Psycholinguistic Evidence for Conceptual Types and CT-Shifts

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According to Löbner's (2011) theory of *Conceptual Types and Determination* (short: *CTD*), nouns and their respective concepts can be divided into four *conceptual types* (short: *CT*) according to their inherent referential properties (see table 1). Each of these types has a preferred contextual profile, i.e. it is typically used with a certain *determination type* (short: *DT*). Table 1 shows typical (i.e. *congruent* or *matching*) DT for each CT indicated by "✓" and atypical (i.e. *incongruent* or *mismatching*) DT indicated by "↦".

	[–U]	**inherently unique [+U]**
[–R]	**SORTAL – SC** *apple cigarette moment human* ✓**indefinite**, plural, dem., quant. ↦singular definite ✓absolute ↦relational, possessive	**INDIVIDUAL – IC** *pope earth weather Police* ↦indefinite, plural, dem., quant. ✓singular **definite** ✓absolute ↦relational, possessive
inherently relational [+R]	**RELATIONAL – RC** *colleague arm page idea* ✓**indefinite**, plural, dem., quant. ↦singular definite ↦absolute ✓relational, **possessive**	**FUNCTIONAL – FC** *mother body age birth* ↦indefinite, plural, dem., quant. ✓singular **definite** ↦absolute ✓relational, **possessive**

Table 1: Concept Types and Determination (modified Version of Löbner, 2011:307)

If nouns that belong to a particular CT occur in the context of incongruent DT, the interpretation requires a reanalysis process, a *conceptual type shift (short: CT-shift)*, coercing the noun to match the required referential properties of the DT (Löbner, 2011:307ff). From the CTD we can derive two basic assumptions:

(1) **Underlying CT**: CT-information is lexically stored, thus most nouns have one underlying concept type.
(2) **CT-shifts**: The use of a noun with an incongruent DT leads to a shift of the CT, so that its referential properties then match the ones required by the DT.

In the following example (a) *Papst* is an individual concept [+U, –R]. In a) it is used congruently with the definite article.

a) Der Papst wohnt in Italien.
(*The Pope lives in Italy*.)
b) Johannes Paul II. war ein freundlicher Papst.
(*John Paul II. was a friendly pope.*)

The indefinite article 'ein' in (b) requires a SC [–U, –R], thus we have an incongruity between CT and DT in (b). We assume that the interpretation of (b) leads to a CT-shift

due to CT-DT- incongruity: the referential properties of the IC 'Papst' are changed from [+U, –R] to [–U, –R], to match the values required by the DT 'ein'.

From a psycholinguists view the question arises, if there is any empirical evidence for the cognitive reality of the acclaimed conceptual types and for CT-shifts being reanalysis processes in the semantic processing of utterances. Our predictions resulting from the assumptions mentioned above are the following:

(1) If CT-information is lexically stored, congruent DT should facilitate the lexical access of the following noun.
(2) If CT-shifts due to incongruent DTs are additional cognitive processes, they should be time consuming and slow down response times.

To investigate this question we conducted a series of psycholinguistic experiments with German nouns using the lexical decision paradigm, as it accesses lexical as well as post-lexical processes and thus taps into both levels of processing (c.f. Marselen-Wilson, 1990). Participants were presented with 80 German noun phrases containing combined instances of DT and CT (20 nouns per CT). We combined each of these nouns with each of the following DTs - indefinite, definite or possessive determiner, or no determiner at all (realized with a neutral filler stimulus 'xxxx'). These combinations allowed us to compare congruent (e.g. 'die Mutter'), incongruent (e.g. 'eine Mutter') and no-determination (e.g. 'xxxx Mutter') DT-CT-combinations. In addition we used 80 pseudo nouns which were mixed amongst our target nouns randomly. While our subjects performed a visual or auditory lexical decision task ("*Word or pseudoword?*") we measured the reaction times of the subjects´ lexical decision responses.

Our data showed main effects of CT (SCs and FCs were processed faster than ICs and RTs) and DT (responses to nouns that were not preceded by a determiner were slower than responses to nouns preceeded by a determiner). Given that all determiners were inflected for gender, the DT main effect is most likely due to gender congruency (c.f. Vigliocco et al., 2004; Bölte et al., 2004). More importantly, there was an interaction effect between DT and CT: nouns presented with CT-congruent determination evoked faster responses than nouns in incongruent contexts. When taking into account the magnitude of the gender congruency effect as assessed in a further control experiment, the CT congruency effect seems to be the combined effect of an inhibition for incongruent DTs and a facilitation for congruent DTs.

Our findings are compatible with the assumptions of (1) lexically specified CTs and (2) incongruency-induced CT-shifts as additional cognitive operations. Further investigations are needed to determine the exact processing stages (lexical or post-lexical level), mechanisms (types, directions and micro-processes of CT-shifts), and time course of processing conceptual information.

Bölte, J. & Connine, C. M. (2004). Grammatical gender in spoken word recognition in German. Perception & Psychophysics 66, pp. 1018-1032.

Löbner, S. (2011). Conceptual Types and Determination. Journal of Semantics 28, pp. 279-333.

Marslen-Wilson, W. D. (1990). Activation, competition, and frequency in lexical access. In Gerry T. M. Altmann (Eds.). Cognitive models of speech processing: Psycholinguistic and computational perspectives. Cambridge, MA: MIT Press, pp. 148-172.

Vigliocco, G., Vinson, D., Indefrey, P., Levelt, W. J. M., & Hellwig, F. (2004). Role of grammatical gender and semantics in German word production. Journal of Experimental Psychology: Language, Memory, and Cognition 30, pp. 483-497.