Babylab

Birkbeck UNIVERSITY OF LONDON

Centre for Brain and Cognitive Development

NEWSLETTER 2009

A HUGE Thank You to our current funders, including: Medical Research Council, Autism Speaks, Economic and Social Research Council, European Union, Wellcome Trust, Leverhulme Trust, The Baily Thomas Charitable Fund, The Henry Smith Charity, Great Britain Sasakawa Foundation, Eranda Foundation, British Academy, Birkbeck College and the University of London.

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!!!

Recruitment

We are also very appreciative of the support we receive from Health Visitors, GPs, playgroups, nurseries, and staff in Mothercare and other shops who display our posters and leaflets.

We are always in need of babies and toddlers because they grow up so quickly. If you know anyone who would be interested, please pass on our details. Your recommendation is very important to our future success!

Highlights for this issue

We are very proud of our CBCD members who are also now new glowing mums…
They have delighted us with their newborn babies' pictures and stories.

In this picture from the left Andrea Handl, Maja Tsolo, Victoria Southgate and Kathrin Cohen-Kadosh. Since this picture was taken Suzie Chandler, Teresa Farroni and Evelyne Mercure have also joined the glowing mums' group.

Highlights for this issue (continued)

2009 has been a very busy year!

We participated in the documentary series "Growing babies" on BBC 4.

Baby Emmanuel (on the right), the son of the Master of Birkbeck, visited the Babylab to take part in one of the studies conducted by Babylab PhD student Rachel Wu. (see page 3 for details on Rachel Wu's study).

We also had a visit from Lord Mandelson, who visited Birkbeck to give a speech to University vice chancellors on 27 July. In the picture on the left you can see Rafi playing in our Babylab reception area with Lord Mandelson.

Dr. Atsushi Senju started a study looking at the development of social communication in sighted babies of blind parents.

Infants have an amazing capacity to learn from adults. Such capacity for social communication develops rapidly in the first few years of life. The main purpose of our study is to explore how sighted babies with blind parents develop the brain mechanisms and skills for social communication. The protocol of this study has been discussed in detail with a research officer from the Royal National Institute of Blind People.

If you know a sighted baby with a blind parent we would like to hear from you!
To receive further details about the study contact:
Leslie Tucker, email: l.tucker@bbk.ac.uk
Tel: 020 7631 6325 (direct line)
www.cbcd.bbk.ac.uk/babylab/SIBP/

At the Babylab we are always thinking of ways to improve our knowledge of how babies develop. It is important to understand typical development in order to gain insight into how children with developmental disorders develop differently. In this issue we give you brief descriptions of our new studies with examples of some of the techniques we are using.

Recent eye tracking studies

In order to gather information about where babies are looking, we use a special camera mounted within a video monitor. This is an excellent technique to use with babies because they can sit freely on their parent's lap while observing images on a screen, while at the same time we get exact information of where the baby is looking.

See the following studies for examples of how we use this method to gather information on aspects of babies' development.

Social Object Statistics – By Rachel Wu and Natasha Kirkham

Your face is very good at directing your baby's attention. If you say to your baby, "Look at this!" and turn to an object, he or she will often look at the object with you. Does directing your baby's attention help him or her learn about objects in the world especially in an environment with many distractions (such as a typical playroom)?

Movies with the face cue from the Social Object Statistics study.

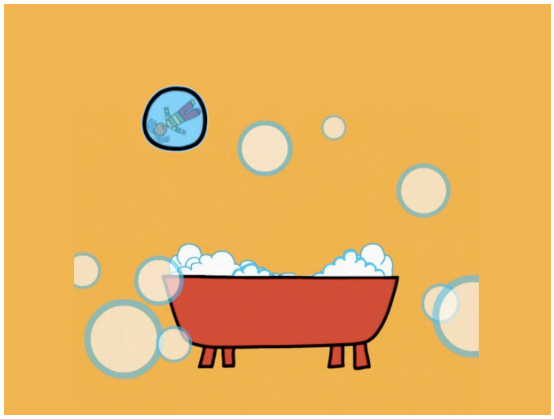
We showed nine-month-olds movies of a face turning to one of two shape sequences while recording where they were looking using an eye-tracker. Each baby effectively learned three shape patterns in each sequence. After some repetitions either with or without the help of a face, we switched the locations of the shape patterns to see if they would recognise the difference.

