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OSCCI NEWSLETTER

Oxford Study of Children's Communication Impairments, Department of Experimental Psychology,
Anna Watts Building, University of Oxford, OX2 6GG
http://www.psy.ox.ac.uk/research/oxford-study-of-children-s-communication-impairments

It's all about communication!

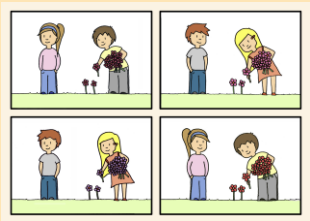
Our research covers many different topics, but the common theme is how do people communicate, and why is language learning difficult for some children. Here we just give a taster of our latest research: you can find links to our scientific papers and other resources on our website.

Here's a quick rundown of what you'll find in this newsletter:

Understanding complex sentences

When children learn to talk, they first produce simple utterances such as 'want juice', but in the space of a few years they can say complicated things like 'She dried the boy that was sitting'. Complex sentences like this link two ideas (she dried the boy, the boy was sitting) to express new meanings. But sentences like this can tax memory and be hard to understand.

Dr Pauline Frizelle set out to find new ways to assess children's understanding of complex sentences. A common approach is to present the child with a set of pictures and ask them to find the picture that matches a sentence.



Test sentence: 'He saw the girl that picked the flowers'

Pauline's research showed that this method can underestimate young children's understanding, if they get distracted by having so much to look at and remember. Pictures also can't show complex events unfolding in time. In Pauline's new assessment, the child has to say if a short video matches a spoken sentence.

Understanding what isn't said

Graduate student Alex Wilson is interested in an aspect of communication that hasn't been much studied: our ability to work out what people mean, going beyond the actual words. For instance, if I say 'dinner is on the table', you'll probably realise I want you to come and eat – even though I didn't actually say that.

In everyday communication between people, we continually 'fill in the gaps' in a spoken message to work out what someone means – most people do this so effortlessly, they barely notice.

Yet some people find this hard, and tend to rely more on what has literally been said. This seems to be a particular problem for autistic people. Alex has devised some computerised tasks, using cartoons, to see how people use context to help them understand what others mean.

Alex is looking for volunteers for this study: please see the back page for details.

The influence of an extra X or Y chromosome on language development

Why do some children have difficulties with learning to talk, understand or read? People often assume this is caused by a child's environment, but genetic differences between children can also be important. We are trying to understand this better, and one approach is to look at known medical conditions that are associated with language problems.

One thing that increases the risk of having language problems is when a person has an extra copy of an X or Y chromosome.

Between 2011 and 2017 a total of 143 children helped in our study of extra X and Y chromosomes ('trisomies'). We visited children at home or school to assess their language and other skills, and we measured blood flow in the brain while they did a language task. We also looked at information from questionnaires that parents completed, to get a detailed picture of the child's development.

We found that language problems are common in children with an extra X or Y chromosome, but there were big differences from child to child (see plot below). Most children attended mainstream school, and although they generally needed some additional help, severe problems were uncommon.

Some children had more serious difficulties that interfered with daily life, but the types of problem varied: some had autism, others had attentional difficulties or problems with speech, and in others, anxiety was more of an issue.

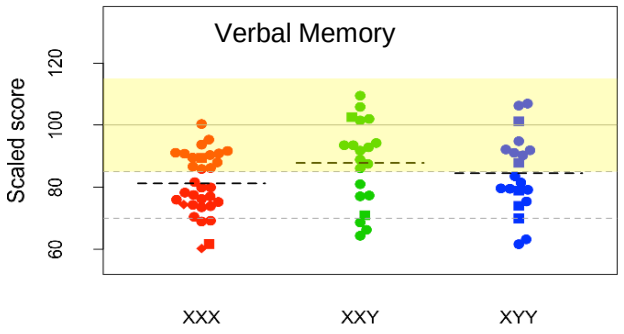
Our study also showed that if a trisomy was discovered during genetic testing for behavioural or school-based problems, then problems were usually more severe than in a child whose trisomy was detected through routine prenatal screening.

These results are of interest to genetic counsellors who advise families when a trisomy is discovered. On the one hand, there is an increased risk of a range of developmental difficulties, and by being aware of these, we can help ensure children get help early on. On the other hand, for cases identified on prenatal screening, difficulties are often mild.

Our results fit with the view that genetic influences on language disorders are complex: it's not that you have one genetic condition that causes the disorder. Rather, we all have a mixture of different genetic variants that add together and affect how far we are at risk of language and other developmental problems. Having an extra X or Y chromosome is a risk factor with a relatively big effect, but whether the child has mild or severe difficulties will depend on other genetic variants, as well as the play of chance.

