



Language and Social Communication Project

Boston University School of Medicine
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Spring 2005 Newsletter

Welcome

Greetings from the Lab of Developmental Cognitive Neuroscience! It's been a great year here at the lab, and we are pleased to give you an update about our research team changes, the progress on our face processing, language, and brain imaging studies, and some special events in which we have been able to take part.

Research Team Update

As summer approaches, we're saying a sad goodbye to two members of our research team, but welcoming a new face to our group. Family Coordinator **Kelley Larrow** left our lab on March 1 to pursue an exciting opportunity to teach in Vienna, Austria for the spring and summer before beginning doctoral work at Harvard University in the Fall. We recently received a postcard from her saying that she is happy to be teaching again, and hopes to visit our lab sometime soon. Research Assistant **Rebecca McNally** has also made plans to leave our lab to continue pursuing her education. Rebecca has been accepted into a doctoral program in clinical psychology at the University of Louisville, where she will be studying with other experts in the field of autism research, and where another former research assistant, **Ovsanna Leyfer**, enrolled last year. We wish Kelley and Rebecca the best of luck as they move forward with their educational and career goals.

On June 24, we look forward to welcoming our new Family Coordinator, **Lin Themelis**. Lin will be graduating this May with a Master of Arts in Applied Linguistics from Boston University. She has extensive teaching and special needs coordination experience from previous positions in Montessori and foreign language education. We are all looking forward to getting to know Lin and hope you will get to hear from her soon as you make arrangements for your next visit to our lab.



Our lab's team made strides for autism research this Fall at the National Alliance for Autism Research's Walk F.A.R. for NAAR event, raising over \$6,000 in sponsorships and donations.

International Meeting for Autism Research

On May 5-7, 2005, the Lab of Developmental Cognitive Neuroscience at Boston University School of Medicine hosted the fourth annual conference of the International Society for Autism Research at the Boston Copley Marriott. Over 700 researchers in the field of autism convened to discuss their latest findings, implications for treatments and interventions, and new directions for future research projects – the largest IMFAR meeting yet! In addition to hosting and providing volunteers for this event, several of our researchers presented their findings at this conference. A description of the language processing research **Karen Condouris** presented in her slide show can be found on the back of this page. Additionally, **Robert Joseph** and **Rebecca McNally** presented posters about new information that has emerged from the face processing experiments – a new measure of emotion recognition and some fascinating findings on repetitive behaviors. It was a great honor for all of us to be part of such a well-attended and successful event!

Face Processing Study Update

A major focus of our research program on social communication has been on children's face processing. Over the last year we completed a set of studies that were aimed toward gaining a better understanding of the exact nature of the face processing difficulties in children with autism and children with similar social difficulties. These studies were designed to help us to distinguish between the perceptual, attentional, and emotional processes involved in face processing so that we could home in on precisely what is difficult for children with autism. In a nutshell, we continued to find no clear evidence of a perceptual problem in the way that children with autism see faces and encode faces in memory. As you may remember, we hypothesized the possibility of a part-by-part processing approach that would be different from the typical holistic processing preference for faces, but we did not find clear evidence of this. Rather, we continued to find a problem with processing information from people's eyes in autism. In a follow up experiment, we examined whether we could improve children's performance in face recognition tests simply by cueing them to look carefully at the eye region. By using eye-tracking to determine exactly where on the computer screen children were looking, we were able to confirm that our cues were effective in getting children to look at people's eyes, but children with autism still processed information from the eyes relatively poorly. The practical implication of this study is that, in addition to being alerted to attend to people's eyes, children with autism and other social disabilities are quite likely to benefit from remedial assistance in learning to read the various kinds of information we can get from people's eyes. Finally, in two additional experiments, we found that children with autism were not as sensitive to shifts in gaze as other children and that they had an increased arousal response to making direct eye contact. We do not know whether this latter finding reflects a basic aversion to making eye contact, or if it might be a conditioned response borne of the anxiety children feel when they do not understand what people's eyes are communicating. In our

current wave of experiments, we are following up on these findings as well as examining the role of more general visual perceptual and attentional abilities in the face processing skills of children with autism and non-autistic children. When your child completes these experiments, we will send you a detailed description of them.

Brain Imaging Study Update

In our brain imaging studies, we are continuing to collect MRI images to look at the size and shape of different brain areas and their relationship with specific behaviors. We are also using diffusion tensor imaging (DTI) to look at how different areas of the brain are connected. We are currently in the process of planning functional MRI studies to look at what brain areas are used when specific tasks are being done. We will be looking at brain areas involved in processing language, as well as which brain areas are involved in face and eye gaze processing. We are hoping to start these studies sometime this summer.

