

Supplementary Information File 1: Instructions and Questionnaires

Instructions for Participants

When the Participant Arrives

Thank you for agreeing to take part in this experiment. The aim of our study is to investigate how our brain represents rhythms and whether it is possible to improve this representation through a short learning. I will first ask you to read the information letter, sign the consent form, and fill in a questionnaire about your musical and dance abilities.

The experience will take place in three parts. Bear in mind that you can stop the experiment at any time and for any reason, without having to justify yourself. It is also important that you let me know if anything seems odd or uncomfortable.

In the first part, you will listen to rhythmic sounds without moving while we record your brain responses using the EEG technique.

→ *ask the participant if they are familiar with EEG; if not, briefly introduce the technique*

In some trials, the rhythm of the music will slow down at some point. Your task will be to detect when these slowdowns occur. When you detect a slowdown, do not report it immediately, but when the trial is over (i.e., when the music stops). Here is an example of a slowdown.

→ *play an example stimulus*

Here the slowdown is obvious, but it will be more subtle during the experience. Do not worry if you find the task difficult and frustrating, it is all part of the experience. Do your best and be honest, even if you do not hear a change in many trials. The most important thing is that you concentrate on the sound.

In the second part of the experiment, you will practice moving to rhythmic sounds in a particular way, which I will explain in more detail later.

Finally, in the third part, you will again listen to rhythmic sounds without moving, while we record your cerebral responses using the EEG.

There will also be a few trials during which you will have to clap your hands in rhythm with the sounds you hear. This task can be quite complicated, so we will do a few practice runs.

→ *perform the tap training*

That's it, you're ready for what's next! We will start by setting up the EEG material, which will take about 20 minutes.

→ *EEG preparation*

Pre-Movement Session

We're ready to go! I will now play the sounds for you, and you will have to listen to them without moving, fixing your gaze on the fixation cross in front of you. The EEG is very sensitive to movement, so it is important that you stay as still as possible (e.g., don't move your toes rhythmically). Each trial lasts 40 s and there will be around 20 of them. At the end of each trial, I will ask you if you detected a slowdown at any point. At that moment, do not hesitate to move to relax your muscles and let me know if you need a break. Each time, I will let you know when we can start the next trial. From this point on, it is very important that you stay still and look at the fixation cross. Do you have any questions?

I am going to insert the headphones, so you will be isolated from the surrounding sounds. I will let you know when we start.

→ *run the listen trials of the pre-movement session*

We will now move on to the clapping trials. As a reminder, you need to clap your hands to mark the beat of the rhythm you will hear. Imagine what you would do if you tapped your foot while listening to music in a bar or if you clapped your hands at a concert. You can move your head and feet if that helps you get the right beat. Do you have any questions?

→ *run the clapping trials of the pre-movement session*

We've completed the first part of the experiment!

Body-Movement Session

You will now hear the same kind of rhythm as before, but this time a metronome will be superimposed. Your task is to walk-on-the-spot and clap your hands in sync with this metronome, as if you were dancing. Here is a short video example.

→ *play the audio-video example*

You can move freely, so do not hesitate to move your head if that helps. There will be about 20 trials. At the end of each trial, the rhythm will remain, but the cadence will no longer be present. You need to continue stepping and clapping to follow the cadence of the metronome you heard previously, as if it were still there. The trial ends when you no longer hear any sound. Are you ready?

→ *run the body-movement trials*

Well done, you've finished training!

Post-Movement Session

The last part of the experiment is similar to what you did at the beginning. You will hear sounds, and you'll have to listen to them without moving, fixing your gaze on the fixation cross in front of you. There will be around 20 trials. At the end of each trial, I will ask you if you detected a slowdown in the rhythm at any point. Do you have any questions?

→ *run the listen trials of the post-movement session*

We will now move on to the clapping trials. As a reminder, you need to clap your hands to mark the beat of the rhythm you hear. Imagine what you would do if you tapped your foot while listening to music in a bar or clapped your hands at a concert. You can move your head and feet if that helps you get the right beat. Do you have any questions?

→ *run the clapping trials of the pre-movement session*

We've finished, thank you for participating!

→ *explain the purpose of the study to the participant and answer any questions*

Screening Questionnaire for Stage 2 #1

Note that this an English version of the questionnaire, but that all questionnaires will be given either in French or English.

Surname, first name: _____

Email address: _____

Gender (male, female, other): _____

Are you aged between 18 and 45? Yes / No

Do you suffer from hearing, neurological (epilepsy, migraines, etc.) or psychiatric problems?
Yes / No

Demographics:

Q1: Did you, or both your parents, live at least the first 15 years of your/their life in one of the following countries: *Mali, Côte d'Ivoire, Togo, Benin, Cameroon, Gabon, Republic of Congo, or Democratic Republic of Congo*? Yes / No

Musical expertise:

Q2: Do you consider yourself a musician? Yes / No

Q3: Do you have more than 4 years of musical experience? Yes / No

Q4: Have you ever played an instrument in front of an audience? Yes / No

Dance expertise:

Q5: Do you consider yourself a dancer? Yes / No

Q6: Have you practiced dance for more than 4 years? Yes / No

Q7: Have you ever danced in a performance in front of an audience? Yes / No

Screening Questionnaire for Stage 2 #2

Note that this is an English version of the questionnaire, but that all questionnaires will be given either in French or English.

