The Babylab

Birkbeck UNIVERSITY OF LONDON

Centre for Brain and Cognitive Development

NEWSLETTER 2007

A HUGE Thank You . . .

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

A lot has happened since our last Newsletter . . . we were awarded the Queen's Anniversary Prize for Higher and Further Education, were granted Marie Curie "Centre of Excellence in Training" status by the European Commission, moved to a purpose-built building AND have seen over 1000 babies!

We are very grateful for your continued participation through these exciting times.

Recruitment

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

We are always in need of babies and toddlers because they grow up so quickly, so if you know anyone who would be interested, please pass on our details.

Many of our new recruits have come by word of mouth so your recommendation is very important to our future success!

Rudy, 6 months

In This Issue

Birkbeck wins prestigious "Queen's Anniversary Prize"

We have won the Queen's Anniversary Prize for Higher and Further Education for our work investigating brain function and cognitive development in infants.

The prize forms part of the nation's honours system and is given every two years to reward outstanding importance and quality in various educational fields.

One of the most exciting areas of scientific research is studying the relationship between the mind and brain. The Babylab investigates the brain basis of human mental abilities (such as the perception of faces and objects, attention, memory, and language) with a specific emphasis on the *early development* of these abilities during infancy and childhood.

This research is crucial for understanding typical patterns of development so that atypical patterns (such as autism and dyslexia) can be detected as early as possible, ultimately creating more effective interventions and improving the quality of life for those affected.

The Queen meeting members of CBCD at the Award's Ceremony

Our new building!

Under construction . . .

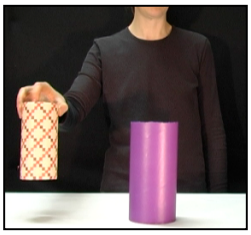
We are very excited to have moved into our brand new purpose-built premises at the **Henry Wellcome Building**, located just a few doors down from the old Babylab at 32 Torrington Square.

We are now spoilt for space and even have a lift to take you and your baby down to the newly furnished baby labs! Please see the last page for directions and a map. We look forward to your next visit!

. . . finished!
"CBCD at the Henry Wellcome Building"

The "Containers" Study - by Sarah Snoxall

Oval pattern (into container)



Diamond pattern (set aside)

Oval pattern (magically disappears!)

Imagine you had never seen a dog. The first time you saw one, you would have no idea what it was. Could it be dangerous, or even edible? With time, as you encountered more animals that looked and behaved similarly, you would group these animals into the concept of 'dogs'. Without this critical categorisation skill, you would have to work out what a dog was each and every time you encountered one.

How do babies form these concepts? Our research suggests that initially, they rely on their immediate experiences. But with time, they store this knowledge and draw on it to learn new concepts. We looked at how 10- and 13-month-olds combine their immediate experiences with background knowledge when they form concepts, by showing them a series of films with a simple concept rule. All the objects with one pattern were placed into a tall container, while all those with a different pattern were set aside. After seeing this many times, they then saw the wrong pattern being placed into the container. We found that they looked longer at this, suggesting that they noticed the concept rule had been broken and had therefore learned the concept – an impressive achievement, especially considering many adults didn't notice there was a rule!

But we also wanted to see whether their background knowledge would influence the way they formed concepts. So, we showed some of the babies objects 'magically' disappearing into a short container – something that contradicted their knowledge. These babies did not learn the concept rule – the improbability of the action perhaps distracting and confusing them.

The "Birds & Cars" Study - by Tobias Grossmann & Teodora Gliga (Teea)

Categorisation (grouping objects) determines how we learn the relationships between things. These learned relationships help us to organise our world and are crucial for development in many areas. As adults, when we look at something, we not only see the individual object ("sparrow") but also activate knowledge about the category of the object ("bird"). This study was designed to understand how rapidly babies learn to group objects and whether they can use this knowledge successfully.

We showed one group of six-month-olds 40 bird images and another 40 car images. This was done to familiarise the babies with a group of images and "teach" them the bird or car categories. Next, the babies were shown new bird and car images.

We predicted that if babies learned the first category they were shown (birds) then they would look longer at the new items from the category they weren't shown (cars) rather than new items from the category they were already familiar with. Our results supported this and showed that babies who were first familiarised to the birds looked proportionally longer at the new car images and vice versa.

