

## **Do you see what I'm thinking about? How adults' eye-movements are influenced by representations of mental states.**

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Following recent eye-tracking research on perspective-taking and false-belief reasoning in adults (Keysar, Lin & Barr, 2003; Ferguson, Scheepers & Sanford, 2010; Rubio-Fernandez & Glucksberg, *under review*), we propose to investigate the processes and representations that underlie eye-movements in Theory of Mind tasks. Focusing on those patterns of eye-movements that have been interpreted as evidence of an 'egocentric bias' in adult false-belief reasoning, our primary aim is to test hypotheses about which representations control eye-movements during comprehension of narratives involving false beliefs. Our collaborative research should thereby contribute to controversies concerning the nature and development of Theory of Mind cognition.

As indicated on our application, the purpose of our second meeting in London in July was threefold:

First, we wanted to take the opportunity to discuss the results of the pilot eye-tracking experiment that one of Daniel Richardson's MSc students had ran for us this summer. This is a study where we are investigating the nature of first fixations to the wrong location in FB tasks. Second, in view of the results of the pilot study, we were planning to work on the materials and the set up for the actual eye-tracking study, which we plan

to run this fall. Finally, we wanted to finish designing a follow up study that we have recently been working on, where we want to investigate eye movements in FB tasks that involve false beliefs about identity and not only about object location.

Regarding the outcome of our meeting, I am happy to report that we met all the objectives:

The results of Daniel Richardson's pilot study were not as clear as we had hoped for. However, we took the opportunity to identify some interesting patterns of results that we want to further investigate in future experiments. We plan to present the results of our pilot study at the XPrag workshop in Pisa at the end of September.

In view of the results of our pilot study, we agreed on the design of our first eye-tracking study where we will use a version of the Sally-Anne task separating action prediction from object location. Unlike in the traditional version of the task where the story character is supposed to take the toy from its location, the characters in our story will access their toys from two locations at the top of the screen, while the toys are kept in two locations at the bottom of the screen. This way, if participants make a first fixation on an egocentric location, we will be able to differentiate first looks to the location for action prediction (i.e. the location where the character would appear if she knew that the toy had been moved) and first looks to the actual location of the object (i.e. the location where the toy has been moved to, unbeknownst to the story character). The separation between action prediction and object location should allow us to characterize the type of egocentric bias revealed by first fixations as one driven by a failure of Theory of Mind (wrong action prediction) or by a pull of the real (object bias).

Finally, we designed a new battery of eye-tracking experiments investigating whether FB narratives are understood on the basis of representations of belief, or perhaps by employing a lower-level mechanism of registration (Apperly & Butterfil, 2010). The design and implementation of these experiments will require further work in coming meetings.

The next step in our research project will be to run the Sally-Anne task that we designed on the basis of Daniel Richardson's pilot study. I will do this in November. Once we have collected the data, we will meet again to discuss the results and hopefully, draft a paper.