Surname, first name: _____

Email address: _____

Gender (male, female, other): _____

Are you aged between 18 and 45? Yes / No

Do you suffer from hearing, neurological (epilepsy, migraines, etc.) or psychiatric problems?
Yes / No

Demographics:

Q1: Did you, or both your parents, live at least the first 15 years of your/their life in one of the following countries: *Belgium, France, United Kingdom, Netherlands, Germany, Luxembourg, Spain, Portugal, Italy, Switzerland*? Yes / No

Q2: Did you, or both your parents, live at least the first 15 years of your/their life in one of the following countries: Mali, Côte d'Ivoire, Togo, Benin, Cameroon, Gabon, Republic of Congo, or Democratic Republic of Congo? Yes / No

Musical expertise:

Q3: Do you consider yourself a musician? Yes / No

Q4: Do you have more than 4 years of musical experience? Yes / No

Q5: Have you ever played an instrument in front of an audience? Yes / No

Dance expertise:

Q6: Do you consider yourself a dancer? Yes / No

Q7: Have you practiced dance for more than 4 years? Yes / No

Q8: Have you ever danced in a performance in front of an audience? Yes / No

Main Questionnaire for Stage 2 #1 and Stage 2 #2

Note that this an English version of the questionnaire, but that all questionnaires will be given either in French or English.

Surname, First name: _____

Gender (Male, Female, Other): _____

Date of birth: _____

Dominant hand (Right, Left): _____

Demographics:

Q1: Country in which you grew up (several options are possible): _____
(If other than Belgium, please specify the age at which you arrived in Belgium: _____)

Q2: Culture in which you grew up (several options are possible): _____

Q3: Country in which your parents grew up (several options possible):
(If they migrated to Belgium, please specify the age at which they arrived: _____)

Parent n°1: _____ Parent n°2: _____

Q4: Culture in which your parents grew up (several options are possible):

Parent n°1: _____ Parent n°2: _____

Language fluency:

Q5: Mother tongue (or idiom) (several options are possible):

Q6: Secondary language (or idiom) (several options are possible):

Q7: Average time spent speaking the secondary language(s):

Secondary language n°1: _____ h/week

Secondary language n°2: _____ h/week

Secondary language n°3: _____ h/week

Musical expertise and preferences

Q8: Have you ever taken music lessons on a regular basis, alone or in a group?
Yes / No

If yes, please specify the age you started playing music, the period, the instrument, and the average number of hours of musical practice per week: _____

TIME PERIOD (For example, between 10 and 12 years old)	INSTRUMENT and/or OTHER	AVERAGE AMOUNT OF HOURS PER WEEK
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Q9: Which category best describes you?

- Non-musician
- Not a musician but very fond of music
- Amateur musician
- Serious amateur musician
- Semi-professional musician
- Professional musician

Q10: Are you familiar with (do you often listen to, play, or dance to) music typical of any of the regions or countries listed below?

(If yes, please specify the style/region and the average number of hours you listen to it per week):

- Western Countries (Europe, North America): Yes / No
If yes, style/region: _____ for _____ h/week
- Africa: Yes / No
If yes, style/region: _____ for _____ h/week
- Central and Latin America: Yes / No
If yes, style/region: _____ for _____ h/week
- Asia: Yes / No
If yes, style/region: _____ for _____ h/week
- Other: Yes / No
If yes, style/region: _____ for _____ h/week

Dance expertise:

Q11: Have you ever taken dance classes on a regular basis, either alone or in a group?
Yes / No

If yes, please specify the age you started dancing, the period, the type of dance and the average number of hours per week: _____

TIME PERIOD (For example, between 10 and 12 years old)	TYPE OF DANCE	AVERAGE NUMBER OF HOURS PER WEEK
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Familiarity with the rhythmic pattern

Q12: How difficult did you find it to clap along with the rhythm?

- As a response, you can choose between 0%, meaning not at all difficult, 100% meaning extremely difficult, and the intermediate levels of 25%, 50% and 75%.

0% 25% 50% 75% 100%

Q13: How much did you like the rhythm?

- The response format is the same: You can choose between 0%, which in this case means you did not like the example at all, 100% meaning you liked it really very much, and the intermediate levels of 25%, 50% and 75%.

0% 25% 50% 75% 100%

Q14: To what extent did the rhythm seem unfamiliar and strange to you?

- Again, the response format is the same: You can choose between 0%, which here means that you did not find the example strange at all, 100% meaning you found it extremely strange, and the intermediate levels of 25%, 50% and 75%.

0% 25% 50% 75% 100%

Q15: Finally, did the rhythm remind you of something?

Yes / No

- If “yes”, meaning that the rhythm indeed reminded you of something, what was that the rhythm reminded you of? Here you can respond with whatever comes to your mind, be it the name of a style of music, a musical piece or genre, activities or events you know from your everyday life or whatever else it might be that the example reminded you of.
