



School of Psychology
Participant Information Sheet
Version: 3 Date: 14/06/2024



**The Effects of Piano Training on
Cognition and Neural Microstructure in
Healthy Older Adults**

You are being invited to take part in a research project. Before you decide whether or not to take part, it is important for you to understand why the research is being undertaken and what it will involve. Please take time to read the following information carefully and discuss it with others, if you wish.

Thank you for reading this.

1. What is the purpose of this research project?

This research study is part of a PhD project that will investigate whether learning to play the piano through online instruction can have a positive impact on mental abilities and brain structure in later adulthood. Previous studies have found that learning to play the piano through in-person instruction can lead to brain changes and improved performance on cognitive tests. This project aims to develop an online piano training programme that will be easily accessible and have a positive impact on cognition for older adults who have no music experience.

2. Why have I been invited to take part?

You have been invited because you are a healthy volunteer over the age of 50 years old, with no underlying neurological diagnoses, who has very little or no music training, and has access to the internet via PC/laptop/tablet in order to take part.

3. Do I have to take part?

No, your participation in this research project is entirely voluntary and it is up to you to decide whether or not to take part. If you do decide to take part, the research project will be discussed with you in detail and you will be asked to sign a consent form if you agree to take part. If you decide not to take part, you do not have to explain your reasons and it will not affect your legal rights. If you are a student at Cardiff University, your involvement in this project will have no effect on your education or progression through your course.

You are free to withdraw your consent to participate in the research project at any time, without giving a reason, even after signing the consent form.

4. What will taking part involve?

Your involvement will occur over a 12-week period, which can be split into “beginning”, “middle” and “end” phases. See below for details.

Beginning of the study: (weeks 1-2)

This is the “baseline testing” phase. If you agree to take part, you will come to CUBRIC for cognitive testing and MRI scanning. Cognitive testing will last for 2 hours and MRI scanning will last for 30 mins. Testing will also include a short piano task where your playing will be

recorded using MIDI data. At the end of testing, you will be randomly assigned to **one** of two groups: i) a piano training group or ii) a control group. The piano group will receive a keyboard to take home with them to practice for the next 8 weeks.

Middle of the study (weeks 3-10)

The middle phase of the study is the intervention period which lasts for 8 weeks. What happens during this period depends on whether you were randomly assigned to the piano group or the control group.

Piano Group: If you have been randomly assigned to the piano group, you will be emailed one piano training video every week for 8 weeks. The videos last approximately 20 minutes each and you must follow along with the video demonstrations at home using the keyboard provided. You must also practice the prescribed exercises for 30 minutes, 5 days per week in your own time. Practice sessions must be logged as accurately as possible in diaries provided and returned to the researcher at the end of the 8-week period. The researcher will contact you every two weeks via phone call to check in to see how you are finding the training.

Control Group: If you have been randomly assigned to the control group, you will be asked not to take part in any music-based activities, such as choir singing, dancing or learning an instrument for the duration of the study. This is important because this group will act as a comparison group for research purposes. (Note: at the end of the study, you will receive the piano training material as a thank-you for your participation, provided that you also complete follow-up testing.)

End of the Study (weeks 11-12)

This is the “follow-up testing” phase. After the 8-week intervention period, you will return to CUBRIC for a second visit to repeat the cognitive testing and MRI scanning outlined above, lasting approximately 2.5 hours again. If you were randomly assigned to the piano group, you will be asked to return your keyboard during this visit.

5. What is an MRI scan?

An MRI scan uses a strong magnetic field to record images of the brain. It is non-invasive and safe and does not involve injections or use harmful radiation.

