your data if you withdraw before it was deposited in the database. However, any data and research results already shared with other investigators or the general public cannot be destroyed, withdrawn or recalled.
By agreeing to participate, you will be making a free and generous gift for research that might help others. It is possible that some of the research conducted using your information eventually could lead to the development of new methods for studying brain, new diagnostic tests, new drugs or other commercial products. Should this occur, there is no plan to provide you with any part of the profits generated from such products and you will not have any ownership rights in the products.

Letting us use and share your data is voluntary. However, you must be willing to share your data in this way in order to participate in this study. If you are not willing, you cannot participate in this study.
By signing below, you agree to provide your data for future research. You agree that these may be shared with other investigators at other institutions from around the world. The details, results, and implications of these studies are unknown.

Marburg, the _____

Date, signature of the participant

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https://open-brain-consent.readthedocs.io/en/master/