The babies who had the help of a face directing their attention recognised a difference and were able to learn the sequence. The babies who saw a simplified version without the face or distracting pattern also learned the sequence. However, infants who did not have the help of the face in the presence of the distracting pattern had more trouble learning. Therefore, in an environment with distractions, the face helps babies focus their attention, facilitating learning.

Marco participating in the Social Object statistics study

Shooting Stars - By Sam Wass

We are starting to run eye-tracking studies where babies can actually control what happens next on the screen depending on where they look. For example, when we present a face on the screen, as soon as the baby looks at it, a cartoon with music pops-up, as a reward. In this way babies learn very quickly that some events are dependent on where they look, and that to a certain degree (without the need for any behavioural response) they can control what is happening on the screen just by looking.



We are developing these tasks to see if babies can learn to have more control over what they choose to pay attention to and what they choose to ignore, in situations where they have a choice of what to look at.

The Infant Number Study -
By Dean D'Souza, Maja Rodic, Tessa Dekker, Jo Van Herwegen, and Annette Karmiloff-Smith

Typically developing children begin to discriminate between exact number displays of 2 and 3 objects at around three months of age, as well as between approximate magnitudes of 8 and 16 objects (ratio 1:2) at six months and 8:12 objects at nine months (ratio 2:3).

Dean D'Souza with baby Chiara

We have previously studied these abilities in infants and toddlers with a genetic condition called Williams Syndrome, who succeed on exact number discrimination but fail on magnitude discrimination. Since later in development older children and adults with Down Syndrome perform better on a wide battery of number tasks than those with Williams Syndrome, we hypothesize that magnitude comparisons may be a stronger foundation for subsequent number development than small exact number discrimination.

In order to test this hypothesis, we plan to examine how infants with Down Syndrome perform on both exact number and approximate magnitude discriminations. This cross-syndrome approach will help us to ascertain how things start to go awry in early development, and subsequently to devise syndrome-specific intervention strategies to help infants and toddlers with developmental disabilities.

Recent studies using fMRI and fNIRS

One other technique we are using in some of our new studies is fMRI (functional Magnetic Resonance Imaging). This technique has been around for over thirty years, is completely safe, and is widely used in scientific research. You may recognise the name from television programmes where they show brain images.

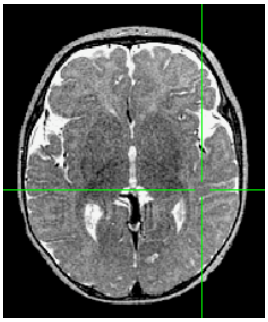
The MRI scanner (which looks a bit like a giant doughnut) uses a large magnet to measure naturally occurring changes of oxygen in our brain. This can tell us which parts of the brain are being used as, we view or listen to different pictures and sounds. At the same time the MRI scanner takes repeated pictures of the brain, but similar to when you use an old-fashioned camera, movement can easily blur these pictures. Therefore, in order to get the best picture and to ensure that the babies are comfortable, we wait until they are asleep.

The following studies tell you about what we have been doing over the last year using fMRI and fNIRS

The Early Social Brain Study (fMRI and fNIRS) -
By Sarah Lloyd-Fox, Evelyne Mercure and Anna Blasi

In collaboration with Kings College London, (KCL) we have been involved in a study to look at the early development of human voice processing. This is the first study that the Babylab has undertaken that uses both optical imaging (fNIRS) (for a description of this method see the following article about the 'Biomap' study) and magnetic resonance imaging (fMRI) to look at the activity of babies' brains while they look at or listen to social cues.

Baby Astrid wearing fNIRS hat



The babies, aged four to seven months, visited both the Babylab and KCL on two separate days. At the Babylab the babies watched videos of people playing 'Peek-a-boo' whilst listening to sounds of people laughing, crying and yawning. While they watched and listened they wore a hat that allowed us to see how their brain responded to these different things. Then, on a second visit at KCL, the babies listened to the same sounds while they were asleep in the MRI scanner. We were then able to look at which parts of the brain were responding whilst they heard these sounds (and watched the videos in the other study) and compare these with the areas found to respond to such sounds and images in adults. We will report on the results in the next Babylab newsletter.

The NIRS "Biomap" Study- By Sarah Lloyd-Fox and Anna Blasi

Five-month-old infants detect different forms of hand, eye and mouth movements in socially specialised areas of their brain. This is one of the findings of the NIRS "Biomap" Study.