Most children with language problems do not have a trisomy. We have also looked for genetic variants associated with language problems in a sample of twin children, but so far have not found any. We are currently working on further genetic analyses, and will keep families informed of our findings.

In this plot, each point shows one child's Verbal Memory score. The yellow band shows the normal range. The dotted lines show the average for each group. Although the group averages are at the bottom of the normal range, children are very variable, and many score within normal limits. Note: this plot does not show results of children whose trisomy was discovered during testing for behavioural or neurodevelopmental problems: they are more likely to have severe difficulties.



Language in the Brain

A new brain-imaging study

Over the years, we've learned a lot about how the human brain processes language. We can use brain scanning to see which areas become active when people talk or listen to language.

We know much less, though, about differences between people's language processing. For children who have trouble learning language, we might expect to see evidence of different brain organization, or a slower rate of development of language areas. So far, however, there have been very few studies using brain scanning with children, and their findings haven't been consistent.

These studies often have only small numbers, and that can make it difficult to see any pattern in the results. OSCCI is collaborating with Professor Kate Watkins and her team in the Speech and Brain Group at Oxford to run a brain-imaging study of developmental language disorder, and we are aiming to recruit as many children as possible.

We are looking for children aged 10-15, with a history of language problems, to take part in this study. If you think your child might be suitable and willing to take part, please take a look at the links on the back page to our information sheets and video. Note that the focus of this study is children who don't have any known biological or genetic condition that might have caused language problems.

People with unusual brain organization for language: does it matter?

As well as using brain scans to study people with language problems, we can turn the question on its head and look at language skills in people who are known to have unusual brain organization.

There's plenty of evidence that in most people, the left side of the brain is more active than the right when they talk. But some people are organized the other way round – the right side is more active – and other people don't seem to have a strong difference between the two sides.

For many years it's been suspected that unusual brain organization might be a risk factor for problems in language development, but it has been difficult to test this on large numbers.

In 2018, we were able to test this convincingly with a large sample of twin children who had taken part in our studies of language development and disorders. We found that most children showed the usual bias to left-sided processing for language, but we found absolutely no relationship with their language abilities: those children with right-sided language or lack of strong preference did not differ in language skills from other children.

Dr Zoe Woodhead and Abigail Bradshaw are now taking this a step further by looking at brain organization for different tasks. There is tantalizing evidence that some people are left-sided for some language tasks, but right-sided for others – and they tend to be left-handed. The next step is to test whether this unusual brain organisation is disadvantageous.

Kuppuraj: a tribute

2018 was a very sad year for us all at OSCCI, because we lost a dear colleague, Kuppuraj. You can see an obituary on our Facebook page. Kuppu was not only a promising young researcher but also a very special person to all who knew him. We plan to build on some of his ideas in future studies to develop better methods for training language comprehension.

Kuppu with Paul Thompson and Zoe Woodhead on a team outing

Stay in Touch! Find out more!

There is lots of information about our research on our website (see below – or just Google 'OSCCI'). We are currently recruiting for two studies, and are planning others

Study on understanding conversation (see page 1)

For this study we are recruiting **children with autism** (aged 7 to 14) and **children with X and Y chromosome trisomies** (with or without autism). Parents/guardians would be asked to complete some questionnaires and to speak to us over the phone about their child's development. Children are asked to do some fun language activities on the computer, including cartoons and audio. They can do this at home with their family, or with a researcher either in Oxford or at home/school. For more information, follow links to research-projects/understanding-conversation on our website. If you'd like to take part, please email alexander.wilson2@psy.ox.ac.uk.

Brain imaging study (see page 3)

For this study we are looking for **non-autistic children aged 10-15, with a history of language problems**, who have no known biological or genetic condition that might have caused language problems. You can find out more about this study by reading our information sheets: boldstudy.wordpress.com/info/ or watching our short video boldstudy.wordpress.com/contact/video.
If you'd like to take part, please email bold.study@psy.ox.ac.uk or phone 01865 271429.

Genetics and language in children with X and Y chromosome trisomies

See the Current research projects section of our website for more information on the studies described on page 2. If you would be willing to be contacted with details of future studies on this topic, please sign up on our website, or contact nuala.simpson@psy.ox.ac.uk.

Change of address

You can update your contact details on our website (https://www.psy.ox.ac.uk/forms/OSCCI-SCT-Study-Change-of-Address-form), or by emailing us at oscci@psy.ox.ac.uk

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

Many thanks to the funders who support our work with major grants, especially the Wellcome Trust and the European Research Council

Please see our website for further details of our research and publications:
http://www.psy.ox.ac.uk/research/oxford-study-of-children-s-communication-impairments