Caitlin Decuyper

How fast can you speak?

Some people talk faster than others. We all have friends, neighbors, or colleagues who talk so quickly that we can hardly follow and others who speak slowly. Although the differences in speech rate are obvious in daily live, very little is known about their causes.

Antje S. Meyer and Hans Rutger Bosker of the Max Planck Institute for Psycholinguistics in Nijmegen aim to unravel the mystery of individual differences in speech rate. Maybe fast speakers can control their lips and tongue better? Or maybe they think faster? Or are they better at retrieving the words they want to use from their memory? The researchers also wonder how people become slow or fast speakers. Finally, they want to explore whether fast speaking parents also have fast speaking children.

For the research carried out at NEMO the researchers had two goals, namely (1) to develop a good test of speech rate, and (2) to explore whether children's speech rates were related to the speech rates of their parents.

Traffic lights, tongue twisters, and confusing pictures

807 visitors participated in the "How fast can you speak?" project, among them 397 children and adolescents between 6 and 19 years. Since visitors mostly come in family groups, the researchers could also explore how similar family members are in their performance.

Under guidance of Caitlin Decuyper and Annelies van Wijngaarden, all participants performed a set of tasks. First, their reaction speed was measured via a 'traffic light task'. Here participants saw a red square that was after a few seconds replaced by a green circle (see Figure 1). As soon as the green circle appeared, participants pressed the spacebar as quickly as they could. Using this task, the researchers could investigate whether people with fast general processing speed can also talk fast.

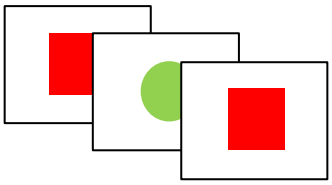

Figure 1. The traffic light task.

In order to check how fast participants can talk, they were asked to do several speech tasks. They counted as quickly as possible to 10, they named the days of the week as quickly as possible, and they tried to pronounce the non-word 'pataka' as many times as possible within 7 seconds.

Next, participants were asked to name pictures as quickly as possible. To make the task more challenging, a word appeared superimposed on each picture. This word could be related or unrelated to the picture name (see Figure 2). Participants had to name the pictures, not the words.

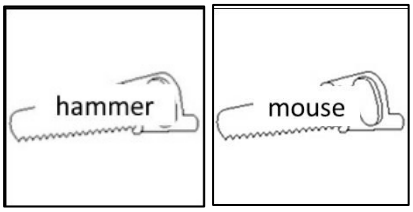

Figure 2. Which picture is easier to name?

Parents are faster

To the surprise of many visitors, parents were, on all tasks, on average faster than their children. This is shown below for the traffic light task in Figure 3. The same figure also shows that there were no differences between boys and girls, or between mothers and fathers. Figure 4 shows that older children were faster than younger ones ($r = -.63$, $p < .01$, $n = 241$).

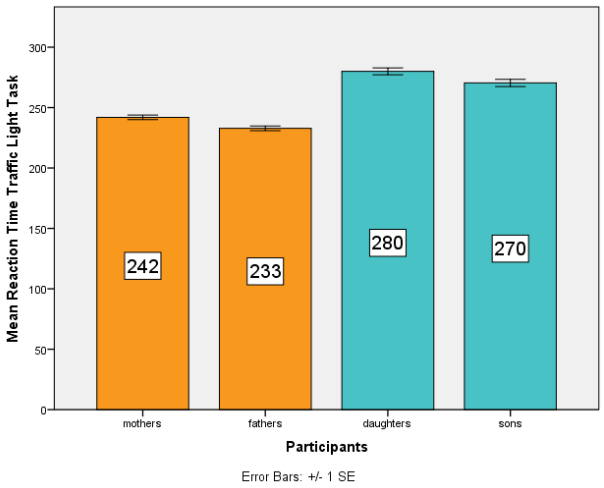

Figure 3. Mean reaction times (in milliseconds) in the traffic light task for mothers, fathers, daughters, and sons.