Babies were shown videos of actresses moving their hand, eyes or mouth. While the infants watched this, they wore a specially designed optical imaging hat, which uses near infrared spectroscopy to measure their brain natural activity.

Preliminary results showed that infants are able to detect these subtle social cues showing responses in distinct areas of the brain. There was also some evidence of dissociable patterns of brain activation according to the type of social cue that they perceived.

One of the challenges of working with infants is finding ways to understand what they are thinking without being able to just ask them. It is too early to draw firm conclusions but these results seem to indicate that infants are sensitive to certain socially relevant movements from an early age. Moreover, these brain responses appear to be occurring in areas that are thought to make up the so called 'social brain' network in adults. The capacity to engage and communicate in a social world is one of the defining characteristics of the human species. Further research will establish whether this ability develops over the first few months of life, or whether we are sensitive to such social cues from the moment we are born.

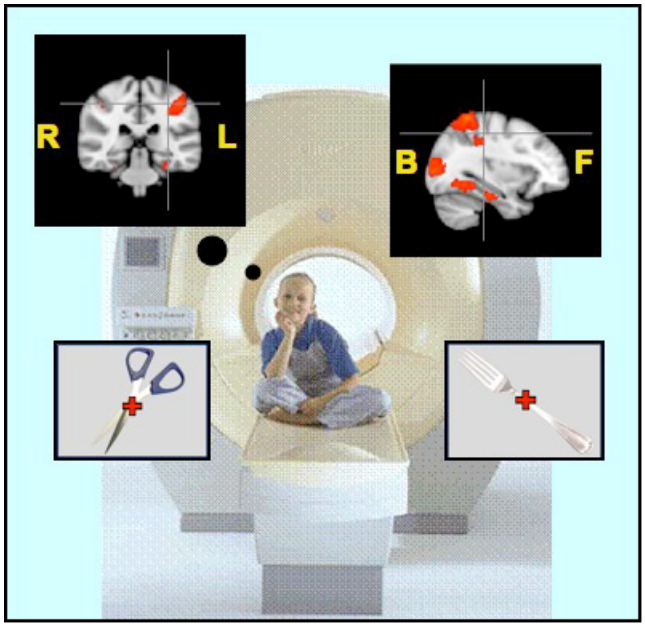
We would like to thank all of the parents, carers and babies that took part in our study and hope to see you again in the future.

How the brain gets to grips with tools
By Tessa Dekker

The ability to use tools is an important human skill. Parts of the adult brain are specialized for dealing with tools. Some of these brain regions focus on the ability of manual grasping. Surprisingly, these grasping areas get active even when we are *only looking* at tools. We're unsure why this happens. On the one hand, it may be that we use these regions to store knowledge that helps us recognize tools as graspable objects; alternatively it could be that these regions simply respond to images of tools and are not important for our understanding of tools at all.

In this study, we wanted to learn more about the development of tool-regions in young children's brains. We therefore asked 6 to 10-year-old children as well as adults, while they were lying in the MRI scanner, to perform simple memory tasks with pictures of tools.

The resulting images of the brain at work showed that the tool regions in the brains of children look a lot like the tool regions of adults. We concluded that the experiences children have with tools early in life are enough to shape the brain so that the tool regions look like the adult regions by the time children are six. We will need to do more research to find out if tool regions mature earlier in life or if some are even already present at birth.



In this picture you see a child sitting on the bed of the MRI scanner, with examples of tool pictures and brain images that we made during the visit. The orange blobs on the brain are areas that are specialized for tool processing.

If you have a child aged from 6 to 9 who would like to help us discover how the brain works, learn about neuroscience in a fun and playful manner and get a free picture of his or her own brain, please contact bucni@bbk.ac.uk or call +447515638869

Recent studies using playing and imitation

Spoon Study - By Haiko Bailleux

In this study we tried to find out whether 9-, 14-, and 19-month-olds' grasping behaviour is different with objects for which they know the function (like a spoon) compared to objects that they have never handled or seen before (like a screwdriver), and whether this grasping changes after of a short demonstration of the novel tools use.

In this study we aimed to answer three main questions:

*Which part of the object would babies prefer to grasp first?
*Would babies be influenced by the orientation of the object?
*Would a demonstration of the use of the unfamiliar object change babies' initial grasping preference?

