Babylab

Newsletter 2011

Centre for Brain and Cognitive Development

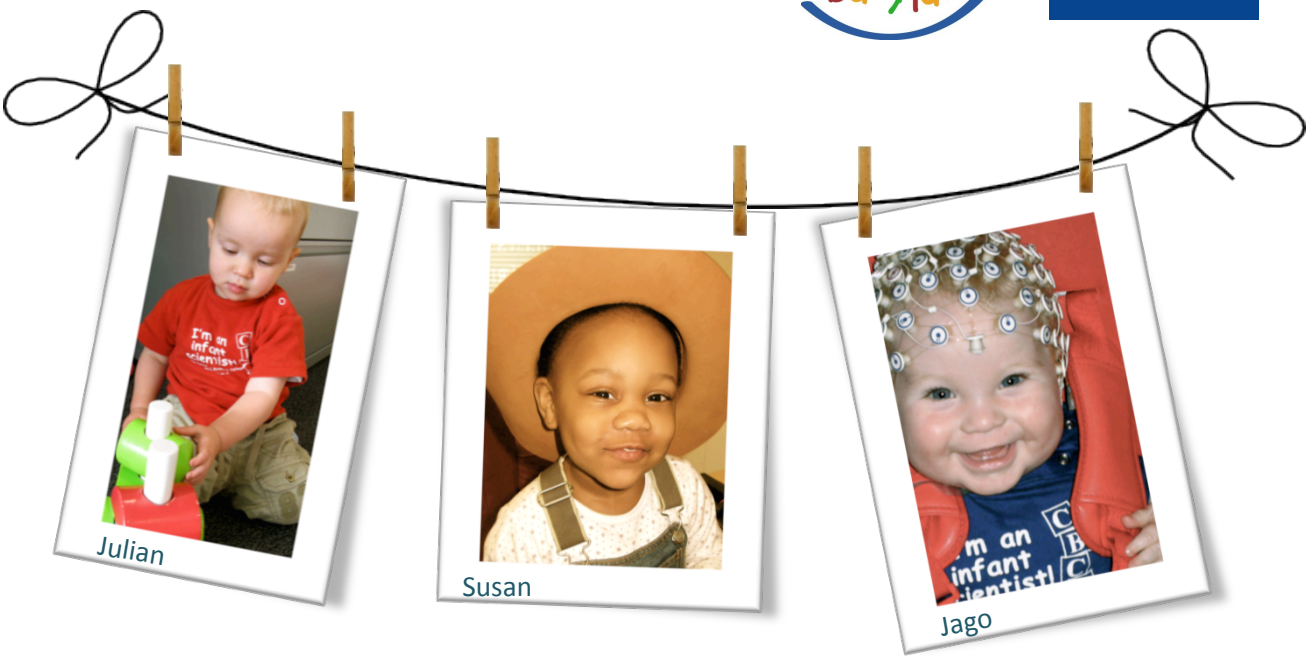
A HUGE Thank You to our current funders, including:

- Medical Research Council
- European Commission
- Autistica
- The Baily Thomas Charitable Fund
- British Academy
- Charles Wolfson Charitable Trust
- The David and Elaine Potter Foundation
- Economic and Social Research Council
- The Great British Sasakawa Foundation
- The Henry Smith Charity
- Leverhulme Trust
- The Mercers' Charitable Foundation
- Simons Foundation
- Kirby Laing Foundation
- The Mason le Page Charitable Trust
- The Waterloo Foundation
- Wellcome Trust

Also a HUGE Thank You to the parents, grandparents and carers who have volunteered their babies and toddlers for our studies and to everyone who has supported our scientific research over the years, without whom our research into how the brain develops would not be possible.
Thank you!!!

Birkbeck
UNIVERSITY OF LONDON

Visit the Babylab on facebook



Our Good News

In September 2011 we were thrilled to welcome the new PhD students to the Babylab.
You can meet some of them on this picture (on the left). Watch out for their exciting new studies in the near future.

