Spontaneous semantic associations of German verbs: Giving ontological and functional structure to speakers' elicited concepts

Alissa Melinger and Sabine Schulte im Walde
Computational Linguistics and Psycholinguistics
Saarland University
{*melinger,schulte*}*@coli.uni-sb.de*

This work is concerned with an investigation of spontaneous semantic associations. We performed a web experiment where linguistic experts and non-experts were asked to spontaneously list semantic associations for German verbs. The elicited conceptual knowledge was then given ontological structure based on codes from the psycholinguistic ontology GermaNet as well as linguistic functions obtained from statistical corpus parses. The investigation is directed towards discovering and specifying the structural and conceptual types of verb associations, stemming from an interest in identifying salient conceptual components and relationships.

Web Experiment: The online web experiment (http://www.coli.uni-sb.de/˜schulte/cgi-bin/verb-exp-04/) asked native German speakers to list spontaneous associations for a total of 200 German verbs. For each verb, speakers were asked to produce as many associates as possible within a 30 second time limit. The verbs were drawn from a variety of conceptual domains (such as manner of motion, cognition, commercial transactions, etc.) and varied in corpus frequency (Schulte im Walde, 2003, chapter 2).

Linguistic Analysis of Experiment Data: The verb associations were investigated on three linguistic issues. We were interested in the type of semantic relationship typical associates established with the target verb. For example, whether verb responses refer to particular semantic relations (such as synonyms, antonyms, hypernyms), whether noun responses are typical argument holders of verb valency, whether adjective responses describe conceptual attributes, and whether adverb responses provide aspectual information. To address these questions, we conducted the following analyses:

1. We distinguished the responses with respect to the major parts-of-speech: nouns, verbs, adjectives and adverbs.
2. For each verb associate, we looked up the semantic relation between the target and response verbs using GermaNet (Kunze, 2000), which encodes a total of 8,810 German verbs and the semantic relations synonymy, antonymy, hypernymy/hyponymy, entailment and cause between verbs. Based on the GermaNet relations, we could distinguish between the different kinds of verb associations elicited from speakers. For example, the associate response "hetzen" for "hasten" (both meaning: to rush) are synonyms of each other, but the associate response "bewegen" (to move) is a hypernym for verbs such as "rennen" (to run), "rollen" (to roll), "fließen" (to float). With these distinctions, we can identify what kinds of verb concepts are evoked by the target verbs.

3. We investigated the kinds of linguistic functions that are realised by noun associations of the verbs: The German statistical grammar model contains empirical information on linguistic functions and head-head relationships. We used this information to determine the linguistic functions for each noun associated with a certain verb. For example, the German noun ”Haus” (house) associated with the verb ”bauen” (to build) appeared 77 times (7.4% of all nouns in that specific relationship), and the noun ”Wohnung” (appartment) appeared 62 times (6.0%) as the direct object of the verb. By this functional and empirical information we can refer to typical conceptual roles which speakers have in mind.

Outlook: Our work not only provides an association database for German verbs, but furthermore allows insight into the types of salient relationships we observe for verb associations. Further work will continue the semantic investigation with respect to e.g. a comparison of elicited verb associations with the contextual window approach, or an analysis of verb associations for the purpose of automatic verb classification.