The results indicated that object familiarity helps infants' grasping behaviour by at least 14 months of age, and that this is influenced by the orientation of the object. In general we found that infants held the handle of the object more and more with age. When the handle was presented towards the infant (s)he held it longer than the other side of the object, but this difference was much larger for the familiar object (the spoon).

Finally, there was a marked difference between the 9-month-olds and the 14- and 19-month-olds, in terms of them trying to imitate the demonstration of the use of the object. The 9-month-olds did not imitate the experimenter at all and were more interested in the object itself, whereas both the 14- and 19-month-olds were very eager to try and replicate the demonstrated action.

Imitation – By Natasha Kirkham and Rachel Wu

Babies seem to imitate everything you do; they pretend to chat on mobile phones, they throw their hands up in faux exasperation during your (rare) moments of road rage, and, hopefully, they mimic your teeth brushing and face washing routines. However, imitating everything you see is only useful if you can learn from it. This research looked at whether babies imitate "blindly", doing all of the experimenter's actions whether or not they already know what to do with an object.

Toys used in the Imitation study.

118 babies from 16-21 months of age took part. They were shown either familiar objects (such as mobile phones and sun glasses) or never-seen-before objects hand-made by the experimenter. The experimenter played with each toy in a new way (such as pretending to fly a mobile phone across the room) and then asked the baby to imitate the actions.

Felix participating in the Imitation study with Rachel Wu.

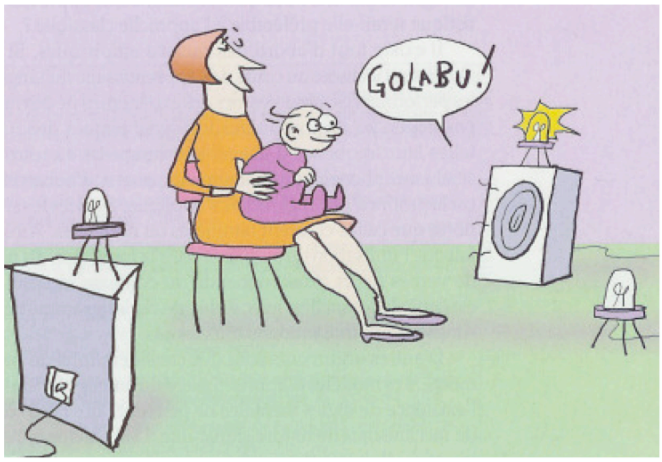
The older babies would not imitate new actions with familiar toys. They went with what they already knew: They put the phones to their ears, they placed the glasses on their faces, and rarely bothered to imitate the new way to play with the toy. This would suggest that once older infants know how to use an object, they are not inclined to learn new ways to use it. Younger babies, however, happily imitated everything (flying the phone), until presented with even more familiar objects (baby spoons and cups), which they then used in a typical way.

The babies were not just ignoring the experimenter. When the researchers told the babies that this was a “game” played with silly actions, the older babies changed their behaviours and imitated all the actions. Babies have many interesting learning devices at their disposal and imitation is one of the most powerful. But it does not work if you do not use it smartly. Discovering that they imitate only when something is new (or when it has a playful purpose) means that babies are using imitation as a way of building up their repertoire of behaviour and then using it appropriately.

The Baby Babble Study – By Caspar Addyman

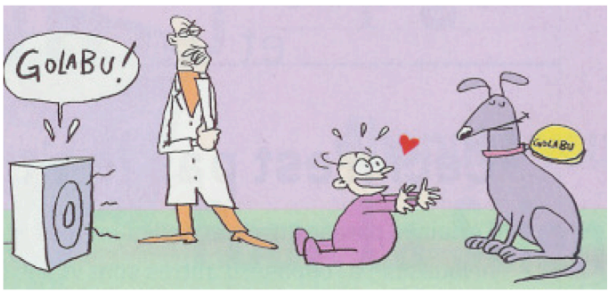
We were interested in how eight-month-old babies pick out the words in spoken language. This is not easy because speech is a continuous stream of sounds and to understand it babies need to pick out the regularities that group certain sounds into words. Imagine yourself trying to work out what are the words in the rapid 'babble' of a completely foreign language.

We already know that babies can do this very quickly. With just a couple of minutes listening, babies can find patterns in a sequence of nonsense syllables but we are not sure how they do this. To find out, we had a computerised voice read out the following:
…
pabikutitubogolabudaropigolabutitubopabikut
itubodaropititubogolabudaropipabiku
golabutitubodaropipabikudaropigolabu...



