



OSCCI NEWSLETTER

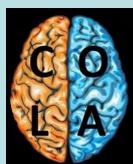


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<http://www.psy.ox.ac.uk/research/oxford-study-of-children-s-communication-impairments>

Consortium on Language Asymmetry: COLA

Zoe Woodhead has led studies investigating how the left and right sides of the brain are involved in language. We have known for many years that for most people, the left side is more active than the right during language tasks, but we've found that:

- The size of the difference between left and right hemisphere activity (known as 'laterality') depends on the task you're performing – laterality is strongest for tasks that involve producing *meaningful* speech, but is surprisingly weak for very familiar speech sequences such as counting aloud.
- Laterality also varies among different people. For some people, the left hemisphere is *much* more active (strong laterality), and for others the difference is smaller (weak laterality).
- For a small minority of people, the right hemisphere is more active than the left (atypical laterality). Interestingly, these people are almost always left handed.



To take this work forward, we have set up **COLA**: a consortium for the study of language asymmetry, involving researchers from the Universities of London, Lincoln, Bangor and Lancaster.

Our goals are to discover the best ways of identifying atypical laterality, to find out more about why some language tasks are more lateralised than others, and to see if atypical laterality has any consequences of language functions. We're using online as well as in-person testing (see p. 3!). You can find out how to take part here:

<https://colaconsortium.wordpress.com/>

Understanding complex language

Graduate student Alex Wilson has done studies using novel computerised tasks that have shone light on understanding of complex language, with a focus on adults and children with autism.

One task involved implied meaning. Consider the following conversation:

"Shall we sit outside?"

"It's quite cold"

The second person didn't explicitly say yes or no but we can infer that they probably don't want to sit outside. This is what we mean by an implied meaning – something that goes beyond what is explicitly stated.

In his study with adults, Alex found that those with autism scored rather less well on this test than non-autistic adults. Also, when they were given the option, autistic adults would prefer not to give a definite answer, indicating a lack of confidence in their decision, but when that option was not available, they usually gave a correct response. Alex concluded that people with autism preferred explicit, direct and literal communication.

Similarly, in a study of children, it was surprising to see how well those with autism did on this task, even though their parents would report major challenges with social communication, e.g. problems giving coherent accounts of events, saying things out of the blue without giving context, or using unusual, sometimes made-up words, and highly repetitive speech.

Alex's research suggests that understanding of implied meaning is not a core problem in autism, provided this skill is tested in a structured situation with clear-cut alternatives.

Language Disorders in University Students

While developmental disorders of language such as dyslexia are usually diagnosed during childhood, we know that their impact may continue to be felt throughout the lifespan.

Abbie Bradshaw worked with a group of adults studying at university with a diagnosed language disorder of dyslexia, dyspraxia, autism or specific learning difficulties. She was interested in finding out what kind of language difficulties they still experienced.

As these people were studying at university we know they were high functioning, yet as a group they scored worse than controls on tasks such as word reading, working memory and spoken language. Interestingly, someone's diagnostic label did not predict the kind of task they would struggle on.

These results are useful for those working for disability advisory services in universities. They show that while many people with language disorders are fully capable of studying at degree level, they may require additional support which should be determined on a case-by-case basis, not according to their diagnostic label.

Word Recognition in the Dyslexic Brain

Following up on Abbie Bradshaw's work on language organisation in the dyslexic brain, we are also running an online study investigating how each side of the brain might contribute to word recognition for dyslexic readers. See page 4 for how to participate.

Promoting robust, reproducible science

In 2019, Dorothy Bishop delivered the Bartlett Lecture at the Experimental Psychology Society, arguing that we human brains are often biased not to think scientifically: we ignore the evidence in front of us and just see what we want to see. The best way to counteract these biases is to anticipate them, and work in a way that makes us more objective and open. Dorothy is a founder of Reproducible Research Oxford, a multi-disciplinary group of academics working towards that goal. <https://ox.ukrn.org/>

Moving beyond the lab using online behavioural research methods

For the OSCCI team, conducting psychological research often involves large numbers of participants visiting the Department of Experimental Psychology here in Oxford. However, with advancements in online behavioural research, it is becoming possible to collect high quality data outside of the lab thanks to advanced platforms, such as Gorilla.sc.