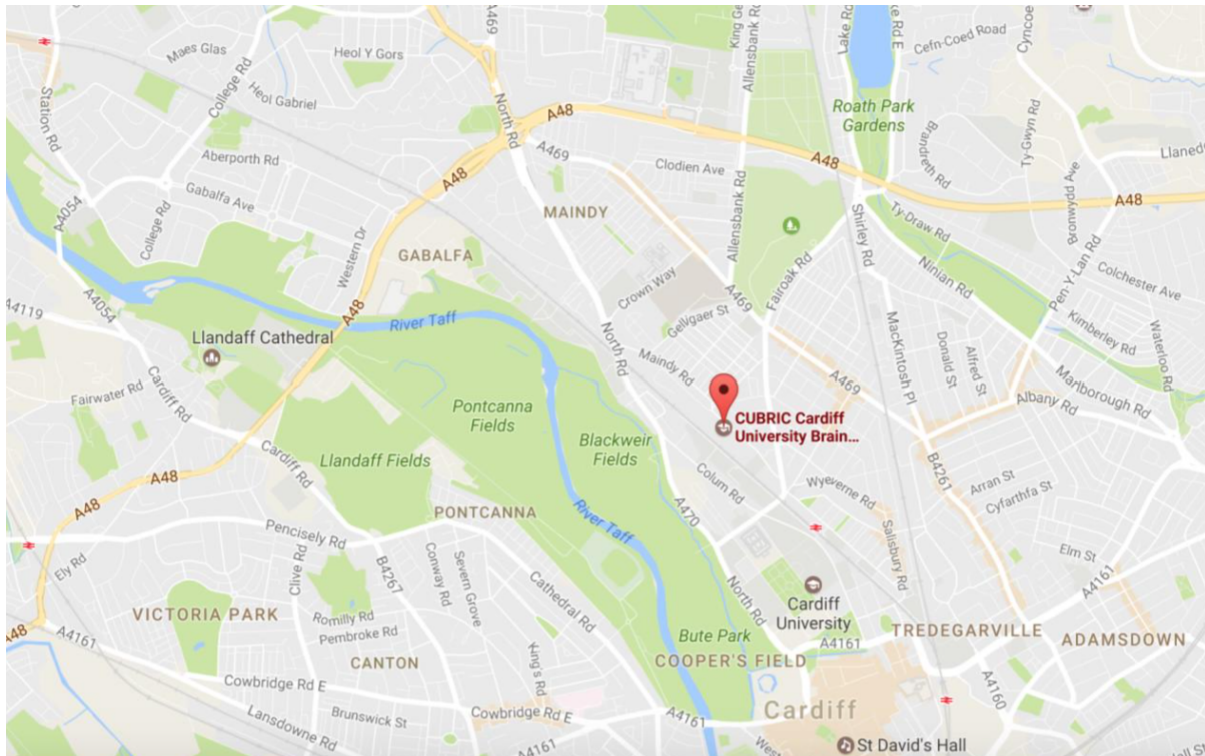
6. What happens during the MRI scan?

When you are ready, you will be asked to change into medical scrubs (like pyjamas), and remove your shoes. You will be asked to lie flat on a platform in front of a scanner. The MRI operator will adjust your body and place some padding around the sides of your head to keep it still and elsewhere around the body for comfort.

The platform will slowly move into the centre of the scanner. You will be able to see outside the scanner by looking at a mirror and you will be able to speak with the operator through a two-way intercom system. Once the scanning starts, you will hear a loud “knocking” noise from the magnetic coils changing pulse direction. This is normal and you will be given ear plugs to keep this to a minimum. The scan will last 30 mins, during which time you will be able to watch a film of your choice.

7. Where is CUBRIC?

CUBRIC is located on Maindy Road in Cardiff (please see the map below). If you require parking, please let the researcher know so that we can book you a space for your visit.



8. Will I be paid for taking part?

If you complete both testing sessions, you will be entered into a draw for a **£100 OneForAll** voucher.

Please understand that any data or feedback that you provide will be as a gift and you will not benefit financially in the future should this research project lead to the development of a new cognitive training programme.

9. What are the possible benefits of taking part?

Taking part in this study may not directly benefit you. You will have a 1 in 2 chance of being randomly selected for the piano training group who will receive a keyboard for 8 weeks for practice, but it must be returned at the end of the study. If you are randomly assigned to the control group, you will still receive the 8 free piano training video tutorials designed specifically for adult beginners at the end of the study once all cognitive tests and MRI scans are complete.

Whether you are randomly assigned to the piano group or the control group, your contribution is equally important because the information that you provide could help contribute to a growing body of research on the importance of music and learning to play an instrument for cognition and neuroplasticity in older adults. It is our hope that in developing an online programme we can make piano playing a more accessible and cost-effective activity to help maintain cognitive abilities in older age.

10. What are the possible disadvantages of taking part?

Provided that there are no contraindications, there is a small risk of MRI scanning. It is important to alert the research team if you have any metal implants or clips in your body. The researcher will go through a checklist with you to ensure that there are no contraindications to you having an MRI scan.

The scanner space is quite reduced and people who are uncomfortable in small or confined spaces may feel claustrophobic because they have to keep still for a long time. If this applies to you, remember that you are free to stop the scan at any time, and are able to withdraw from the study at any time, without explaining why.

Cognitive testing can be tiring for participants. However, the researcher administering the tests is experienced in looking for signals that a participant might be becoming fatigued and you will be offered breaks as needed.

Some questionnaire items on depression and well-being may be sensitive for some participants. Please note that no part of this experiment is diagnostic of any mental health or neurological condition. If taking part in this study raises some health concerns for you, please speak to your GP. You can also find free online support for mental health difficulties at the following:

Samaritans:

- Website: samaritans.org
- Support line: 116 123

Mind:

- Website: mind.org.uk
- Support line: 0300 123 3393

Participation can be time-consuming. If you are randomly assigned to piano training, you will need to find time every week to watch the prescribed videos. Furthermore, if you are randomly assigned to practicing for 2.5 hours per week it will be important to break up this practice time into smaller blocks of 30 minutes a day. Finding time in your schedule for daily piano practice is an important factor to consider when you agree to take part.

