THE LISTENING EYE

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Florent Perek sits in front of a screen on which images appear at regular intervals. On his head, the young scientist wears a device which registers where he looks when viewing the image. The device surrounds the entire head and is connected to a monitoring computer with a hefty bundle of cables. It recognises the area of the eye which is most reflective, the pupil, and uses this information to record the precise movement of Florent's gaze. "Eye tracking" is the technical term that describes this technique.
Before the images are displayed on the screen, Florent hears linguistic stimuli from a loudspeaker, such as the phrase "The cable runs along the wall". He then sees a coloured image of a cable and a wall. The eye tracker registers how Florent views the image. Where does he look? How does his gaze move over what is shown?

Martin Hilpert, director of the experiment and Florent's supervisor, is a linguist; although at first glance his methods and the technical equipment in his laboratory rather bring to mind approaches in other academic disciplines. His work shows that modern empirical working methods are finding an opening within linguistics. "We are a long way from being able to measure all interesting linguistic phenomena both directly and objectively – however: we can observe the behaviour of speakers very precisely and draw conclusions from this." This is one of the fundamental ideas behind Hilpert's experiments. The linguist, who worked previously in Berkeley, California at the International Computer Science Institute (ICSI), has been pursuing research as a Junior Fellow of the School of Language & Literature since May 2008. His research focus, "Cognitive linguistics at the interface between corpus linguistic and psycholinguistic approaches," is founded on the close link between linguistics and cognitive science. Hilpert believes that experimental approaches, which observe the behaviour of test subjects, and corpus-based approaches, which analyse data from digital text corpora, are important methods for re-formulating the questions to which linguistics should find answers.

He is primarily interested in what language reveals about the human mind and how it can be described as a system. By using technology from other sciences in his research, or adapting it to his experimental set-up, he also aims to promote an interdisciplinary dialogue. "I see myself as an arts scholar through and through, but the way one asks questions and examines the mind changes with the technology that is brought into application. I find these changes fascinating."
Hilpert's approaches, namely psycholinguistics and corpus linguistics, primarily call for the further development of established methods and a crossing of disciplinary boundaries. He stresses that collecting data with pencil and paper is no longer sufficient to answer certain questions. He wants to investigate issues in the field of humanities by studying the observable behaviour of speakers, be this as finished products of speech or writing in corpora, or as behaviour shown in experiments.

In addition to other work that takes place in the scientist's laboratory, eye tracking experiments are a focus of Hilpert's research at FRIAS. Here, for example, he investigates reactions to "fictive motion" in linguistic expressions. Speakers of many languages frequently use verbs of motion to describe situations that are actually static. "The road goes through the forest" or "the cable runs along the wall" are just two examples of this phenomenon. Hilpert is researching whether or not these expressions are understood and processed differently by people than phrases which describe the same situation in static terms, such as "the road is in the forest" or "the cable is at the wall".

To date, between 200 and 250 test subjects have taken part in his series of experiments, which follows a defined model. One session lasts 20 minutes. Test subjects are linked up to the eye tracker and look at a screen. First, they hear a sentence over a loudspeaker. This linguistic stimulus will be either "dynamic", and marked by the use of verbs of motion, or "static", describing a situation using stative verbs. Subsequently, the associated image is then displayed on the screen. If the test subject hears a "dynamic" stimulus, the eye tracker is used to check if he or she looks at the picture in a dynamic fashion. As test persons look at the images, their eye movements are observed to see if gaze actually follows the road, i.e. whether comprehending the verb of motion "to go" involves "mental simulation of motion". Bodily reactions are thus measured to investigate how human beings process linguistic expressions. It is precisely this cognitive reality which interests the academic. His hypothesis is that differences in linguistic structure reflect differences in thinking. When hearing a "dynamic" stimulus, the test subject will therefore ideally move his or her gaze over the road in the forest, thereby simulating the semantic content of the sentence. However it remains to be seen whether or not this hypothesis is actually borne out by the data. Do we really understand a phrase such as "the road goes through the forest" differently to its static counterpart "the road is in the forest"? Whatever the answer turns out to be, it will be decided by the actual eye movements recorded for individual test subjects.

"Research into the human mind using language and language use is an enormous project that we linguists have only just begun," says Hilpert. However, we can be sure that this work will eventually yield exciting results. *(ab)*