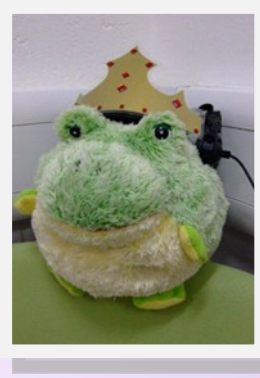
DECEMBER 2010

OSCCI NEWSLETTER

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

Language and the left side of the brain

We've known for many years that the two sides of the brain play different roles in language; for most people, the left side is more important than the right when it comes to generating words and sentences. There is a great deal of interest in how this cerebral lateralisation develops, and whether it is disrupted in children with language difficulties.



We have made progress towards answering this question by using a method called functional transcranial Doppler ultrasonography (fTCD), which measures blood flow to the left and right sides of the brain while people do different tasks. We have had some success with children as young as 4 years, and our team demonstrated the method in a short video article for the Journal of Visualised Experiments: see: http://www.jove.com/index/details.stp?id=2161

With the help of student visitors – Abigail Nye and Richard Rosch from Oxford, and Katja Hagen from Muenster- Nic Badcock has been busy exploring how different tasks affect the lateralised brain response. Our ultimate goal is to develop a method that can be used to measure brain laterality in toddlers. Recently he has been looking at silent word naming – when people just think of a word – as well as story reading. Persuading a 2-year-old to co-operate with the procedure is a challenging task, but Mr Frog and Alfred the bird have helped, as well as the transformation of our headset into the Doppler crown!

Why is there so little research on SLI?

Everyone has heard of dyslexia, autism and ADHD, but specific language impairment (SLI) is relatively unknown, despite being a relatively common condition.

Dorothy Bishop has done an analysis of publications on different conditions, and also looked at research funding by the National Institutes of Health, the major US funder. This confirms that SLI is something of a Cinderella subject. We hope we can bring it more into the limelight with our studies! The article will be published in the journal PLoS one later this year.
For the full article go to: http://dx.plos.org/10.1371/journal.pone.0015112

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

Why is language comprehension so difficult?

We know that some children with specific language impairment (SLI) have difficulties in understanding the meaning of sentences even when they have no trouble understanding the meaning of individual words that form the sentences. This holds them back at school, where it is important to understand what teachers say. We are doing a major study to find out why language comprehension is difficult for some children, and whether we can develop methods for training understanding.

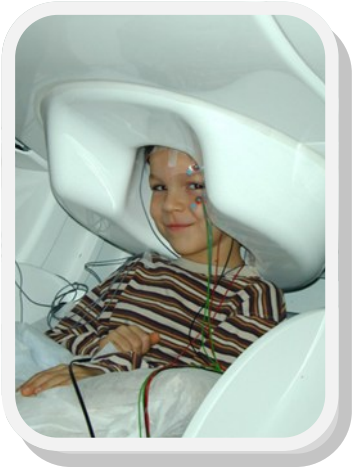
This year we have started visiting schools to examine language comprehension in children with and without language difficulties. Julie Hsu, Mervyn Hardiman, Georgina Holt and Anneka Holden are involved in this project. We see children over several sessions and train their comprehension using computerised games. Children who take part also receive language assessments, learn to understand sentences and new words, and do other tasks to test their general learning ability when language is not involved. So far, 112 children have taken part. Some of these children are recruited from mainstream schools and some are referred to us by their speech and language therapists or their teachers. We are very pleased by how much children have enjoyed the comprehension training games and other tasks.

Currently, we are recruiting children with language learning difficulties and we hope to complete our data collection in 2011 and have some new findings to report this time next year.

We are looking for children with language learning difficulties aged 7-11 years to take part in this study. If you would like further information, please do get in touch (tel: 01865 271334 or email: julie.hsu@psy.ox.ac.uk).

Magnetoencephalography:
A new way to study language development in the brain

The human brain develops throughout childhood and adolescence. Changes in brain structure and function underlie spoken and written language acquisition. Our group has been among those using recordings of electrical brain activity (EEG) to see how timing of brain activation changes dramatically across development.



Magnetoencephalography, MEG, is a similar brain imaging technique that measures the tiny magnetic fields that are produced by brain cells when they process incoming information. Tiina Parviainen, who is working in Oxford on a postdoctoral fellowship from the Academy of Finland, is using MEG to study how the brain processes different types of sounds in children aged 6 to 12 years. She will compare activation to tones, speech sounds and meaningful words, and see how brain activity correlates with their language skills.