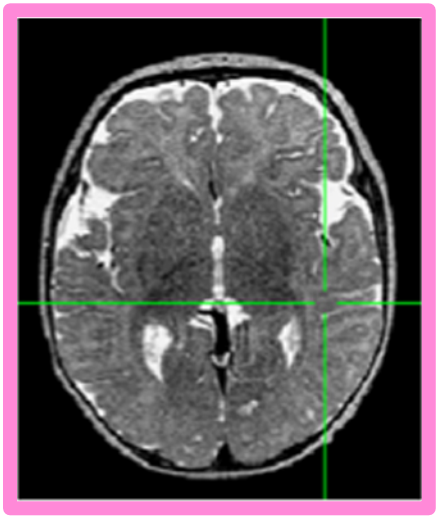
Prof Mark Johnson (pictured left), CBCD Babylab Director, was elected as a Fellow of the British Academy on the 17th of October 2011. This is a prestigious award distinguishing scholars for their outstanding contribution to the humanities and social sciences.

On the 27th of January, the BASIS (British Autism Study of Infant siblings) team published a study showing that babies as young as 6 months old, who have an older brother diagnosed with autism, and who go on to develop autism themselves show differences in early brain responses to social stimuli. This is an important contribution to the understanding of autism as a condition, and we hope that, in the long run, this will help enable earlier diagnosis and improve family support. This article was well received by the scientific community and created quite a news sensation in the UK (with special coverage in the BBC news and the BBC radio4 TODAY's show) and worldwide.

The Babysibs project will also be featured in a new BBC4 3-part documentary series on child development called "Growing Children". One of the episodes will be focusing on autism and the science behind autism research. The programme will be airing this spring 2012, and hopefully this will give you a good insight into the type of things we do at the Babylab!

For more information on the Babysibs Project see page 4.

How do babies' brains work?



This is one of the questions that researchers at the Babylab have been trying to answer.

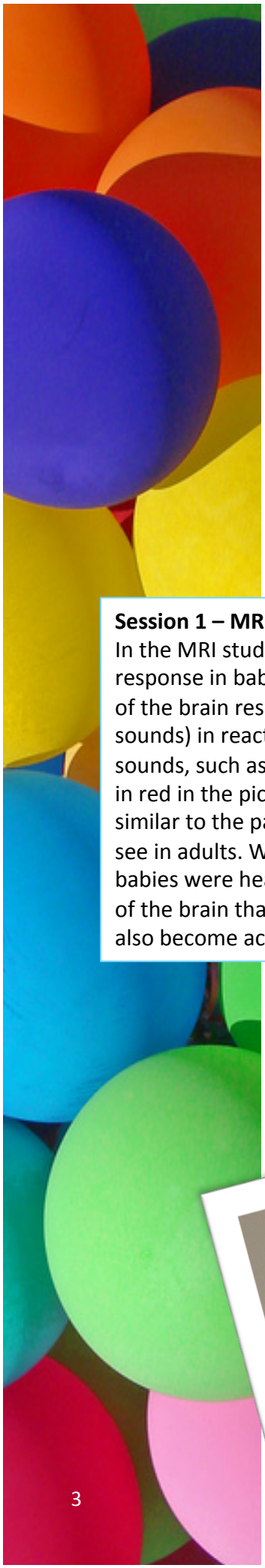
Even in the womb, brain cells are developing at an impressive rate of 250,000 every minute. Billions of brain cell connections are established all the time, and the development of these connections carry on through infancy. Scientists have been studying how the brain develops for many years, and these studies have helped us understand how we think, how we feel and how we interact with the world around us.

One of the challenges when studying the brain is that its structure is so complex, and the brain is able to process many different types of information at the same time, and scientists have to find imaginative ways of developing studies that can give us clues as to how individual parts of the brain work. For this we create specific stimuli and use different kinds of equipment.

At the Babylab we create fun activities using various methods in order to understand how babies' brains work. The following study uses two type of methods – MRI* and NIRS*- to study brain activity, which the Babylab has been pioneering the use of in baby research.

Baby Gwen © Michael Crabtree

*MRI: a system that uses magnetic waves to look at changes in oxygen levels in the brain while participants lie/sleep on a bed
NIRS: a soft black hat containing sensors, which uses small lights to measure changes in oxygen levels in the brain, which in turn can tell us how active the brain is in specific areas.