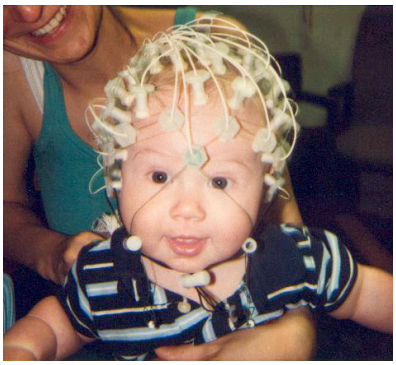
Kanav, 6 months

This suggests that babies as young as six months are able to learn an object category. Interestingly, learning occurred in a very short period of time indicating how little experience it requires for babies to form categories. It appears that categorisation is a powerful learning tool early in development, and that this kind of learning precedes later stages of linguistic development and might play an important role during language acquisition.

In future studies, we are going to look at the specific brain mechanisms that underlie infants' categorisation abilities. This will provide insight into the biological basis of category learning.

The "4-6-9" Studies - by Karla Holmboe

Caitlin, 4 months



Leo, 6 months

Francesca, 9 months

The Babylab is currently running a set of studies where we follow the same children over time (research known as "longitudinal"). Longitudinal studies are very valuable because they give us the opportunity to investigate how the same children develop as they age. This study follows a group of children during their first year of life by seeing each baby when he/she is 4-, 6- and 9-months-old. We are interested in how their attention develops with time.

As the babies for this study are still coming to the Babylab, the analysis has not been completed. Hopefully we will be able to share our findings with you in the next Babylab Newsletter.

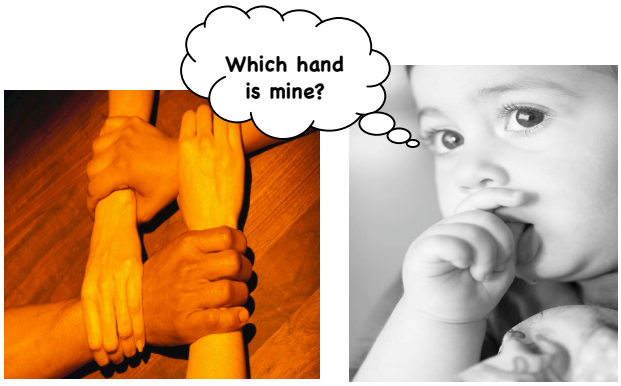
These studies require a special commitment from everybody involved, especially the parents. We would therefore like to ***thank all the parents and carers*** who have volunteered their children for our research. We really appreciate your dedication and hope to see all of you again in the future!

The "Buzz-Buzz" Study - by Andy Bremner

When we experience an unexpected touch, we usually look to the place where the touch occurred. This is because we know where this part of our body is in visual space and so we turn our heads in order to see what caused the touch. Can newborns do this as well? Are they able to integrate touch and visual information like adults do in everyday life?

To investigate, we presented short vibrations (buzzes) to the palms of the babies' hands in order to see whether they could locate the touch sensation (the buzz). We found that babies of 6½- and 10-months of age tended to move their hand after the buzz, and that most of the time they would move the hand that was buzzed. They also glanced toward the hand that was buzzed. So it would seem that even young babies can accurately localise touch sensations.

We then made the task a little trickier by crossing the babies' hands over. In similar tasks with adults, crossing the hands makes localisation more difficult because we get confused when our hands are not where we normally see them.

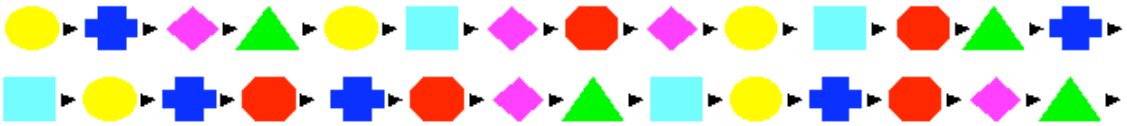


So far, we appear to have found that the same is true for 6½-month-olds. These babies were less accurate at localising the touch when their hands were crossed over.