A blinking experiment

A major theme of our research programme is understanding what goes wrong with language learning in some children – those with specific language impairment (SLI). These children have problems learning to talk and to understand language for no obvious reason. One question is whether the learning problems are specific to language, or whether we can find evidence of more general difficulties in particular systems that underlie learning and memory. One important system uses a part of the brain called the cerebellum. This is thought to be important in the formation of long-term memories for language, but also controls learning of movements, and very simple associations between stimuli and responses.

To study how well the cerebellum is working, we are using a very simple learning task that involves no language at all. This is known as eyeblink conditioning, and it involves learning an association between a tone and an airpuff stimulus. When you gently puff the corner of the eye with air, there is an automatic blink reflex. If a tone is sounded before the puff, people learn to blink when they hear the tone.

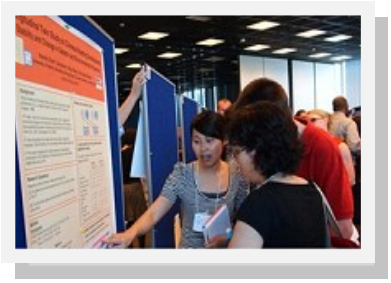
We are currently looking at children aged 7 to 11 years who do not have any difficulties with language to see how they perform on this task. Julie Hsu, Georgina Holt, Anneka Holden and Mervyn Hardiman have nearly finished this study and will soon be looking at children with language difficulties to see if they learn differently.

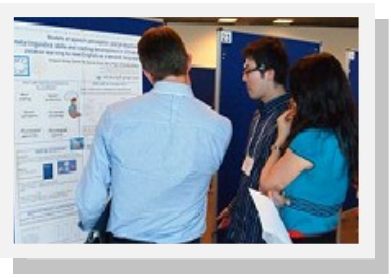
Anneka, Georgina, Mervyn and Julie have been busy testing in schools

Read Dorothy's new blog at
http://deevybee.blogspot.com/

Chinese Twin Study

Graduate students Bonnie Chow and Simpson Wong have investigated how genes and environment influence language and reading development in Chinese as a mother tongue and English as a second language. Over 300 pairs of Chinese twins aged 3 to 11 were tested twice – initially in 2007 with follow-up testing in 2008. Results were similar to those previously found for English; there were strong genetic influences on Chinese word reading, but Chinese vocabulary knowledge was much more influenced by aspects of the environment. We were especially interested in how children coped with learning two languages. Children in Hong Kong are introduced to English when they start school at 3 years. We wondered whether there would be interference between the two languages, because they are so very different, or whether being good at one language would help learn the other. We found that word reading and vocabulary knowledge were similar in the two languages for Chinese-English bilingual children. Thus, a child who was a good reader in Chinese was more likely to also be a good reader in English.





Bonnie and Simpson presenting the findings in an international conference held in Berlin this summer

Children with an extra sex chromosome

This year OSCCI was involved in a study of language and communication in school-aged children who have a sex chromosome trisomy, i.e. instead of the usual two sex chromosomes (XX for girls and XY for boys) they have XXX (girls) or XXY or XYY (boys). Previous studies indicated that most of these children have normal intelligence but they have a high risk of speech and language difficulties. Our study, funded by the NewLife Foundation, involved interviewing parents of a child with a sex chromosome trisomy. We confirmed that, compared with their brothers and sisters, a high proportion of children with a trisomy had been referred for speech and language therapy. We also found that several children had received a diagnosis of autism spectrum disorder. Nevertheless, many children in the study had no developmental or educational difficulties. In future research we aim to do more detailed genetic and behavioural studies of children with sex chromosome trisomies to try and explain why just a subset seem vulnerable to developing language and communication problems.

For the full report see: Bishop, D. V. M et al. (2010). Autism, language and communication in children with sex chromosome trisomies. *Archives of Disease in Childhood*, doi:10.1136/adc.2009.179747

Hellos and Goodbyes

A warm welcome to Dr Tiina Parviainen from Helsinki University of Technology, who is affiliated with OSCCI while spending time in Oxford on a postdoctoral fellowship from the Academy of Finland. We also say farewell to our three graduate students, Bonnie Chow, Simpson Wong, and Peter Collins, who have all successfully completed their theses and gone on to new challenges. We wish them well and look forward to seeing their careers develop in the future.

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