Peek-a-boo, yawns and giggles

By Sarah Lloyd Fox and Anna Blasi

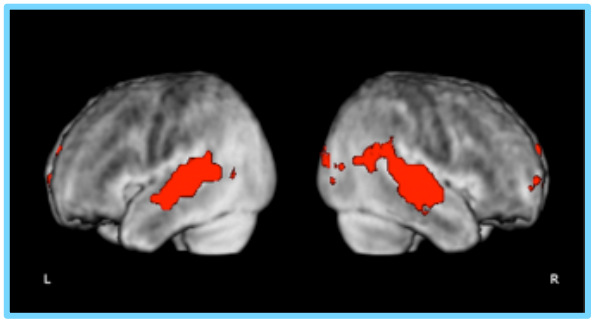
This project investigates how very young babies interpret voice sounds, such as laughter, crying and coughing. This is an important question to ask since these sounds might provide the baby with very useful information about someone's identity, emotions, and gender. For example, when we hear someone crying we know that that person is sad, but would a baby be able to associate the sound of crying with the emotion of sadness too? Do babies process these kind of voice sounds the in same way as adults. Very little is known about how babies develop such associations in infancy.

The study was divided into two sessions:

- In the first session we studied how the brain responds to the sound of human voices while babies are asleep in an MRI scanner (see page 2 for description).
- in the second session we studied how the brain responds to the sound of human voices and images of ladies playing peek-a-boo, while awake and wearing an optical imaging (NIRS) hat (see page 2 for description).

Session 1 – MRI

In the MRI study, we found a strong response in babies' auditory cortex (the part of the brain responsible for processing sounds) in reaction to voices and other sounds, such as toys and baby rattles (shown in red in the picture on the right). This is similar to the pattern of brain response we see in adults. We also found that when the babies were hearing crying sounds the parts of the brain that process emotions would also become active.



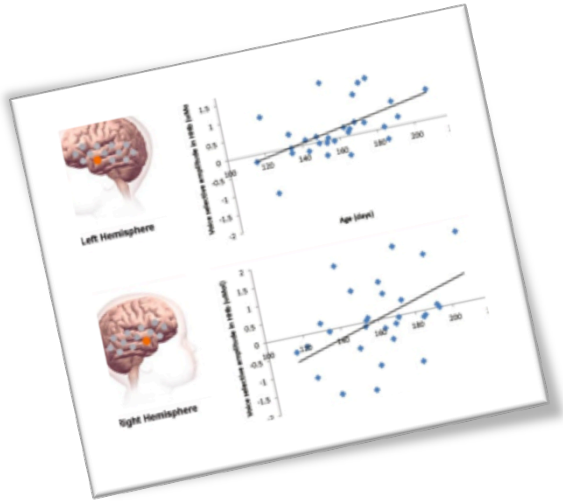
We are very grateful to all of the parents and babies for being so patient and and helped us get this study to work. We were cautiously optimistic about this project as it is not easy to get babies to fall asleep in the middle of the day in a new place, but we needn't have worried as most of the babies slept for at least a couple of minutes!

Session 2 – NIRS

For this part of the study, we showed videos of ladies playing peek-a-boo, together with the same voice sounds (as in session 1), while babies were wearing a NIRS hat. Babies really enjoyed watching the Peek-a-boo and listening to voices – we often noticed babies smiling and cooing when they heard laughter and saw peek-a-boo.

Continues on the next page

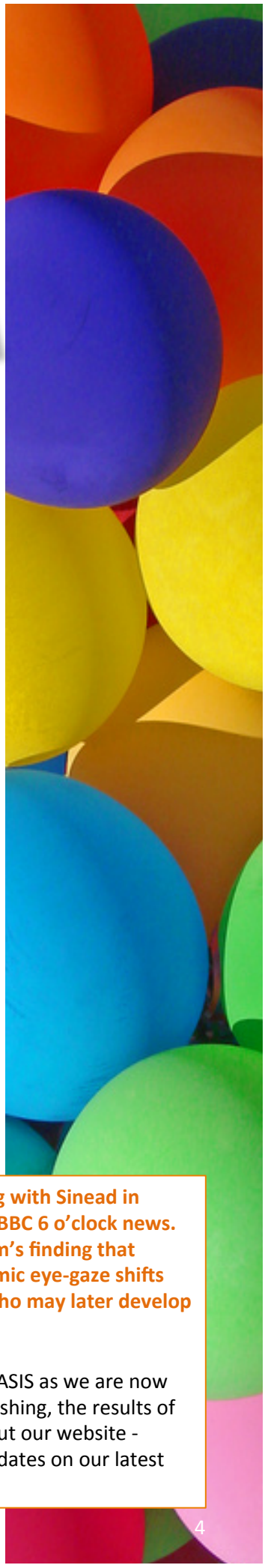
The results from the optical imaging (NIRS system) show that babies have regions of the brain that respond more to voices, and regions of the brain that respond more to other sounds, such as toys. What is really interesting here is that the response increases with the age of the infant tested (see picture on the right).