We are currently enrolling children ages 7-18 in the MRI and DTI study. Children with **autism**, children with **language-based learning difficulties**, and **typically developing children** are invited to participate. Please contact Nancy Shaffer at (617) 414-2348 for more information.

In addition to the new members of our research team who will be working on all of our studies in this research program, we have several new people in the lab working specifically on these imaging studies. **Nancy Shaffer**, whom you may remember from the genetics study we conducted last year, is our family coordinator for the imaging projects. **Kristen Lindgren** is an M.D./Ph.D. student looking at brain regions involved in language. **Andrew Silver** is working as a research assistant on the MRI, DTI, and functional MRI studies. **Tracey Knaus** joins us from Tulane University as the project manager for the imaging studies. They are all looking forward to meeting you soon!

Language Processing Study Updates

We just presented findings from our study of phonological processing in children with autism at the International Meeting from Autism Research (IMFAR) held in Boston on May 6th 2005. Some of the basic processes involved in language functioning include the ability to listen to, remember, compare, and repeat novel speech information. These are skills that help a child learn new words. We were interested in investigating how well children with autism are able to do this because past research has suggested that some children with autism have difficulty repeating novel speech information (nonsense words). In this project, we designed two experiments: a nonsense word discrimination task, where the children heard two nonsense words and had to decide if they were the same or different, and a nonsense word repetition task, where the children heard nonsense words and had to accurately repeat them. By comparing the children's performance on these two tasks, we hoped to determine whether there were processing problems in the early stages of speech processing (listening and remembering the speech information, assessed in the discrimination task) or in later stages of speech processing (retrieving the stored memory of the word and putting together a speech plan, assessed by the repetition task).

Over 70 children participated in these two experiments. We found that children with autism were just as accurate discriminating nonsense words as typically developing children, but some children with autism were much less accurate repeating these same nonsense words. It therefore appears that for some children with autism there are difficulties in the later stages of speech processing. These findings add important information to our understanding of the language skills of children with autism.

We have developed several new experiments continuing our investigation of how children with autism process speech information. Many children have already participated in our new sets of experiments designed to investigate how well children can make use of prosody, the

melody of speech, to understand word meanings and to understand the emotional state of the speaker. We look forward to sharing the results of these new experiments with you in the near future.

Our Most Recent Publications

Hale, C. M. & Tager-Flusberg, H. (2005). Social communication in children with autism: The relationship between theory of mind in discourse development. *Autism*, 9, 157-178.

Joseph, R. M., Steele, S., Meyer, E., & Tager-Flusberg, H. (2005). Self-ordered pointing in children with autism: Failure to use verbal mediation in the service of working memory. *Neuropsychologia On-line*.

Joseph, R. M., McGrath, L., & Tager-Flusberg, H. (2005). Executive dysfunction and its relationship to language impairment in school-age children with autism. *Developmental Neuropsychology*, 27, 361-378.

Roberts, J., Rice, M., & Tager-Flusberg, H. (2004). Tense marking in children with autism. *Applied Psycholinguistics*, 25, 429-448.

Tager-Flusberg, H. (2004). Do autism and specific language impairment represent overlapping language disorders? In M. L. Rice & S. Warren (Eds.), *Developmental language disorders: From phenotypes to etiologies* (pp. 31-52). Mahwah, NJ: Lawrence Erlbaum Associates.

Tager-Flusberg, H. (2005). Designing studies to investigate the relationships between genes, environments, and developmental language disorders. *Applied Psycholinguistics*, 26, 29-39.

Tager-Flusberg, H. (2005). Language and communication disorders in autism spectrum disorders. In M. L. Bauman & T. L. Kemper (Eds.), *The neurobiology of autism: Second Edition*, (pp. 45-58). Baltimore, MD: Johns Hopkins University Press.

Tager-Flusberg, H. (2005). Reflections on the connections between autism and blindness. In L. Pring (Ed.), *Autism and blindness* (pp. 181-188). UK: Whurr Publishers.

Tager-Flusberg, H. & Joseph, R. M. (2005). How language facilitates the acquisition of false belief understanding in children with autism. In J. Astington & J. Baird (Eds.), *Why language matters for theory of mind*. Oxford: Oxford University Press.

Tager-Flusberg, H. & Joseph, R. M. (2005). Theory of mind, language, and executive functions in autism: A longitudinal perspective. In W. Schneider, R. Schumann-Hegsteler, and B. Sodian (Eds.), *Young children's cognitive development: Interrelationships among executive functioning, working memory, verbal ability, and theory of mind* (pp. 239-257). Mahwah NJ: Lawrence Erlbaum Associates.