We are now investigating whether even younger babies will find the task easier because they have not yet "learnt" where their hands normally rest.

The "Sequences" Study – by Caspar Addyman

There are lots of situations where babies need to detect patterns in their environment. Speech, for example, is a continuous stream of sounds and to have any chance of understanding it, babies need to pick out the regularities that group certain sounds into words. We already know that babies can learn how to separate these sounds very quickly; with just a couple of minutes listening, babies can learn patterns in a sequence of nonsense syllables (rather like learning to pick out the words in the rapid 'babble' of a foreign language).



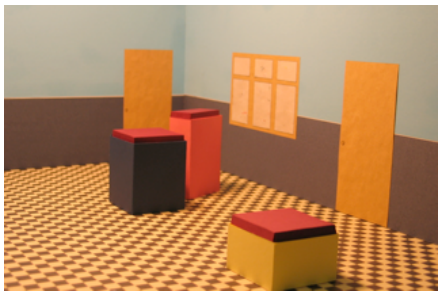
This study was a visual version of the same problem. Five-month-old infants were shown sequences of coloured shapes appearing one after the other on the screen (like the two shown above). In one sequence there is a hidden pattern because the items always come in pairs. In the other, the shapes are completely random. We found that infants could tell the difference because they looked longer at the random sequence. Can you? In the bottom sequence, the shapes always come in pairs and so to an infant, may get boring after awhile, whereas the top sequence is completely random and is always changing thus retaining their interest.

We suspect that infants are sensitive to the complexity or repetitiveness of the patterns and this leads them to focus on the more interesting and varied things in their environment. We tested a further group of infants on a harder version of the problem that had sequences of pairs or triplets. These infants failed to prefer one or the other. We also tested a group of adults and found that they too could do the first version but failed on the harder problem. We will be conducting further studies to explore this question in more detail.

The "Busy Box" Study – by Gergely Csibra

When we see a person doing something, we automatically try to work out their reasons for behaving that way. The context of the action is very important in understanding their reasons. For example, if a person runs towards a bus stop when a bus is coming, we would think that they want to catch the bus. If, however, a bus is nowhere in sight, we would try to find other reasons for their running by looking for clues (like exercise clothes to indicate jogging). Babies also try to understand why people behave in certain ways. In fact, some studies suggest that older babies try to find reasons for the behaviour of any object, even if it is not a person! The purpose of this study was to see if younger babies did the same.

To investigate this, 6.5-month-olds were shown video clips of a 3D box moving around in a room to reach a target destination (as if the box were an intelligent being!). Infants were first shown clips where an obstacle blocked the box's path so that the box had to move around the obstacle to reach its destination.



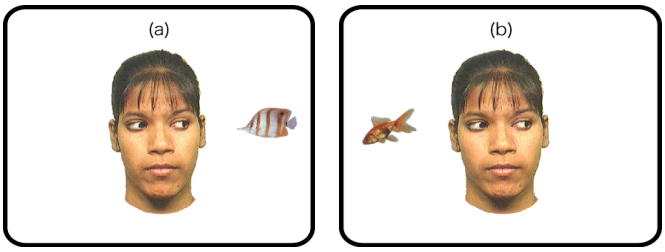
Does the box have a goal?

Once the infants became used to seeing that, they were then shown clips without the obstacle – some where the box still continued to move around an imaginary obstacle and some where the box moved in a straight line to reach its destination (the efficient behaviour).

The infants looked longer when the box took an unnecessary detour than when it acted efficiently, showing surprise the box would appear to avoid an obstacle that didn't exist. Obviously, a box is just an object, but we can still interpret its behaviour as if it were an intelligent being, which is what our results indicate the babies did!

The "Glance" Study – by Atsushi Senju, Gergely Csibra & Mark Johnson

One of the most impressive signs of an infant's understanding of the social world is the ability to follow another person's eye-gaze. We call this behaviour 'gaze following' and it tends to appear between six and nine months. However, the reason why infants follow eye-gaze is still unclear. Is it an automatic behaviour or do they follow the adults' gaze because they think they will see something interesting?