This 'voice-selective' response is also see in studies with adults and shows how fast babies' brains are adapting and responding to the world around them, and how this development continues throughout the first six months of life.

We can also see that the babies' responses look similar across the two different sessions, another important finding for us, as we are the first research lab, worldwide, to look at this question in infants using both methods.

We are carrying out this study in collaboration with the British Autism Study of Infant Siblings (BASIS – See below). We will investigate whether there are any differences in early brain development between infants who have older brothers or sisters with autism and those who do not. In the long term, we hope that this will help identify early signs of the condition, allowing for earlier and more effective intervention aimed at improving the quality of life of children with autism.



British Autism Study of Infant Siblings

This is an ongoing longitudinal study following up infants who have an older sibling with autism. Our aim is to gain a better understanding of why some children develop autism and others do not.

The second group of infants taking part in this project have now completed their last visit and the third phase of the project is now well under way, with some of the infants who first visited us when they were 4-8 months old coming in for their 14 month and 2 year visits.

Baby Isaac and baby Ziyad, playing with Sinead in Babylab reception as seen on the BBC 6 o'clock news. The news was covering BASIS team's finding that different brain responses to dynamic eye-gaze shifts are seen in 6-month-old infants who may later develop autism.

These are very exciting times for BASIS as we are now analysing, and in some cases, publishing, the results of the last 5 years of studies. Check out our website - www.basisnetwork.org – for all updates on our latest publications!

The BASIS Project is still looking for babies (0-18 months of age) who have an older sibling with autism
Please contact us by email: basis@bbk.ac.uk
Or call us on 020 7079 0761 if you would like to take part!

Baby Athalia wearing a sensornet and playing with bubbles

Perception and Attention in Infants and Toddlers with Williams syndrome

By Dean D'Souza, Hana Kyjonková, Rachael Davis and Annette Karmiloff-Smith

This study is investigating how infants and toddlers with Williams syndrome (WS – a rare genetic disorder that may case developmental problems) perceive and attend to information, and how they might differ from infants and toddlers with an older sibling diagnosed with autism (babysibs), as well as typically developing (TD) infants.

The purpose of the study is to determine whether the measures being developed and used to spot early signs of autism are specific to autism or whether they also measure signs common to other disorders too. We want to do this by comparing infants/toddlers with WS with babysibs and TD infants/toddlers on tasks that measure the way children scan faces and objects on a screen, how they pay attention to their environment and switch their attention among different objects and events, and how they perceive and attend to faces.

Continue on the next page

Understanding how autism and other genetic disorders emerge in early infancy can provide answers to puzzling questions, including some of the things that give rise to and shape atypical development in WS and autism. It can also help explain why outcomes are so variable in different children, and pave the way for tailoring remediation techniques to individual syndromes.


Baby Sylvie and her family

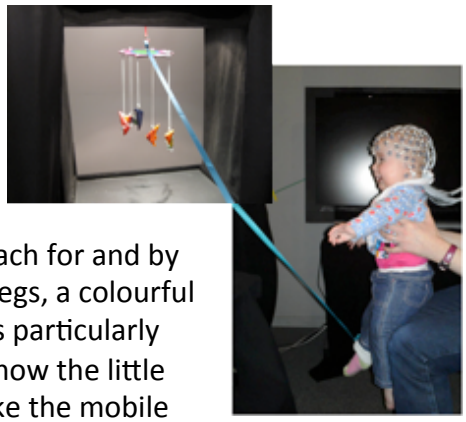
Arms & Legs study

By Carina de Klerk and Victoria Southgate

Other studies have shown that when adults move their arms or their legs, different areas of the brain are active, this is because the legs and the arms are represented in a different part of the motor area of the brain. One of the goals of this study was to find out whether the same thing is happening in the infant brain when they make arm and leg movements.

The babies that participated in this study were encouraged to make arm and leg movements while wearing a EEG sensor hat (as the babies pictured in this page).