There are no pauses at all, so it sounds very confusing but after just a few minutes listening, even though there are still no pauses, adults start to hear it as a stream of words, a bit like this.

... pabiku titubo golabu daropi golabu titubo pabiku titubo daropi titubo golabu daropi pabiku golabu titubo daropi pabiku daropi golabu...



Do babies also hear the words? With adults we can just ask them the question, but for the babies we ran a vocabulary test. After listening to the language babies heard several different types of test items. For example, they might hear 'golabu' which is a whole word, 'tuboda’ which contains part of one word and the beginning of another, or 'dobuti' which is a completely new combination of syllables.

We found that babies preferred the second type of test item. These contain only small chunks of the words they had just been learning. This suggests that babies do learn quickly, but do so in small steps.

British Autism
Study of Infant Siblings

The "Babysibs" Project

Mayada Elsabbagh, Leslie Tucker, Janice Fernandes, Teea Gliga, Jeanne Guiraud, Helena Ribeiro, Kim Davies, & Mark Johnson (CBCD Babylab)

Kristelle Hudry, Susie Chandler, Rachael Bedford and Tony Charman (Institute of Education)

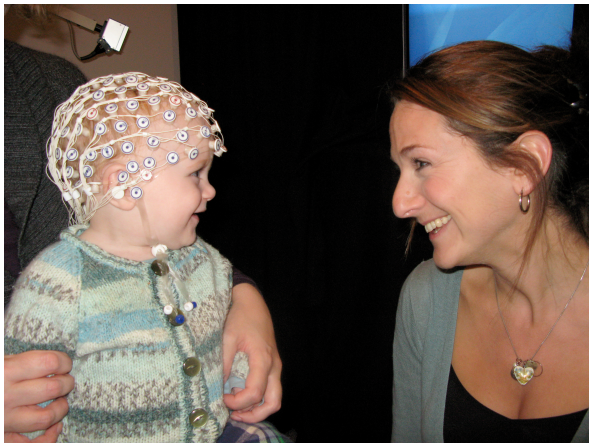
In collaboration with

Simon Baron-Cohen (Autism Research Centre, Cambridge)
Patrick Bolton (Institute of Psychiatry, Kings College London)
Jonathan Green (University of Manchester)
Andrew Pickles (University of Manchester)

Autism is a developmental condition affecting up to 1 in 150 children in the UK. Currently autism can only be diagnosed after three years of age, when symptoms affecting social development and communication are sufficiently clear. Understanding how autism emerges in the early years could provide vital answers to several puzzling questions, including the underlying causes. It could also help explain why outcomes are so variable in different children.

It has been a very exciting time for the Babysibs project, which started at the Babylab a few years ago. The project has grown into a UK wide network called the British Autism Study of Infant Siblings (BASIS). The main aim of BASIS is to follow the development of the baby brothers and sisters of children diagnosed with autism, compared to babies who have older siblings with no family history of autism. It is hoped that in the long term this will help identify the early signs of the disorder, allowing for earlier and more effective intervention aimed at improving the quality of life of children with autism.

BASIS now has enrolled over 150 families who have a child with autism, in addition to families who don't have a family history of autism as a "comparison" group. Unlike most projects at the Babylab, families are asked to visit the lab regularly from the time the babies are around 4-6 months until they reach three years. It has been wonderful to see these little ones grow from babies to toddlers! Families usually spend a whole day at the Babylab, with their child taking part in several fun short computer tasks such as watching faces and colourful animations as well as taking part in interactive games with the researcher.



Baby Piers and Kim Davies

The team would like to take the opportunity to thank all the families who have taken part so far! Their enormous efforts have contributed to the great success we have enjoyed so far. We also would like to thank two team members who have left us recently. Holly Garwood is now training as an Educational Psychologist in London and Agnes Volein has moved back to Hungary to set up a new Babylab there. Our colleague Susie Chandler from the IoE is now on maternity leave with baby Oscar. Along with several new students and interns, we also welcomed new team members Jeanne Guiraud, Kim Davies and Helena Ribeiro who are now busy setting up the next phase of the project, which starts in January.

