



**DEPARTMENT OF PSYCHOLOGICAL SCIENCES
BIRKBECK UNIVERSITY OF LONDON**

Behaviour and Online Neuroimaging to study the Development of Socialisation (BONDS)

Parent Information Sheet – Main Study

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Before you decide to take part in this study, it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully and discuss it with others if you wish. A member of the research team can be contacted if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

What is this study about?

Social cues - like smiles, humming, speech, singing- are the initial cement that will bind together the baby with its mother, father, sibling and broader social circle. But how do they come to detect these cues and which do they prefer from the myriad of options available? To answer this question, we will combine behavioural observations (for example, what do they look at most, or they preferred play activities) and information recorded with child-friendly neuroimaging techniques that allow us to see how the children's brain responds to what they hear and see.

While usually in research studies children are shown a range of stimuli *the researchers* think will be interesting for them, in this study we will ask what *your child* thinks is interesting. Just as we normally do when we play with a child and we select the next toy or game based on what he/she was excited about previously, the same we will do in this study while recording neuroimaging data. Your child will only be asked to watch child-friendly images, videos or scenes while wearing a cap on his/her head that allows us to see brain responses. A computer program will process this neuroimaging data online, so that we can use them in real time to find out what your child is most interested in.

What does participating in this study involve?

We invite you and your child to come to our Babylab for a day, during which we will measure your child's brain activity with two different techniques and what he/she is interested in looking at. With your permission, we would like to take a picture of your face while you look into the camera with your face neutral or smiling that will be used for these experiments only.

- *Looking at behaviour*

We will ask you some questions about your child's behaviour or ask you to complete a couple of **questionnaires** about your child's skills, preferred activities, responses to specific situations. You don't have to answer any questions you don't want to answer. (10-15 minutes)

We would like to observe the interaction between you and your child while playing on a mat with and without toys, to get a sense of your **child's behaviour when he/she is with one of his/her favourite persons**. (10-15 minutes)

These observations will help us to know your child's characteristics and preferred activities, that can be useful to understand the relationship between behaviour and brain responses once the study is completed.

- *Looking at brain activity (neuroimaging)*

During your visit, we will use a neuroimaging technique to look at your child's brain activity. This will allow us to obtain data in real time about what the child is more interested in. All our images and sounds are child-friendly, such as women telling nursery rhymes and toys moving.

Neuroimaging recording involves placing a light hat on the children's head with soft sensors. The cap used during the **first visit (EEG)** will measure their naturally occurring brain waves while they watch and listen to what is happening on the screen or in front of them. The cap used during the **second visit (NIRS)** will measure their naturally occurring changes in the blood supply to specific brain regions while they watch and listen to what is happening on the screen or in front of them. This is a completely non-invasive way to measure the natural state of your child, similar to using a thermometer to measure temperature. We will give you the opportunity to examine the caps before the session so that you can familiarise yourself with the procedure. You will find more information about the neuroimaging techniques in the separate information sheets. Our long experience of research at the Babylab tells us that infants and toddlers tolerate to wear the neuroimaging hat for 30 minutes, so at each visit your child will wear the cap no longer than that while awake.

You will be with your child at all times, and we will do our best to ensure that these sessions are fun and enjoyable for both of you. We will also take video recordings and photographs of your child's performance throughout the task. These will remain fully confidential, and will only be used for research purposes (e.g. for us to see how well the cap was placed on your child's head, or to code the times when he/she was not looking at the screen).

What are the possible risks/side effects of taking part?

We do not expect any risks or side-effects to arise from participation in this experiment. The testing procedures we employ are widely used with young infants and children, and are completely non-invasive. However, if you or your child want to stop at any time, for any reason, just let us know.

What are the benefits of your child taking part?

Your involvement in this study will help further our understanding of why infants choose to socialise and what can be done to help them develop this skill. We will be able to see what your child spontaneously chooses in a range of child-friendly stimuli. In the future, this will help us to plan possible interventions aimed to facilitate the development of brain regions that are important for social interactions.

How will my and my child's data be used?

At the beginning of the study, your child will be given a unique ID number. This will provide a secure link between your child and any personal or identifying information (e.g. name, address). Only the research staff directly involved in the study will have access to this information, and confidentiality



may only be breached in the unlikely event that the researcher has serious concerns about child protection. Your personal data will be securely stored in this form within the Centre for Brain and Cognitive Development (CBCD) indefinitely. This is because we may receive funding to conduct future follow-up studies of infants who have participated in our research, and we would like to let you know about these opportunities. You can ask for us to break this link at any time. If you do not wish to hear about future research opportunities for you and your child, please let us know and we will remove your contact details from our database.

If you are happy to consent, your child's anonymised research data collected in this study will be shared with the research community through a Trusted Digital Repositories such as the UK Data Archive (see <https://www.data-archive.ac.uk>). Data sharing will be done following the General Data Protection Regulation (Data Protection Act 2018). Once the data are shared, you will not be able to withdraw your consent because all data will be anonymised.