We did this by handing them toys to reach for and by showing them that if they kicked their legs, a colourful infant mobile would move. Most babies particularly enjoyed this part and it was fun to see how the little infant scientists figured out how to make the mobile move.


Baby Elizabeth

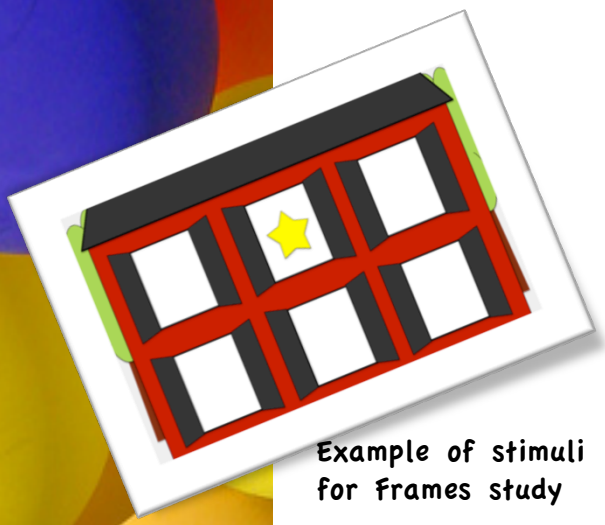

Baby Matilda

The results of this study showed that the motor areas of the brain of 12-month-old infants already appear to have the same organization as in adults. With a new version of the study we are now investigating whether we can see the same pattern of brain activation when infants simply watch other people perform arm and leg movements.

The Frames Study: Predictability & Distraction

By Kristen Swan & Natasha Kirkham

We are interested in understanding how babies develop strategies that help them separate meaningful from irrelevant information, in order to create a clear picture of the world around them. In this set of studies, we investigated how infants learn about their visual world and, particularly, how they divide their attention between interesting and distracting visual events.



Example of stimuli for Frames study

Using an eye-tracking camera, we recorded infants' eye movements as they watched shapes appear in different locations (e.g. the windows of a house). The way the shapes appear could be either predictable or random, and half of the infants also saw distracting lights turn on and off while they watched the shape events.

Our results show that when there were no distracting events, infants were able to follow the shape patterns that were not too predictable, but also not too random. However, when we introduced some distracting lights, infants were only better at following the most predictable shape patterns.

This study shows that the way babies pay attention and learn from the world around them is highly dependent on how information is presented to them and the kind of distractions there are at that time.

Teach Me! Pointing to Learn

By Katarina Begus & Vicky Southgate

Developmental scientists have known for many years that infants use pointing as an important means of communication, but only now we are beginning to understand how, and in what context, infants use pointing to communicate effectively. In one of our previous studies we found that infants point to unfamiliar objects less when they realise that the person they are playing with knows less about that object or event. In this study we were interested in finding out if infants learn better when they initiate pointing to an object or an event, rather than when adults initiate the pointing.

To investigate this question, we presented 16-month-old infants with pairs of unfamiliar objects and let them choose one of the objects by pointing. Once their choice was made, the experimenter demonstrated either the function of the chosen object, or re-directed the infant's attention to the not-chosen object and showed them the function of this one.

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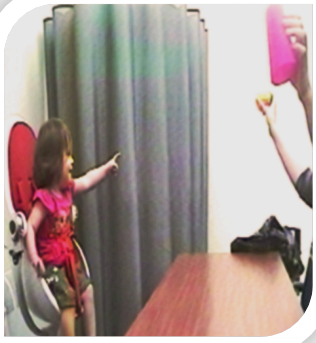
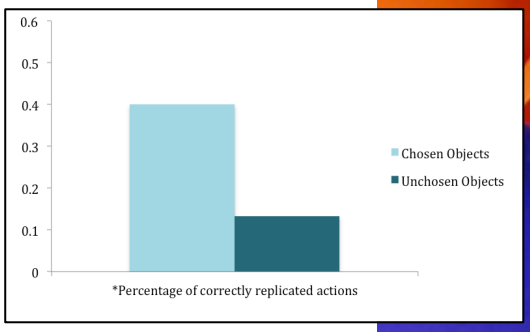


Toddler Myla – pointing expert!

After a delay, infants were able to copy the functions of the objects they chose themselves better than copy the functions of objects the experimenter chose (see graph on the right for percentage of correctly replicated actions). This suggests infants use pointing not only to obtain information, but also to show their willingness to learn, and as a result are able to learn better about the objects they chose.



