

Bekemeier, N., Brenner, D., Biermann-Ruben, K. & Indefrey, P. (2017) The Processing of Conceptual Shifts: an ERP Study. Conference: the 9th Annual Meeting of the Society for the Neurobiology of Language (SNL), Baltimore, USA: November 8-10.

Abstract:

The theory of concept types and determination (Löbner, 2011) differentiates between four concept types – sortal (*a stone*), individual (*the sun*), relational (*his ear*), and functional (*his father*) – and posits that these require a certain inherent determiner type. If a given concept is combined with an incongruent determiner, it is shifted to the respective type: *a stone (sortal)* – *his stone (relational)*. In a series of auditory behavioural studies, Brenner (2015) provided evidence for an overall concept type (CT) congruence effect, with congruent determiners triggering faster lexical decision times (RT) on the subsequent noun than incongruent ones. This facilitating effect was considered to reflect early post-lexical build-up of noun phrases. The objective of the present ERP study was to establish neural correlates of concept type shifts, i.e. to find out whether the determiner congruence effect could be indexed by such classical ERP components as N400, LAN or P600. We argued that if congruent or incongruent determination affects the lexical retrieval of the noun, it should be reflected in the amplitude of the N400 component. If, however, concept type shifts are supported by the same neuronal mechanisms that underlie (morpho-)syntactic processing, incongruent determination should trigger LAN or/and P600.

To test our hypothesis, we compared the processing of nouns of four concept types in congruent (C) and incongruent (I) determiner phrases with the processing of nouns in nominal phrases with matching, semantically mismatching and gender mismatching adjectives. The incongruent condition was built in such a way that the determiner, though grammatically correct, was only likely within a certain context: sortal (C/ I) – **ein** Stein/ **der** Stein (a stone/ the stone), individual (C/ I) – **der** Papst /**sein** Papst (the pope/ his pope), relational (C/ I) – **sein** Ohr/ **das** Ohr (his ear/ the ear), functional (C/ I) – **seine** Mutter/ **eine** Mutter (his mother/ a mother). The violation conditions in the nominal phrases were less subtle: control – **genaues** Datum (exact date), semantic mismatch – **schlichtes** Datum (simple/plain date), gender mismatch – **genauer** Datum (exact (m.) date (n.)).

The results of the study revealed an N400 effect elicited by the semantically mismatching adjectives at around 300 msec post uniqueness point of the noun. The gender violation condition triggered a biphasic LAN-P600 effect. The concept type shifts failed to elicit a significant semantic or syntactic violation effect.

Although behavioural studies demonstrated a facilitation effect of congruent determiner type on the speed of word recognition, we could not establish a neural correlate of this effect. The reason could be two-fold: first, the conceptual shift might be too subtle to be traced by the electrophysiological techniques; and second, considering the overall grammaticality of the conceptual shift, the present paradigm – presentation of individual phrases – might not be suitable for the investigation of determiner congruence.