For information about Birkbeck's data protection policy please visit: <http://www.bbk.ac.uk/about-us/policies/privacy#7>

Results are usually published in the scientific literature. No individuals' names will be included. In addition, we will include summaries of our research findings on our CBCD website (<http://www.cbcd.bbk.ac.uk/babylab>) and affiliated websites (e.g. BabyBrains <http://www.baby-brains.com>, British Autism Study of Infant Siblings – BASIS <http://www.basisnetwork.org>, Studying Autism and ADHD Risks – STAARS <https://www.staars.org>). We will also work with the media to inform the public of significant findings. You will hear about the progress and results of this study through the Babylab newsletter that will be sent to your home address.

Is our participation voluntary? What happens if I change my mind?

You and your child's participation is fully voluntary. We will pay for your travel expenses and we will give a small gift to your little scientist to thank him/her for participating.

If you wish to withdraw, at any time, for any reason, we will do so without penalty.

All procedures in relation to this study are in line with the Babylab Health & Safety Guidelines aimed at reducing the risk of mitigating the risk of COVID-19. Please note that you cannot take part if you or people in your household have an underlying health condition, are pregnant or older than 70 years. We recommend that participants utilise the asymptomatic testing facilities provided by the government. <https://www.gov.uk/find-covid-19-lateral-flow-test-site?priority-taxon=774cee22-d896-44c1-a611-e3109cce8eae>

The project has received ethical approval from the Department of Psychological Sciences Research Ethics Committee of Birkbeck, University of London.

If you have concerns about this study, please contact the School's Ethics Officer at:

ethics@psychology.bbk.ac.uk

School Research Officer
School of Science, Department of Psychological Sciences
Birkbeck, University of London
London WC1E 7HX

You also have the right to submit a complaint to the Information Commissioner's Office:

<https://ico.org.uk/>

If you would like more information, please contact the BONDS team: bonds_babylab@bbk.ac.uk or call Elena Throm: +44 (0)7 756339686.

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Information sheet for EEG

For the past twenty years, researchers at the Centre for Brain and Cognitive Development have been carrying out research using equipment that allows us to measure the naturally occurring electrical activity of the human brain. Such research is very important as it can teach us how and when the brain develops. It will also enable us to learn which areas of the brain are involved in different behaviours.

Our brain cells communicate with each other using faint electric signals. We can eavesdrop on this communication by placing an array of sensors on the head that can pick up the natural activity of the person's brain. This technique is called EEG. The main systems we use with babies and toddlers are known as Enobio and Geodesic Sensor Net. Using these headgears, researchers are able to achieve a detailed "map" of the working human brain.

EEG is completely safe and has been used for studying how the brain works for many years, without using expensive equipment. Although the sensor hat may look like something from a science fiction film, there is no risk associated with measuring brain activity. This hat uses wireless signals to send information to the computer in the same way that baby monitors would send signals to each other.

If you are happy for us to proceed with the net study, this is what will happen:

- You will be with your child at all times during the study.
- First we measure your child's head circumference with a soft tape measure so we can choose the correct net size for your child.
- Then we soak the net in warm, salty water with a bit of baby shampoo or put a little bit of gel on the sensors. This enables us to receive a good recording.
- Placing the net on a child's head is quick and simple as it goes on just like a swimming cap. While we are putting the net on we will play with your child to keep him/her from focusing on the net. Generally, children are quite happy having the net on (it's just like wearing a hat), but if your child becomes fussy at any point, we can take the net off straight away.
- The net will send the signal to a computer that records the brain's activity during the study. The net may leave pressure marks on your child's head, which will go away in a couple of minutes after taking it off.
- We will also email you a photograph of your child wearing the net as a souvenir.



Baby wearing a Geodesic Sensor Net.



Baby playing while wearing an Enobio cap.

Information sheet for NIRS

In collaboration with our colleagues at University College London, we have been developing a new brain imaging technique called near infrared spectroscopy (NIRS). Just like brain scanners that you may have seen in the media, this technique also measures changes in the amount of oxygen in the blood supply to the brain, but this one is easy to use in research with babies and toddlers. Such research is very important as it can teach us how the brain develops. It will also enable us to learn which areas of the brain are involved in different behaviours.

NIRS shines weak rays of light into the head and measures the colour of the light reflected back. If your brain is using lots of oxygen and is busy responding to something, your blood will be red like your arteries. If your blood has less oxygen it will be a bluer colour like your veins. By measuring these colour changes while your child does an activity or watches something on the television, we can see which part of the brain is active. The fibres that carry the light to the head and back are embedded in a small hat that your child can wear comfortably.

This technique is completely safe and has increasingly been used to study the infant brain all over the world. Although the hat may look like something from a science fiction film, there is no risk associated with measuring brain activity by this technique. Just like the natural light does not change objects when it is reflected on them, the weak red light rays that we use do not have any effect on the brain.

If you are happy for us to proceed with the NIRS study, this is what will happen:

- You will be with your child at all times during the study.
- First we measure your child's head circumference with a soft tape measure so we can adjust the hat for your child.
- Then we place the hat on your child's head. While we do this, we play with your child to keep him/her entertained, and then we can adjust the hat so that it fits your child perfectly and comfortably. Generally children are quite happy having the hat on and enjoy watching the screen, but if your child becomes fussy at any point, we can take the hat off straight away.
- The fibres from the hat are then connected to a machine that generates the light rays and measures the light that comes back from the head.
- We will also email you a photograph of your child wearing the hat as a souvenir.



Baby wearing the NIRS headgear.