Additionally, researchers manipulated argument, word order, verb class

Additionally, an Fmri study by Bornkesselet.

al, (2005), examined the syntax (form) and semantics(meaning) interface by separating neural regions sensitive to argumenthierarchy construction and important in understanding the neural basis of theform-to-meaning mapping. What theresearchers investigated was the interaction between word order and verb typealong with the factor of ambiguity. To do that researchers manipulatedargument, word order, verb class and morphological marking, arguing that forGerman, neural areas (posterior superior temporal and inferior frontal regions)are sensitive to that interaction. They had 15 monolingual German nativespeakers, aged 21-27 years.

The materials used were 8 critical sentence conditions (appendix 4). Participants readambiguous and unambiguous experimental sentences, which were presented in asegmented manner and then, they had to answer whether a second sentence of theform Peter hilft Lehrerinnen (Peter helps teachers.) appropriately describedthe content of the preceding experimental sentence, or not. The averaged times wereanalysed (ANOVAs), along with word order (subject–object vs.

object–subject), verb class (active verbs vs. object–experiencer verbs) and ambiguity (Bornkessel, Zysset, Friederici, Cramon, Schlesewsky, 2005). Their results showed thatin both regions, object-initial unambiguous sentences with active verbs activationwas significantly higher than their subject-initial counterparts, a patternwhich was reversed for sentences with object–experiencer verbs.

The parsopercularis of the left IFG, left IFJ, left ventral PMC, posterior left STG andright IPS showed that there was no interaction with ambiguity. These areasshowed higher activation for object- vs. subject-initial sentences with activeverbs, except for the left IFJ for which additional analysis revealed that bothsubject- and object-initial structures with object–experiencer verbs causedintermediate activation. However, only the posterior STS was sensitive tomorphological information of the arguments. This distinction between inferiorfrontal and posterior superior temporal regions reflects the involvement of thepars opercularis in " the linearization of hierarchical interpretive dependencies" (p. 230) and the crucial role ofthe posterior STS in the inference of agency. These results suggest that activation in these regions correlates withproperties of the syntax–semantics interplay and the degree of difficultyassociated with the establishment of relations between arguments (Bornkessel, Zysset, Friederici, Cramon, Schlesewsky, 2005).

According to Thierry et. al, (2000), there are differentlevels of process with regards to words; there is semantic, syntactic andphonologic levels. In their experiment 24 subjects, werepresented with monosyllabic French nouns which they had to judge semantically, or syntactically. For the semantic task, they had two variants: a) displaying two natural objects (e. g.

' Queue Mouette', meaning ' Tail Seagull') and b) othercombinations or " manufactured objects" (e. g. ' Pull Fouet', meaning ' Pullover-Whip') versus other combinations" (Thierry, Cardebat, Dimonet, 2000, p. 320). Forthe syntactic task, they had the following two variants: a) if the first word relatedto the target category subjects could answer without further information(RELEASE condition) and b) if it did not, then they had to process

the secondword as well to give an answer (HOLD condition). To measure speed differencesof semantic and syntactic processing they recorded ERPs at the first noun, whichwas analysed with MANOVA calculations and t-tests. A first semantic splitoccurred before the first syntactic split, suggesting semantic processing begunbefore gender information was considered.

However, semantic processing tooklonger than syntactic processing suggesting temporal embedment in semanticanalysis (Thierry, Cardebat, Dimonet, 2000). Theirresults supported that semantic and syntactic processing is parallel andindependent.