Towards **Away**

In this study the infants looked at two different animations, one where an adult looked *towards* an object and one where the adult looked *away* from the object. We measured how long the infants looked at each animation and the naturally occurring activity in their brains during that time. If they looked longer at one animation over the other, then we can say that the infants understood that gaze 'towards' and gaze 'away' from an object are different.

The infants looked longer at the animation showing an adult looking *towards* the object, showing a preference for that type of gaze. We also identified differences in the infants' brain activity between the gaze 'towards' and gaze 'away' animations. This clearly shows that infants understand the relationship between gaze and the object being looked at.

Why do infants look longer to the adult looking *toward* the object? Perhaps infants prefer to see more 'informative' adults? These are questions we will explore in future studies.

The "Parts and Wholes" Study – by Caspar Addyman

Young children tend to group things together by overall similarity and appearance whilst adults can focus on particular individual features. For example, we can tell Volvos from BMWs either by their whole *shape or by focusing on distinctive* parts *e.g. the front grill or the maker's badge. Children under four years old can easily do the former but find it difficult not to be distracted by the whole shape when required to attend to just a particular feature.*

Robin, 11 months

To investigate when these adult-like abilities start to emerge, we showed a series of similar pictures (houses) to 11-month-olds. At each presentation a single feature (the arrow) always pointed the same way while the size, shape and colour of the house varied. When the infant became bored, we showed three new pictures: one where the arrow pointed in a new direction, one where the house was taller and darker and one totally new picture of a bunny rabbit! The infants did not regain interest for either of the test houses, only perking up when they saw the bunny. This suggests they grouped all the houses together as the same thing.

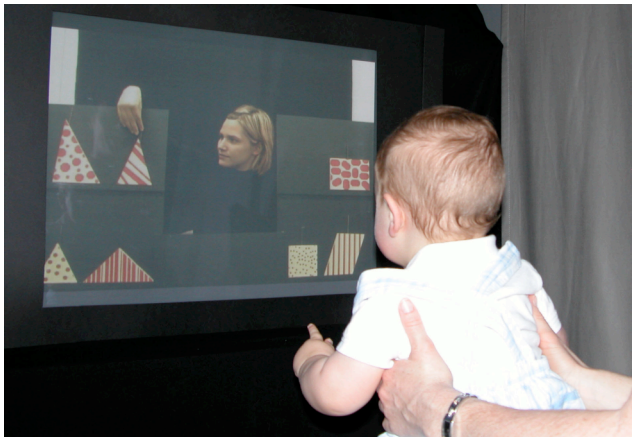
This lack of interest could have been because the simple static pictures were relatively uninteresting for the infant, so we ran a further version of the study using real photographs of houses or cars.

Infants saw up to a dozen different cars (or houses), where each had been digitally manipulated to have a distinctive pattern on its surface. Then we showed another car with a very different pattern on it, and as before, the completely new bunny. Here infants could form the category of cars or houses but again ignored the single salient feature (the pattern) and perked up at the bunny picture!

In both of these studies infants only used overall similarity to group items. We are now trying to design a study that increases the 'obviousness' of the part we want them to attend to, to see if infants can attend to single features the way adults do.

The "Stripey Shapes" Study – by Teodora Gliga (Teea)

During their first months of life infants encounter and then have to make sense of hundreds of new objects. These objects are complicated: they can be brown, furry living things, which bark, eat and jump on the sofa (dog); or orange, liquid, sweet things which come in a cup and taste nice (orange juice)! Only some of these properties are relevant and infants have to learn to sift through all the information to decide which bits are most important. One way to choose the right properties is to focus on what their caregivers highlight for them.



Max, 10 months, learns the "shape" rule

This study investigated whether 10-month-olds could pay attention to one property of a group of objects (i.e. shape) while ignoring a less relevant one (i.e. surface patterns).