This year, we started several online projects with the aim of better understanding language learning and organisation within the brain.

Treasure Hunt

For her undergraduate dissertation, Nicole Tan Li Ning worked on the Treasure Hunt game where children explored a mystical cave in search of treasure while learning the names of animals and making spatial judgements. Nicole was particularly interested in how we can best present these tasks to optimise a child's learning.

While the data indicate that children learned while playing the game, presenting the name learning task and the spatial judgement task separately, as opposed to mixed, had no reliable effect on learning. We are currently devising further studies with this game.

If you are interested in your children taking part, do get in touch.



Lateralisation Screening

For many people, the left side of the brain is dominant for language. Yet, OSCCI work has shown that for some language is not strictly processed in the left side of the brain—it may be processed in both. These participants are interesting but hard to come by. That is where online testing comes in.

By using online methods we can screen participants to see if they show a behavioural pattern characteristic of atypical lateralisation without them coming into the lab. Once identified, we can ask these people to come into the lab and take part in further studies to better understand how language is organised within the human brain.



A chimeric face made by pasting together left and right halves of faces showing different emotions. How people perceive the emotion in such faces may give a clue to brain lateralisation for language.

★ **Now recruiting!** ★

We would like to recruit left handers or twins (either right or left-handed) who are 16-50 years old for a study into typical and atypical patterns of lateralisation. To register your interest please fill in the form in this link:

<https://colaconsortium.wordpress.com/contact/>



Copy number variants in individuals with an extra X or Y chromosome

Dr Nuala Simpson, the geneticist on our team, has worked with Dr Dianne Newbury and Dr Hayley Mountford from Oxford Brookes University to study genetic variation that might influence language development.

Copy number variants (CNVs) are deletions or insertions of segments of DNA within an individual's genetic material. They can be small or large and are relatively common in the general population. Most CNVs don't seem to have much of an effect, but some are more common in people with neurodevelopmental disorders such as autism and intellectual disability.

We were interested in whether CNVs might help explain the variable outcomes of people with an extra X or Y chromosome (trisomies), who are at an increased risk of developing language problems. One possibility was that a CNV might have a worse effect if it occurred in someone with an extra chromosome. Another was that CNVs might be more common in people with an extra X or Y chromosome.

We did not find any evidence for either of these possibilities: We analysed CNVs in the DNA from 125 individuals with an extra X or Y chromosome and a comparison group of 181 people. There was no difference between groups in either the total number or total length of CNVs, nor on other measures that related to whether the CNV disrupted the function of a gene.

The variability in outcomes for people with an extra X or Y chromosome is quite large: some have autism or severe language problems, whereas others have only mild difficulties at school. We've looked hard for genetic reasons for this variability, but so far have not found any explanation in the genes.

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 volunteers for 3 studies:

- **Study on language and communication in children with an extra X or Y chromosome:** <https://www.psy.ox.ac.uk/research/oxford-study-of-children-s-communication-impairments/research-projects/understanding-conversation> or contact alexander.wilson2@psy.ox.ac.uk
- **COLA study of language laterality in the brain (twins and left handed participants aged 16-50):** <https://colaconsortium.wordpress.com/contact/>
- **Online study of laterality in dyslexia (adults):** email adam.parker@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

Hellos and Goodbyes!

This year, Dr Adam Parker joined us from Bournemouth University, to work on projects that use online methods to gather data on a range of language and cognitive tasks. We also welcomed Nicole Tan Li Ning, who joined us as a visiting student from Nanyang Technological University, Singapore for 6 months, doing the project that is described on page 2. Abigail Bradshaw completed her doctoral research in the summer and in a short space of time passed her viva examination, got married and took up a new postdoctoral position in London! Dr Jackie Thompson, who had worked with OSCCI for a few months in 2019, took up a post at the University of Bristol, but remains in close contact as we take forward work on improving people’s ability to think scientifically.



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 have made our research possible, especially the Wellcome Trust and the European Research Council who support our work with major grants.



**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>**