11. What happens if you find something unusual on my scan?

The people conducting your scans will not be able to comment on the results of your MRI scans. In most cases a consultant with expertise in neurology or neuroimaging will not look at the images of your brain. It is important that you realise that these scans are not intended to provide any medical information or diagnoses.

These scans will not be routinely reviewed to detect abnormalities but occasionally when we image participants, the researchers may be concerned that there is an unexpected abnormality on the scan. In this case, we will ask an appropriate consultant, such as a neuroradiologist, to examine the images. If the neuroradiologist feels it to be appropriate, a report will be sent to your GP with your consent. Early detection may have the benefit of starting treatment early but in a small number of cases, may have implications for future employment and insurance.

12. Will my taking part in this research project be kept confidential?

All information collected from you during the research project will be kept confidential and any personal information you provide will be managed in accordance with data protection legislation. Your name and contact details will not be visible next to your research data but will be linked by a unique code number.

When taking part in a PhD research project, it is occasionally necessary for participants' details to be made available to academic supervisors or other authorised research staff who are bound by the same duty of confidentiality. This may include people who work on research ethics committees or monitors who conduct quality control checks to confirm the research was carried out correctly. The anonymised data will be kept for 15 years after completion of the project before it is destroyed.

Please see 'What will happen to my Personal Data?' (below) for further information.

13. What will happen to my Personal Data?

You will be given a unique code number at the beginning of the study. Personal information that you provide (email address, phone number, date of birth) will be used to contact you throughout the duration of the project.

At the end of the data collection period (12 weeks including test phases), the password-protected file which links your code number to your personal details will be destroyed, so that all the research data you have provided will be anonymous.

If you decide to withdraw from the study at any point, the data collected up until your withdrawal will be retained and to test acceptability of the study design. Note that it will not be possible to withdraw any anonymised data that has already been published or in some cases, where identifiers are irreversibly removed during the course of a research project, from the point at which it has been anonymised.

Cardiff University is the Data Controller and is committed to respecting and protecting your personal data in accordance with your expectations and Data Protection legislation. Further information about Data Protection, including:

- your rights
- the legal basis under which Cardiff University processes your personal data for research
- Cardiff University's Data Protection Policy
- how to contact the Cardiff University Data Protection Officer
- how to contact the Information Commissioner's Office

may be found at <https://www.cardiff.ac.uk/public-information/policies-and-procedures/data-protection>

14. What happens to the data at the end of the research project?

Your anonymised data may be used for further research projects within Cardiff University by sharing it with other investigators working in similar research areas. The data may be published in journals, books and presented at conferences, but this will always be anonymised (i.e. any identifying information such as names, initials, date of birth and personal contact information will be removed from it). If the research project is submitted to a journal for publication, the anonymised data file may also be submitted to the Open Science Framework website as part of the submission where it will be retained indefinitely where it is likely to have

continuing value for research purposes, but any personal identifying information will be removed.

15. What will happen to the results of the research project?

It is intended that the results of this research project will be published as part of a PhD thesis, in academic journals and presented at conferences. Participants will not be identified in any report, publication or presentation.

16. What if there is a problem?

If you wish to complain or have grounds for concerns about any aspect of the manner in which you have been approached or treated during the course of this research, please contact **Dr Claudia Metzler-Baddeley** (metzler-baddeleyc@cardiff.ac.uk) or the School of Psychology Research Ethics Committee, Cardiff University at the address below. If your complaint is not managed to your satisfaction, please contact the Information Commissioner's Office should you wish to complain, can be found at the following: <https://www.cardiff.ac.uk/public-information/policies-and-procedures/data-protection>.

If you are harmed by taking part in this research project, there are no special compensation arrangements. If you are harmed due to someone's negligence, you may have grounds for legal action, but you may have to pay for it.

17. Who is organising and funding this research project?

The research is organised by PhD student Fionnuala Rogers, under the supervision of Dr. Claudia Metzler-Baddeley. The research is funded by Cardiff University.

18. Who has reviewed this research project?

This research project has been reviewed and given a favourable opinion by the School of Psychology Research Ethics Committee, Cardiff University. Secretary of the Ethics Committee, School of Psychology, Cardiff University, Park Place, Cardiff, CF10 3AT. Tel: 029 2087 0707 Email: psychethics@cardiff.ac.uk.

19. Further information and contact details

Should you have any questions relating to this research project, you may contact us during normal working hours:

Fionnuala Rogers (RogersF2@cardiff.ac.uk) or **Dr. Claudia Metzler-Baddeley** (Metzler-baddeleyc@cardiff.ac.uk)

Thank you for considering to take part in this research project. If you decide to participate, you will be given a copy of the Participant Information Sheet and a signed consent form to keep for your records.