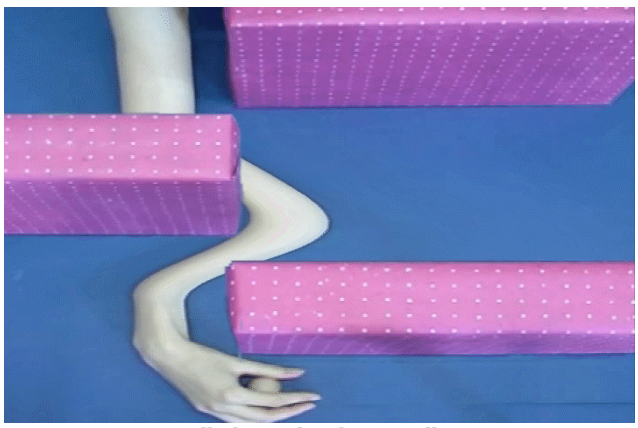
After being shown a few sequences where an actor consistently placed objects on two boards depending on their shape or patterns, infants looked longer at a later sequence where the actor made a placement inconsistent with the learned rule. For example, after learning that shape was the relevant property, infants looked longer when the actor placed a striped triangle with striped rectangles, but not when it was placed with dotted triangles. This suggests that the babies learned to attend to the relevant properties presented in the study.

These results encourage us to ask further questions about how flexible infants can be when learning about object categories. For example, would the same infant be able to see one object as belonging to two different categories, depending on the context? Future studies will address such questions and hopefully provide us with more insight into how infants develop their categorisation abilities.

The "Wiggly Arm" Study – by Victoria Southgate

In order to understand and learn from other people, infants must be able to make sense of other people's actions. By six months, infants interpret the actions of others in terms of goals. How do they learn this? It may be that infants learn that the actions of others have goals through performing actions themselves and watching other people perform actions. Alternatively, it may be that infants have an in-built system that helps them to detect efficient actions and perceive them as goal-directed.

This study aimed to test these two alternative views by presenting six-month-olds with an efficient but biologically impossible action (the wiggly arm). If infants only learn that actions are goal-directed through trial and observation, they should not perceive the wiggly arm as goal-directed because they could never have performed or seen such an action.



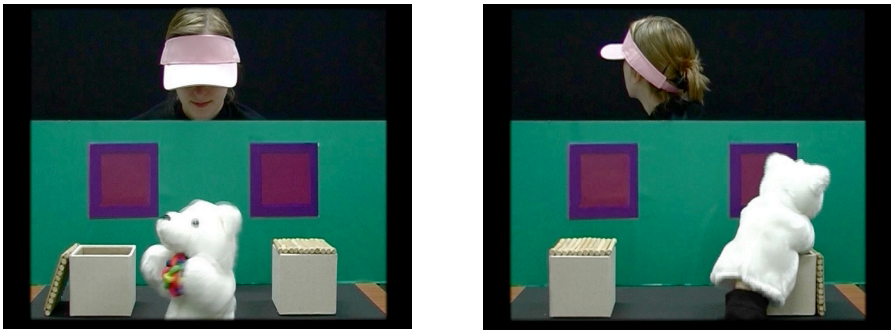
"The wiggly arm"
(an impossible action)

We found that infants did attribute a goal to the wiggly arm, providing support for the view that infants tend to perceive actions in terms of efficiency, which leads them to attribute goals to many different agents and actions. Such an open-minded approach to other people's actions will help infants learn the purpose or goal of actions even if they have never seen or tried them before.

The "Hidden Ball" Study – by Victoria Southgate, Atsushi Senju & Gergely Csibra

We were interested in whether two-year-olds understand that other people can have beliefs that are different from their own, and in some cases false. Traditionally, the understanding of this concept of 'false-belief' has been thought to emerge somewhere between three and four years of age. Until that point, it is widely believed that young children think that if they know something, then you must know it too.

In the past, this concept has always been tested with a verbal task in which children are asked where they think someone else will search for an object that they didn't see being hidden, but which the child did see. Under four years of age, children will tell you that the person will look for the object where the child knows it is located. Such a complicated question may be very difficult for young children to fully understand and so we designed a version of the task in which the child is not asked a question. Instead, we examined where the child expected the adult to search by analyzing the child's eye movements using an eye tracker.



Bear hiding object (ball) with or without person looking

We found that the majority of two-year-olds accurately predicted where the adult would search for the object and predicted that she would indeed search in the wrong place because she did not see the bear hiding the ball. This shows that even children as young as two years have an understanding that others can have beliefs that are, in fact, incorrect.