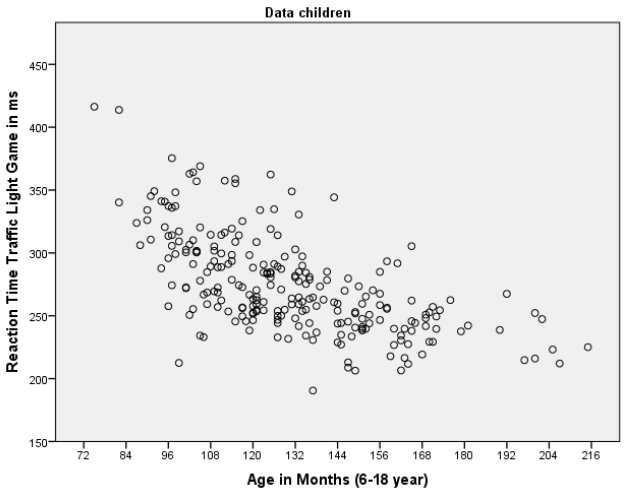

Figure 4. Correlation between children's age and reaction time in the traffic light game.

Finding a good way to measure speech rate

One of the goals of the study was to find good ways of measuring speech rate. It turned out that the 'pataka' task was too hard for most visitors. The counting task, on the other hand, was too easy, as everyone could do this very fast. But the 'say the days of the week task' worked well, showing good variability between people. In this task, adults' speed was related to their speed in the traffic light task ($r = .19$, $n = 258$, $p < .01$). For children, this was (when their age was taken into account) not the case. These results will be used in further research.

Naming pictures

In the picture naming task, the visitors of NEMO performed very similarly to students tested in earlier studies. In particular, they found pictures with incorrect but related labels (e.g. sow/hammer) harder to name than pictures with incorrect, unrelated labels (e.g. sow/mouse), see Figure 2. This is important to know as most research in this field is done with students. Furthermore, the effect of a distracting related label compared to unrelated labels was of the same size for children and adults and for male and female visitors (see Figure 5).

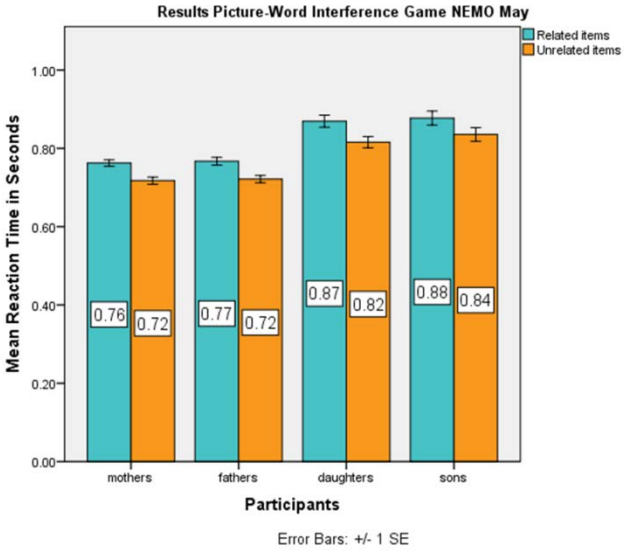

Figure 5. Results of picture-word interference game.

The children named the pictures more slowly than the adults. The children's naming speed was only related to their age, but not to their speed in the traffic light or in the days-of-the-week task. By contrast, the naming speed of the adults was predicted, to some extent, by their speed in the traffic light task ($r = .27$, $n = 146$, $p < .01$), and by their speed in the days-of-the-week task ($r = .28$, $n = 129 < .01$). Further statistical analyses (regression) showed that both performance in the traffic light task and performance in the days-of-the-week task independently account for some of the variability in the picture naming task. This result, though preliminary, is important because it suggests that speech rate is not simply a function of general processing speed. It will be followed up in further research.

As parent as child?

The researchers wanted to find out whether fast parents also have fast children. This was not the case in the traffic light task or in the picture naming task. But the results were different for the days-of-the-week task. Here the children's performance was best predicted by their age - older children were faster, but it was also predicted by the performance of a parent (father or mother) on the same task ($r = .20$, $n = 250$, $p < .01$ (controlled for age of children)). Thus, parents and children were related in their speech rate. Why is this? Various accounts spring to mind. There might, for instance, be a hereditary basis for this skill, or children might imitate their parents (or vice versa). Further research, in collaboration with geneticists, will be directed at this question.