BASIS Network www.basisnetwork.org
Since its formal launch in 2008, the BASIS project portfolio has grown substantially. In addition to the ongoing work at the Babylab, BASIS scientists are now setting up projects on genetics, brain imaging, and intervention. Collaborating centres include Birkbeck, University of London, Institute of Child Health, Institute of Psychiatry, Cambridge University, Oxford University, and University of Manchester. Moreover, over 50 affiliated scientists from different institutions around the UK attended the last annual scientific meeting in March to share what they are learning and to discuss future directions. We hope BASIS will continue to be a platform for some very fruitful collaboration across different teams in the UK.

More families needed!

BASIS continues family enrolment as usual, so if you are pregnant, or have a baby between the ages of 0 – 8 months who has a full sibling diagnosed with an autism spectrum disorder, please contact us for more details. Travel costs to central London (WC1) are reimbursed and special arrangements are made for families who live further away.

CONTACT US

BASIS Coordinator:
Janice Fernandes

Tel: 020 7079 0761
E-mail: basis@bbk.ac.uk
Web: www.basisnetwork.org
www.cbcd.bbk.ac.uk/babylab/babysibs

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 within five miles of 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 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 remain calm. 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: 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 http://www.bbk.ac.uk/psyc.

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.

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!

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

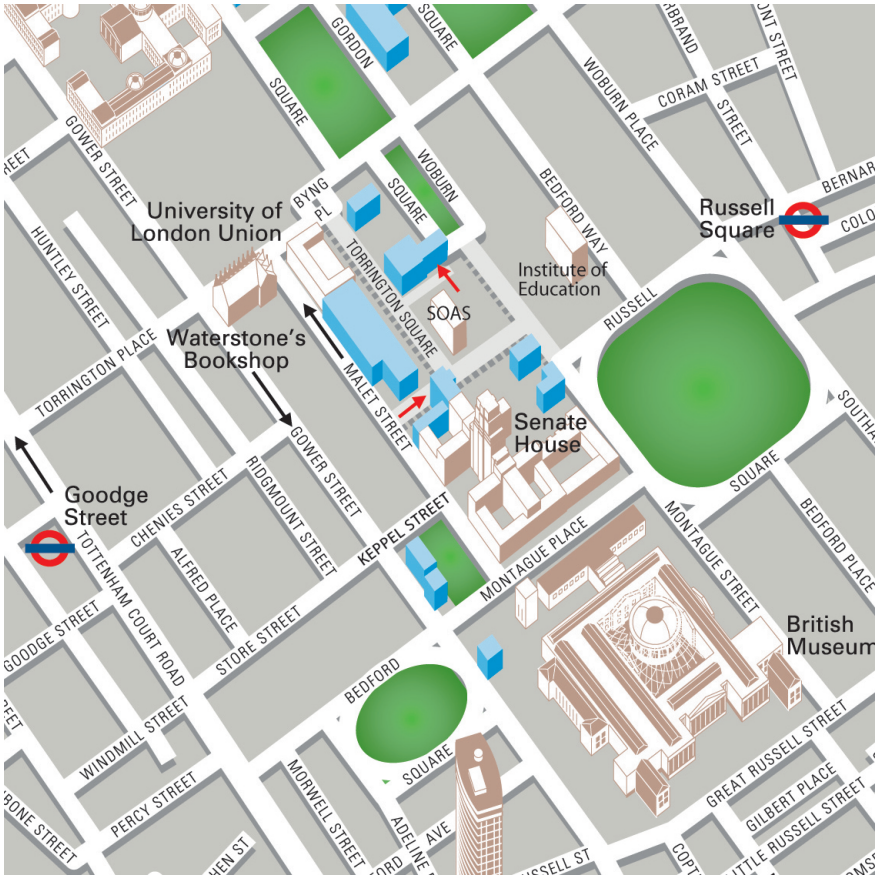
A: At the Babylab, we do not study the performance of individual babies. Our studies are not intended to be diagnostic tests that give results on the development of the individual - the information we receive from the babies is averaged-out to provide overall results.

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 and Kings Cross.



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, though there may not be empty parking spaces there during the day. Torrington Square is more difficult to navigate by car. However since it is a quiet residential street, there are usually a few spaces open. 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. You can park on either side of **Woburn 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 should enter Woburn Square from the West side and drop you off at the far end of the street – the Henry Wellcome Building is on the sloped path to your right.

Is your baby an INFANT SCIENTIST?

They could be at…. the Babylab

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