The "Changing Faces & Objects" Study

– by Victoria Southgate, Gergely Csibra, Jordy Kaufman & Mark Johnson

*When an infant looks at faces or objects, which aspects do they pay attention to and remember? Do they focus on **where** the object/face was or do they focus on **what** it looked like?*

There is evidence that what young infants remember about something when it disappears/reappears depends on what it is. With objects, infants tend to remember and notice changes in location, not features. But when infants remember faces, the reverse is true – they tend to remember the features, not the location.

In this study, we investigated whether a particular type of brain activity (which scientists have found present during the hiding or 'occlusion' of objects) would also be present during the occlusion of faces. If this activity is specific to remembering objects (location), then it should not be present during the occlusion of a face (features).

To do this we presented infants with either a face or an object that was then hidden by a screen. When the screen was removed, infants saw either the same face or object that was hidden, or a different one.

Missy, 6 months

We found an increase in brain activity when 6-month-olds saw an object hidden, but not a face. This supports our theory that this particular type of brain activity is specific to remembering locations and not features.

The "Autism Baby Siblings" Project

by Mayada Elsabbagh, Holly Garwood, Karla Holmboe,
Agnes Volein, Leslie Tucker, Gergely Csibra & Mark Johnson

In collaboration with
Simon Baron-Cohen, Autism Research Centre, Cambridge
Tony Charman, Institute of Child Health, University College London
Patrick Bolton, Institute of Psychiatry, King's College London
Gillian Baird, Guy's & St.Thomas' NHS Trust

The Babylab has launched the first study in the UK looking at baby brothers and sisters of older children with autism. The team is investigating whether there are any differences in development between infants who have brothers or sisters with autism and those who do not.

Over the last year, the Babylab has welcomed around 30 very special families who took part in the Autism Baby Siblings Project. Families travelled from all over the UK to take part in the research, showing their support and enthusiasm for the project. Here are some of their comments,

"A big thanks to all of you again for the great time we had in London. Not only did we have a very enjoyable trip to London in fantastic weather, I was also absolutely fascinated by the professional conduct of your research and the interesting experiment setup."

"Having a child with autism has led me to want to help improve our knowledge of the condition and also the possibility of earlier recognition and improved intervention."

Happy families!

This was the first phase of this project and we are now inviting more families to take part in a new phase, where we will see the same babies on multiple visits.

Project news

June 2006: The CBCD held an event inviting renowned experts on autism and infancy from the UK and North America. This event was the first step in an effort to establish a national network for the study of infant siblings in the UK.

July 2006: The Babylab proudly took part in the Walk for Autism Research in Windsor Park. We raised close to £2,500 in support of biomedical research into the causes of autism.

Could you help us with our project?
Funded by the Medical Research Council and the parent supported charity Autism Speaks, the Baby Siblings project is the first of its kind in the UK.

Infant Scientists Wanted!

Are you pregnant or do you have a baby between the ages of 0-9 months who has an older brother or sister with autism?

The aim of our ongoing project is to learn more about the early development of baby brothers and sisters of children with autism spectrum disorder. We hope our studies will help to improve the early detection and diagnosis of children with autism.

If you have a baby between the ages of 0-9 months or are pregnant AND have an older child who has been 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.

The Babylab, Centre for Brain & Cognitive Development, FREEPOST RRGX-ARGH-SESR, Henry Wellcome Building, Birkbeck College, Malet St. London. WC1E 7HX. Tel: 020 7079 0754, e-mail: asd@bbk.ac.uk or visit: www.cbcd.bbk.ac.uk

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 outside our building reserved for visiting parents. We always reimburse petrol costs and the £8 for 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: I want to participate in a study, but I have other children who are not in school. Can I bring them with me?

A: Yes, if you think they'll be happy to be left with one of us, playing with the toys and books in the reception area while you spend a few minutes away from them with your baby doing a study. We're always pleased to take time-out from our computer screens to entertain siblings.

