**Developmental relationships of understanding complements, naive theory of mind, and word acquisition – or: ToM said that there was a wug in the box.**

**Keywords:** complements, naive theory of mind, word acquisition, autism

Our developmental psycholinguistic research focuses on the way language system interacts with other aspects of human cognition, more specifically, with the development of naive theory of mind. Although the existence of a developmental influence between language and naive theory of mind (the ability to attribute mental states) is not questionable any more, the nature and direction of the relationship is not yet clear. It is possible that theory of mind or its precursors (for example: joint attention behaviors) are needed for the acquisition of language (see, e.g., Baldwin, 1995) but it is also an empirical possibility that language or its particular aspects allow the child to acquire the ability to attribute mental states to others. The later claim was supported by a few longitudinal studies (Astington & Jenkins, 1999; de Villiers, 2002), where early language level predicted the later performance on tests of false belief understanding (a measure of theory of mind functioning). De Villiers (2002) found that this relation holds not for language in general but for a particular aspect of syntax: sentential complements.

Similar connection was found between complement syntax and theory of mind in children with autism (Tager-Flusberg, 2000). Autism, a pervasive neurocognitive developmental disorder with heterogeneous but dominantly genetic origins is an excellent test-field of empirical hypotheses concerning the relationship between linguistic and socio-cognitive development. This is so, because while language in the formal sense is often sound in autism, existence of a theory of mind deficit in children with autism has been confirmed in hundreds of studies since it was first found in Baron-Cohen et al. (1985). What makes autism especially relevant for our studies is the "problem of passers": that although most children with autism fail on theory of mind tasks, there are a few who pass them. A possible resolution of this problem is the assumption that these children use *a verbal compensatory strategy* to pass false belief tasks (see, e.g., Happé, 1995). If this is indeed the case, we expect a very strong predictive effect of complement understanding to theory of mind ability in autism.

Study I

In our first study we investigated our *verbal mediation hypothesis*; that the predictive effect of language level concerning theory of mind ability is due to the *verbal* nature of theory of mind tests. In this case the above-mentioned findings are rather methodological by-products than valid indicators of a real causal connection between the two abilities. Using our newly developed nonverbal false belief understanding task (Győri et al., in press) we were able to test de Villiers's complementation hypothesis without the contaminating effects of verbal mediation.

We tested the verbal mediation hypothesis on typically developing preschoolers (mean age 4;4 years) and with children with autism (mean age 10;2 years). Our results partially supported de Villiers's hypothesis: we also found that the performance on complements predicted the performance on the *verbal* false belief understanding tasks both in typically developing children and children with autism, but we didn't found such a connection between complements and the *nonverbal* false belief understanding test in any of the two samples. These results challenge the original form of the complement hypothesis that claimed a fundamental relation between structures of complements and mental state representations – rather, they suggest that the verbal complexity of the tasks accounts (at least: partly) for the apparent interdependence.

Study II

In our second study the method of testing complement understanding was combined with the testing of word acquisition. Happé and Loth (2002) found that significantly more children passed the false belief task when it was combined with a word learning task than when presented in its standard form. This somewhat paradoxical finding (increasing task complexity resulted in higher performance) raised another aspect of language/theory of mind relationship: in the authors' interpretation, theory of mind mechanism might be not a unitary mechanism but it might consist of more – at least two – component mechanisms, and their developmental trajectories may be different.

In our study we tested two related hypotheses on 2,5-5 years old typically developing children. One of them was what we call the *extended de Villiers hypothesis;* if indeed there is an essential connection between acquisition of complement syntax and acquisition of theory of mind *as such,* then we expect that mastery of sentential complements predict false belief understanding not only in the standard, but also in the word learning context.

The other aim of the study was to reveal the mechanism of the effect of word learning situations on mental state attribution. In contrast with Happé and Loth's interpretation, in our *facilitation hypothesis* we suggest that the better performance in false belief understanding in word learning contexts is due to a general facilitation effect of such situations and not to the different developmental trajectories of two separate mechanisms of theory of mind. Testing complement understanding in word learning task is a possible method to test this hypothesis; according to the facilitation hypothesis the general effect of word learning context can be observed not only in theory of mind tasks but also in other tasks – for example in complement tasks. Our expectation is that children can pass the complements in word learning task easier than the standard complement task.

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