DECEMBER 2011

OSCCI NEWSLETTER

Oxford Study of Children's Communication Impairments, Department of Experimental Psychology, University of Oxford, OX1 3UD http://oscci.psy.ox.ac.uk

Late-talking toddlers. Should parents worry?

Joseph is 18 months old but says very little. In fact, when his mum is asked to mark on a checklist which words he says, she is only able to tick 'mummy', 'daddy', 'cat', 'car', 'moo', 'byebye', 'spoon', 'chair' and 'milk'. She goes to her GP who tells her not to worry. But is that right? The surprising answer is probably 'yes'. Most late-talkers are just late bloomers who do go on to catch up with other children, so that within a year or so their language is within normal limits.

But it's not true for everyone: in some children, late talking is the first sign of longer-term problems with speech and language. The problem is picking out the 'late bloomers' from those with longer-term difficulties. We did a study of 24 late-talkers. We gave them a detailed assessment at 20 months of age, and then saw them again when they were four. Out of 24 late talkers, 15 had normal language skills at four years of age. We found that language outcome could be predicted by two things. First, language at four years was worse if children had poor understanding of language at 20 months. Children who understood what others said had better outcomes, even if they said very little. Second, children were more likely to have language problems at four years if they had a parent or brother or sister who had language or reading problems. Taken together, these two factors could help predict outcome in children who were late starting to talk, but the prediction was far from perfect. Some four-year-olds who had language problems had started out well at 20 months, but then hit problems later on. Our study confirms the view that 18 months is too early to pick up children in need of help with language, as so many improve on their own.

For a blogpost on early intervention with late talkers see: http://tinyurl.com/3vmuba8

A big THANK YOU to all those families, school staff and other professionals who have helped with all the studies featured in our newsletter. Our research would not be possible without you!

OSCCI team 2011

How do genes affect our ability to talk?

This summer we started a new project looking at language and communication in children with an extra X or Y chromosome. Most people have either two X chromosomes (XX, females) or an X and a Y (XY, males), but around one in 600-1000 children is born with an extra X or Y chromosome. We are seeing girls with XXX, and boys with XXY or XYY. These children are at greater risk of having speech and language difficulties than their brothers and sisters, but not all of them have problems. We want to find out why some children are affected and others aren't. We are aiming to see around 150 children altogether, and we will assess their language skills and take a sample of DNA so we can see if specific genes are important.

As well as doing lots of language activities with us, the children have been letting us look at which side of the brain is working hard when they talk. In most people the left side of the brain is more active than the right when they talk. We've found that in children with language difficulties this may not always be the case, and so we are interested to see if this is a factor in children with an extra X or Y chromosome. We are using a method called functional transcranial Doppler ultrasonography (fTCD). This measures blood flow to the left and right sides of the brain while children watch short video clips and then tell us what happened in them. Finally, we are also taking DNA samples, so all the children that are taking part have given us some of their saliva! We are seeing children all over the UK and It will take a couple of years before we complete this study, but we hope to be able to give some preliminary results in 2013.

We are also doing the same activities with children who have the usual XX or XY chromosomes, but who are twins. We are also studying their DNA, and we will be able to see whether identical twins (who are genetically the same) are more similar than non-identical twins on measures such as our Doppler test.

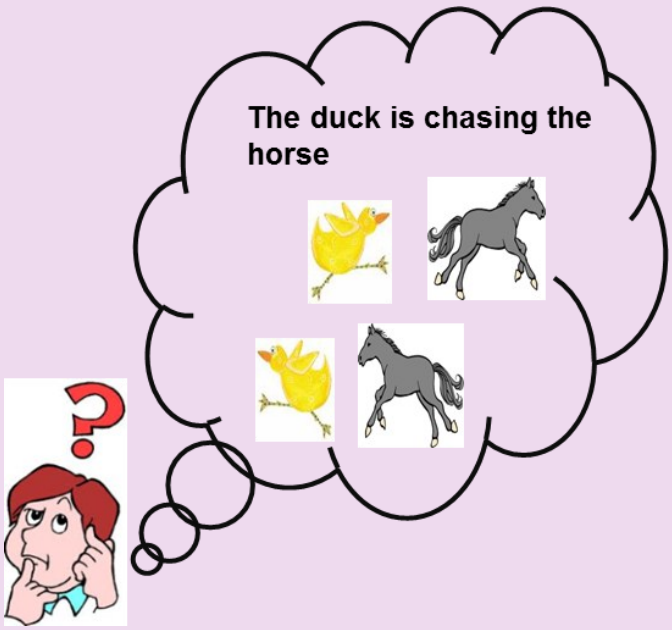
You can see a video that shows some of the activities we do with children here:

http://www.youtube.com/watch?v=QdDxfY2ZvE0

If you have twin children aged between 7 and 11 who would like to take part, we'd love to hear from you!