The Infant Time Machine

By Denis Mareschal, Caspar Addyman and Sinead Rocha

Over the next two years we are running a group of studies all aimed at understanding babies' sense of time; how it works and how it develops. By this we mean babies' ability to tell if something takes a long or a short amount of time, or to anticipate when a repeating event might happen again.

It might seem strange to study infants' sense of time, as it is often said that young babies live in an 'eternal now'. Babies and young children have very little sense of how time passes in hours or days, but they do have a feeling for events lasting seconds and minutes. They can anticipate when a parent's face reappears in a game of peek-a-boo. They can learn how long it takes to reach for, or crawl to, a near or far toy. They can tell if something is happening quickly or slowly. These are the skills that we are investigating.

We have designed a series of short games, each of which investigates a different aspect of a baby's sense of time. Most of these involve the baby watching videos on a computer screen with repetitive or surprising events in them while we record the baby's reactions. Often we just record where the baby looks. Sometimes we will also record his or her heart-rate or muscle activity. In other games, babies have to try and grab a puppet that appears at regular intervals.

We believe that how active and mobile a baby is will affect how good his or her sense of timing is. The more you move about, the more you have to coordinate actions, anticipate events and estimate intervals. Therefore, we are also collecting questionnaire data about babies' motor skills.

This project is in its own infancy but we hope, with the help of all our baby volunteers, to get a much better sense of our sense of time.

Frequently Asked Questions

Q: I would like to visit the Centre, but would like to find out more about travel arrangements. How is it done?

A: We will always cover your travel expenses when you come to visit the Babylab. If you are outside of our taxi zone you can arrange your own taxi/train, keep your receipts, and you will be reimbursed during your visit. We can provide a taxi service if you live close to our Centre. If you decide to drive to the Centre we provide a parking space close our building reserved for visiting parents. We always reimburse petrol costs and the congestion charge. Please remember that we cannot pay the congestion charge for you, though if you are unsure of how to pay the charge we can help you through the process during your visit.

Q: What if my baby does not want to participate on the day?

A: You should not feel badly if your baby decides they would rather not participate on the day of your appointment. This can be for many reasons: heat, teething, illness, tiredness, etc. Some babies just find the study too boring to look at. This does not mean that your baby will always react in this way during a study. Babies change day-to-day, hour-to-hour. We will be happy to ask you back for another visit if your baby comes within the appropriate age-range for another study.

Q: Do you ever need adult participants for your studies?

A: Yes. Sometimes we do run studies and require adult subjects. There are also other studies running within the Department of Psychology at Birkbeck College.

If you are interested, you can fill out a Volunteer Form at:
https://psyc-bbk.sona-systems.com/student_new_user.aspx

Q: Can I find out if my baby is developing normally from the data you collect during your studies?

A: At the Babylab, we do not study the performance of individual babies.
Our studies are not intended to be diagnostic tests that give results on the development of the individual - the information we receive from the babies is grouped to provide overall results.

Q: What if my baby is asleep, hungry or needs changing upon arrival?

A: Many babies fall asleep during their journey to the Babylab. We try to let the babies make their own schedule. We want happy babies so that they will be content to sit through our studies. If a baby is tired, hungry or wet, they are unlikely to want to participate. Therefore, we encourage you to carry on with their normal schedule as far as possible, even if it is during a visit. We have changing facilities at the Babylab and you can also feed your baby in the reception area. Water, tea and coffee are always available for parents and carers. However, if you know that your baby naps/eats regularly during certain hours, please mention this when booking an appointment.

Q: I received my packet of information from the Babylab months ago, but I've not been asked to participate in a study . . . will I get a call?

