Producing novel compound words in German: A primed picture-naming task

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Background: Compound nouns are frequent in German and novel compounds are generated on the fly to express specific meanings (e.g., Zebrabaum [zebra tree] for a tree with stripes). Because novel compounds have no lexical entry, they are well suited to investigate the processes related to modifier and head during the production of noun compounds. In earlier studies, gender-marked determiner primes (*der, die, das* [the]) were used in a picture-naming task with familiar noun-noun (NN-) compound targets (e.g., $\text{Sekt}_{\text{MASC}}\text{glas}_{\text{NEUT}}$ [champaign glass]) to investigate how compounds are represented lexically [1, 2]. Determiner primes congruent with the compound's head produced significant facilitation across studies. However, no significant effects were present for determiner primes related to the modifier in young adult speakers ([1], but see [2]). The use of existing compounds does not allow to disentangle head-related effects from effects related to the compound as a whole. The present study therefore used depictions of novel concepts (e.g., a tree with stripes = zebra tree) to elicit novel NN-compounds in speech production, using a determiner-primed picture naming task. As novel compounds have no lexical representation, facilitation by congruency between determiner and head can only be due to the head constituent. A second aim was to investigate the specific roles of modifier and head in novel compound production, by analyzing effects of their compositional semantic transparency, their constituent-specific frequency and interactions with constituent-specific priming effects.

Method: A determiner-primed picture–naming task was used with novel NN-compounds as targets. Pictures of modified or merged concepts were used to elicit novel compounds (e.g., a pear-shaped ear: Ohrenbirne [ear pear]; a flower stem with a fish as its blossom: Fischblume [fish flower]). We used 54 line drawings of novel NN-compounds with gender-mismatching constituents ($\text{Zebra}_{\text{NEUT}}\text{baum}_{\text{MASC}}$) that were presented for spoken naming in combination with spoken gender-marked determiner primes. Three prime conditions were used: 1) head-related primes, 2) modifier-related primes, 3) incongruent primes (see Table 1). A group of 41 young neurotypical adults were tested. Head- and modifier-related priming effects on picture-naming accuracies and latencies were analysed. The novel compounds varied with respect to their semantic compositionality and constituent-specific word frequencies, and it was tested how these factors contribute to head- and modifier-related effects ([3, 4]).

Results: Both head- and modifier-related effects were observed in picture-naming accuracies. Determiner-primes that were congruent with the modifier (but not the head) inhibited novel compound production, compared to completely incongruent determiner primes. In contrast, determiner primes congruent with the head marginally facilitated novel compound production. In contrast to our predictions, no modifier-related effects were observed in response latencies, while significant effects were found when determiner and head matched for gender (Figure 1). Furthermore, this congruency effect was stronger when the semantic compositionality of heads was high, and their frequency low (Figure 2). This interaction was not observed for the modifier (cf. [4]).

Discussion: Different effects for the constituents of novel compounds were confirmed. Response accuracies showed that modifier-related primes inhibited, while head-related primes facilitated novel-compound naming. In response latencies, only head-related primes produced significant effects. Furthermore, a three-way interaction between semantic compositionality, constituent-specific frequency and determiner priming was observed for the head constituent but not for the modifier. The data will be discussed in relation to previous studies ([1–5]).

Prime Condition	Prime	Target
Head congruent	der_{MASC} [the]	
Modifier congruent	das_{NEUT} [the]	
Incongruent	die_{FEM} [the]	$Zebra_{NEUT}baum_{MASC}$

Table 1: Experimental conditions in determiner-primed picture naming task.

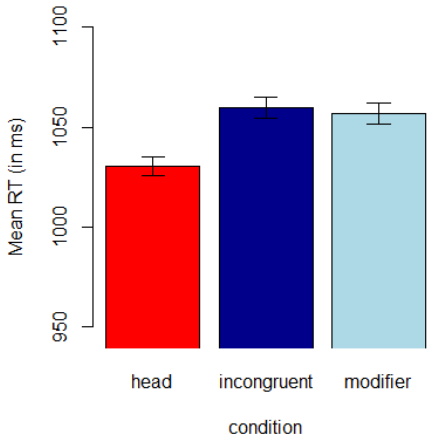

Figure 1: Mean naming latency separated by prime condition.

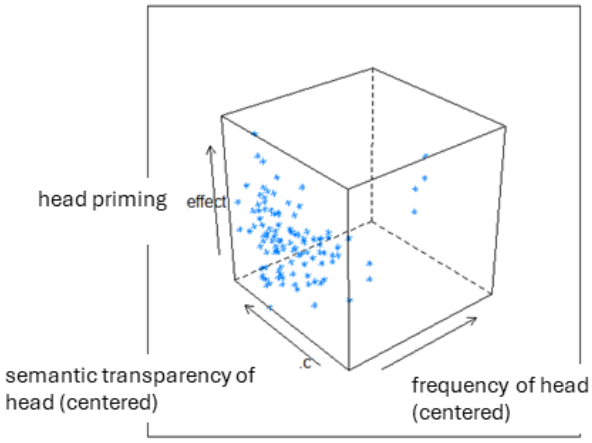

Figure 2: Three-way interaction: stronger head priming with higher semantic transparency and lower frequency of head.

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