The lexico-semantic representation of words in the mental lexicon = De lexico-semantische representatie van woorden in het mentale lexicon

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English summary

Although speech production appears effortless, the underlying cognitive architecture is complex. Speech production planning involves retrieving information from memory, arranging words in proper grammatical order, and articulation. In this thesis, we have explored how the brain processes linguistic information in language production by focusing on two linguistic factors, i.e., semantic features and lexico-syntactic features. First, we examined the effect of semantic features. We were particularly interested in how a single semantic feature and multiple semantic features are reflected in their behavioural correlates and neural correlates in language production for native Mandarin Chinese speakers. Second, we have investigated the effect of lexico-syntactic features with multiple grammatically correct options by employing the Mandarin Chinese classifier system as an example. These are crucial issues because they are directly related to the underlying architecture that makes speech production possible when understanding the complexities involved in this remarkable human ability.

In **Chapter 2** of this thesis, we examined the role of a single semantic feature in language production by using animacy as an example. We observed an animacy interference effect together with a larger N400 component for animacy-incongruent vs. congruent picture-word pairs. We concluded that the previously described semantic category interference effects are at least partially caused by these more elementary semantic features. We also postulated that if

we accept the semantic network as described in Levelt's model, our findings suggest that conceptual nodes that are congruent in a given semantic feature (e.g., animacy) might be located more closely to each other than conceptual nodes that are incongruent with respect to that semantic feature.

In **Chapter 3** of this thesis, we examined the role of multiple semantic features in language production by using semantic categories as a collection of multiple semantic features. We observed a main effect of semantic category that was stronger than the main effect of shape (i.e., a semantic feature). We concluded that with an increase in the number of overlapping features between word pairs, there may be more spreading of activation between them during word production. We also postulated that if we accept the semantic network as described in Levelt's model, our findings suggest that with increasing feature overlap between word pairs, the proximity between their corresponding conceptual nodes in the binary semantic network assumed by Levelt's model may increase. Note that based on the findings obtained from Chapter 2 and Chapter 3, we cannot make claims about the architecture of the semantic network. In other words, semantic features could influence pre-activation in other ways than proposed by Levelt and colleagues.

In **Chapter 4** of this thesis, we investigated the role of lexico-syntactic features with multiple grammatically correct options by using the Mandarin Chinese classifiers as an example. We observed that distractors with dissimilar classifier distributions resulted in a more positive P600-like effect, but no behavioural effect was observed compared to distractor nouns having similar classifier distributions. Based on these findings, we concluded that multiple options of lexico-syntactic features are activated in language production. We also proposed a method for extending the encoding of lexico-syntactic features in Levelt's model to accommodate both single and multiple options for a given noun through the incorporation of an empirical lexico-syntactic feature probability distribution, e.g., the Mandarin Chinese classifier probability distribution reported in this thesis.

In **Chapter 5** of this thesis, we looked at all findings together from a broader perspective. Regarding the semantic features, we

compared the architecture of the semantic network proposed by Levelt and colleagues with those proposed by alternative models, such as Caramazza's model. We concluded that experimentally distinguishing the organization of the semantic network described in Levelt's model from these alternative models and theories is challenging. This is also applicable to our findings on semantic features in Chapters 2 and 3, meaning that they are also consistent with the role of semantic features in these alternative models and theories. Regarding the lexico-syntactic feature, due to the lack of directly comparable existing studies, we employed studies on the mechanism of classifier selection to illuminate the activation of lexico-syntactic features with multiple grammatically correct options. We concluded that the results from studies focusing on classifier selection align with the findings and conclusions of this thesis. The insights gained regarding semantic and lexico-syntactic features with multiple grammatically correct options enhance our understanding of the architecture underlying speech production.