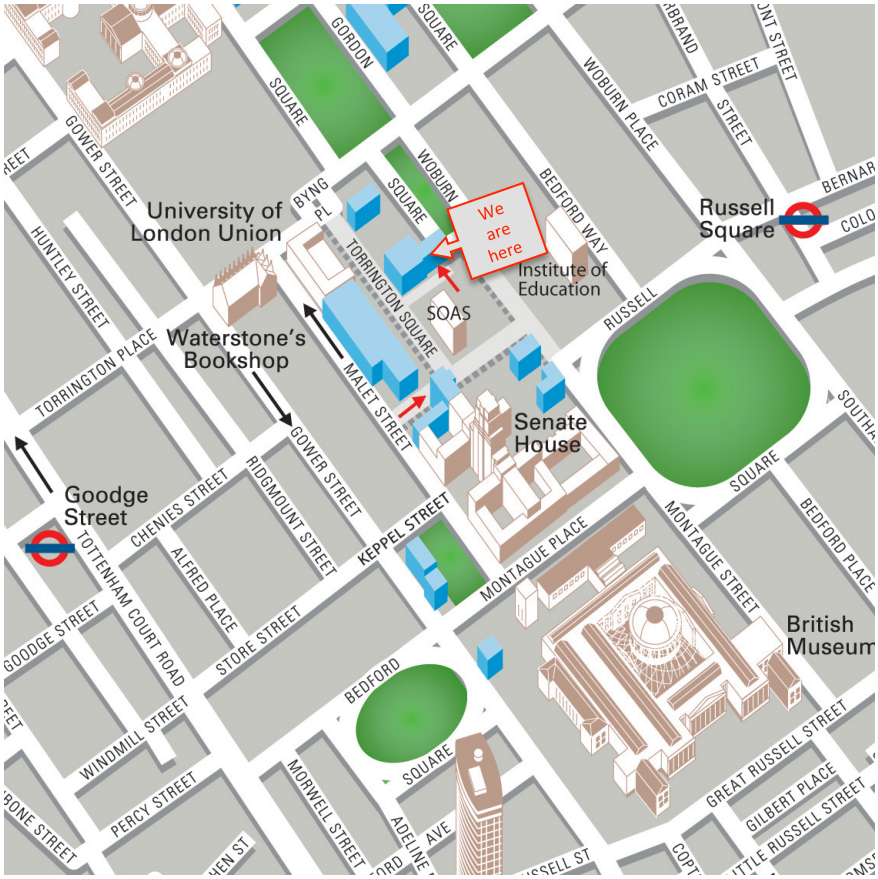
A: Whether or not you are called for an appointment is completely dependent on the studies that are currently running. Each study has an age range that is specific to a particular stage of infant development. If you have not been contacted it is not because we have forgotten about you, it is only because your baby does not fit into the age range of one of our current studies. Our studies are constantly beginning and ending so new opportunities may arise!

The Map of where we are

The Henry Wellcome Building is located just off Torrington Square, around the corner from the 'Clore Management Building' (on the path between Torrington Square and Woburn Square).

Signs on either side of the doors say 'The Wolfson Institute for Brain Function and Development' and 'The Henry Wellcome Building'.

We are within *walking* distance from the following stations: Russell Square, Goodge Street, Euston, Euston Square, Warren Street, Kings Cross an St Pancras.



If *driving*, The Babylab has two areas available for parking: **Woburn Square** (both sides) and **Torrington Square. Woburn Square is easier to** access within the one-way system in this area and you can park on either side of **Woburn Square.** To enter **Torrington Square you must make your way through the** one-way system to Keppel Street to get into Malet Street. From Malet Street turn right through the University of London gates, then left into Torrington Square (drive down the slope) and park on the right-hand side of the square**. When you arrive at the Babylab, we will** provide you with a temporary parking permit. If you are staying overnight for a study, we recommend that you park on Torrington Square to guarantee a parking space.

Taxi drivers: Please ask the driver to drop you outside 28 Woburn Square, WC1H 0AA (not our building). Once at the top of the square turn right and walk up the paved slope. The Henry Wellcome Building is a new building on the right.

Join the Babylab or update your information

Don't lose touch! If you are moving house or having another baby please let us know so that we can update our records. Ring us on 020 7631 6258, return the form below or contact us via e-mail at babylab@bbk.ac.uk.

If you have a friend who you think may enjoy a visit to the Babylab please ask them to contact us too. We are constantly in need of babies from birth to twelve months to help us with our research.

Parent's name_____Daytime tel_____

Address_____

_____

_____Baby's name_____ Sex_____ DOB (or expected date)_____

Please return form to:
The Babylab
FREEPOST RRGX-ARGH-SESR
Centre for Brain & Cognitive Development
The Henry Wellcome Building
Birkbeck, University of London
Malet Street
London WC1E 7HX

Or you can…
Tel: **020 7631 6258**
E-mail: **babylab@bbk.ac.uk**
Website: **www.cbcd.bbk.ac.uk**