Q: What if my baby is asleep, hungry or wet 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: 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: 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: 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 new location

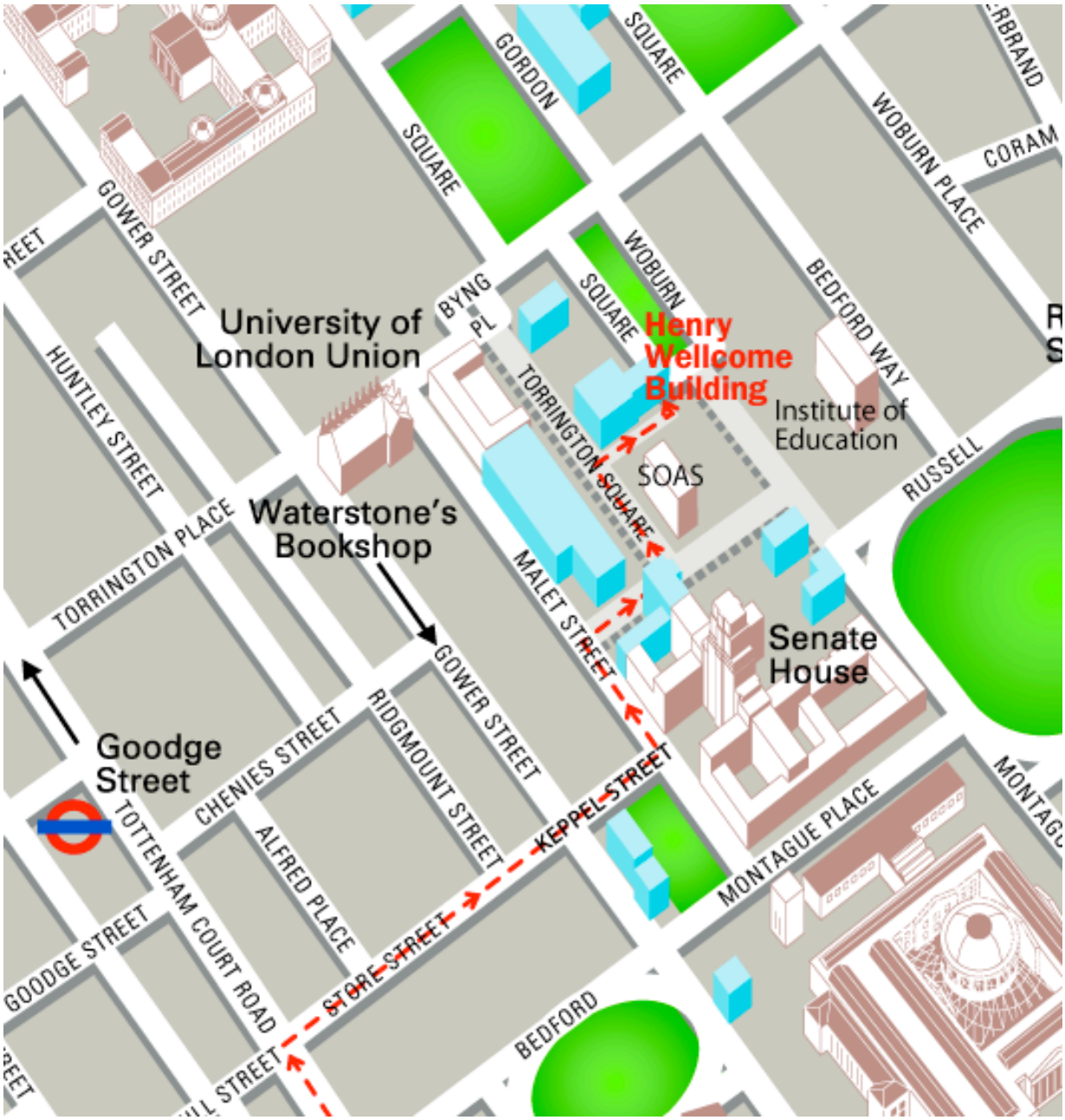
The Henry Wellcome Building is located just off Torrington Square, around the corner from the 'Clore Management Building' (on the path between Torrington Square and Woburn Square).

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*, make your way to Keppel Street to get onto Malet Street. From Malet Street turn right through the University of London gates, then left onto Torrington Square (drive down the slope). Park anywhere along Torrington Square – when you arrive at the Babylab we will provide you with a temporary parking permit.

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**