Can we train language comprehension?

Many children with language difficulties struggle to understand the meaning of sentences, even when they have no trouble understanding the meaning of individual words that form the sentences. This year we have visited many schools in Oxfordshire, Wiltshire, West Berkshire, Buckinghamshire, and Hampshire to study language comprehension in children with and without language difficulties.



Children take part in language assessments, play computer games to practice understanding sentences and new words, and do other tasks to test their general learning ability.

We first started data collection for this project in February 2010 and so far, 239 children have taken part. We hope to complete our data collection by the end of this year and have some new findings to report this time next year.

Members of OSCCI involved in this project (left to right: Julie Hsu, Georgina Holt, Anneka Holden, Mervyn Hardiman, Eleanor Paine, Nikki Gratton, Annie Brookman).

How does the brain perceive speech?

Brain imaging can show what happens in our brains when we listen to speech. Dr. Tiina Parviainen and Joseph De Martino used magnetoencephalography (MEG) to study development of speech perception. This method measures the tiny magnetic signals that are produced when brain cells are activated. They studied both children and adults while they were listening to various sounds. They wanted to see if the brain responds differently to speech and non-speech sounds (tones), and whether meaningful words involve different brain processes. Analysis of MEG data is complicated and will take some months, but the preliminary results show remarkable differences in brain processes between adults and children. It will be interesting is to see if the children's language skills are related to their brain activation. This project will serve as a starting point for further use of MEG imaging in studying the brain basis of difficulties in language learning.

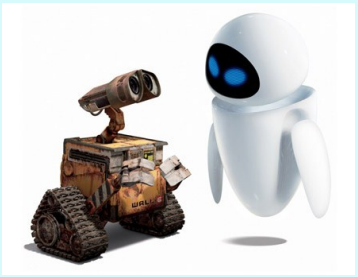
Brain measurements in children with language impairments

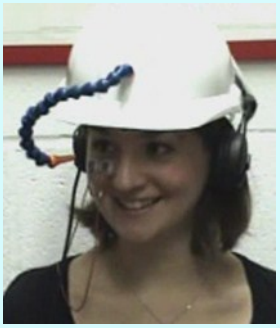
The brain often looks entirely normal even if a child has severe language problems. In order to find the causes of language difficulties, we need to look in detail at how the brain works. Last year we completed analysis of a brain-imaging study looking at how language areas of the brain respond when children are asked to think of a word such as 'duck' when listening to the description 'animal that quacks'. We found that the part of the brain that controls the output of speech on the front left-hand side was underactive in children with language difficulties. A paper describing this study has now been accepted for publication.

We have also examined basic brain responses to simple sounds, such as tones, or the syllables 'ba' and 'da'. To study this, we have used a method where we measure electrical signals generated by the brain using sensors placed on the scalp. We have found abnormal responses that are most pronounced for the syllables. The pattern of results suggests that children with language impairments may use a larger brain region when distinguishing sounds, whereas typically developing children have more specific activity in a particular region.

Our blinking experiment

This year we completed a study to look at a very basic form of learning in children with language difficulties. Using a method called eyeblink conditioning we studied how the brain associates two events that occur close in time. We played a sound together with a gentle air puff while the children were amused by watching 'WALL-E'. We expected that some children with language difficulties might not be able to learn quickly because the connections between one or more parts of the brain that allow this type of learning had not yet formed. However, we have been pleasantly surprised to find that the children with language difficulties learned just as well as everyone else.





OSCCI News

2011 has seen major changes in OSCCI. Georgina Holt had a little girl, Florence, in April, and is currently on maternity leave; we are looking forward to having her back on the team in 2012 . Nic Badcock returned to Australia with his wife, Elena, where their son Elliot was born in June. Nic has managed to combine fatherhood with a burst of scholarly productivity, and we will see a series of publications out soon. He has recently taken up a new position at the Macquarie Centre for Cognitive Science in Sydney. Tiina Parviainen has returned to her native Finland to take up a post as Research Director in the Psychology department of Jyväskylä University. She promises she will come back and see us soon, as she still has research going on in Oxford. Our co-ordinator/ RA Anneka Holden has taken off for the big smoke having survived extremely stiff competition to get a post at St Mary's Hospital, Paddington. There are many new faces in our group, and we are delighted to welcome to the OSCCI team Annie Brookman, Nikki Gratton and Eleanor Paine. Finally, we were visited by Bonnie Chow and Simpson Wong in the summer, who were over for their graduation ceremony, and who have announced their engagement! Many congratulations.

For further information please consult our website, which has details of our research and publications: http://oscci.psy.ox.ac.uk