



## Getting to the very core of language

Language is a door to human cognition, says Marijke De Belder. The linguist is investigating how words are structured and how we glean information from even the smallest linguistic building blocks. Her research not only provides theoretical fodder within academia, it also helps us understand how people actually acquire and process language.

**W**hen Dr Marijke De Belder hears the Dutch word *kreeftskeerkring* – which means Tropic of Cancer – it is not Henry Miller’s novel or geography that springs to mind. For her this word is associated above all with one thing: an analytical challenge.

De Belder is an expert in word structures. One of her main areas of expertise is morphology, a sub-discipline of linguistics. She investigates the patterns according to which words are structured and what the individual parts of a word reveal about its function. She also analyses how words and their grammatical forms interact with other linguistic levels, such as sentence structure. Her objective is to penetrate to the very core of language and find answers to the question of how it works at the most basic level.

“Language fascinates me because it is something deeply human,” says De Belder. “Although some animals also communicate using sounds, the way we humans speak and form sounds or sentences is unique,” explains the Belgian-born researcher, who studied linguistics and literature at the KU Leuven and then completed her doctorate at Utrecht University. The structured and empirical approach is what De Belder likes most about linguistic research. “We collect and analyse a lot of data; the research is very formal,” she stresses.

And De Belder knows exactly what she is talking about: she devoted a substantial part of her more than 300-page-long habilitation thesis to analysing Dutch compound words like *kreeftskeerkring*. Among other findings she was able to establish that the “s” in this and similar words makes the component *kreeft* identifiable as a proper noun. “I believe I am the first person to have recognized this,” she notes, not without a hint of pride.

In addition to these rather abstract

findings, De Belder, who since 2018 has been researching and teaching in a group led by Professor of Dutch Linguistics Esther Ruigendijk at the University of Oldenburg, is also seeking answers to applied linguistics questions with practical applications: Can structural differences between types of words be detected, and what role do they play in language comprehension? One goal here is to gain a better understanding of the problems that children with hearing impairments encounter in language acquisition – a topic that the researchers in the Oldenburg-based Cluster of Excellence Hearing4all, funded by the German Research Foundation, also investigate. The 39-year-old linguist’s collaboration with Ruigendijk’s team is fruitful for both sides because De Belder combines her research approach with the experimental methods of her colleagues from the field of psycholinguistics – the sub-discipline that deals with language acquisition, language processing and the relationship between language and thought. “Before coming to Oldenburg I mainly worked in theoretical linguistics as a ‘system linguist,’” De Belder explains.

**“People intuitively know that different types of words are structured in different ways.”**

Together with Ruigendijk and her colleague Dr Bénédicte Grandon she conducted experiments that demonstrated that in both Dutch and German, different word classes such as nouns or verbs have different syllable structures. And that people subconsciously associate the different struc-

tures with the various word classes. To arrive at this result, the team analysed long lists of words using artificial intelligence and then demonstrated a statistical correlation between structure and word class. Test persons were then asked to identify pseudowords – terms that follow the phonetic rules of a language but have no meaning. The tests showed that the participants were able to infer the function of a word based on its syllable structure alone, much as AI does. “People intuitively know that different word classes have their own particular structure,” explains De Belder.

Based on a study conducted with German-speaking test persons, the researchers also found that humans can detect cues from the sounds of a word which remain hidden to AI: “Words with nasal consonants, for example ‘n’, ‘m’ or ‘tj’ – as in ‘ng’ – are more likely to be identified as a noun than a verb in German,” De Belder points out. In her view, experts need to start paying more attention to these connections between sentence and phonetic structure.

These findings also have practical relevance, the linguist adds. Researchers suspect that babies already use sounds – or phonological cues – to analyse sentences, even though they do not know the words or their meaning. “Children with hearing impairments, for example, are probably lacking these cues,” De Belder explains. This opens up new pathways for research in the Cluster of Excellence.

In addition to their practical relevance these findings also reveal a certain fundamental truth, says the linguist: “Anyone who works with language is opening a door to human cognition.” To analyse her native Dutch in depth, she sometimes relies on a very human tool: intuition. “When it comes to Dutch, I sense certain things before I understand them. I am so deeply acquainted with the language – just as I understand my own sister better than any other person.” (cb)