

# Syntactic Priming in German: Priming of dative and voice alternation using sentence recall

Mirko Hanke\*, Sandra Pappert, and Thomas Pechmann (\*Correspondence: public@mirkonet.de)

## Introduction

Syntactic priming effects could be shown in experiments using English language material. Particularly, the dative alternation and the active/passive voice alternation have been shown to be primeable experimentally (e. g. Bock & Loebell, 1990; Pickering & Branigan, 1998). Priming of the dative alternation has been shown for German before, for instance by Melinger and Dobel (2005). However, so far priming of voice has been difficult to show for German (cf. Hadelich, Crocker, & Scheepers, 2003; Loebell & Bock, 2003). The experiments reported here aimed at showing syntactic priming effects for the dative and voice alternation in German, using the 'immediate sentence recall' paradigm (Potter & Lombardi, 1998) which was recently employed by Chang, Bock, and Goldberg (2003) to show syntactic priming of the dative alternation in English.

## Hypothesis

We assumed that the structure of a prime sentence exerts an influence on the subsequent production of a target structure. An alteration of the target structure was hypothesised to occur more frequently when the syntactic structures of prime and target sentences were not identical, rather than identical. We hoped to elicit syntactic priming effects for the dative alternation in German, as have been shown before with other paradigms. Apart from that we wanted to find out whether the immediate recall paradigm can be used to show syntactic priming effects for the voice alternation in German.

## Experiment 1: dative alternation

### Critical conditions

Prime sentence	Target sentence	Prime and Target structure are
double object (DO)	double object (DO)	identical
prepositional obj. (PO)	prepositional obj. (PO)	identical
prepositional obj. (PO)	double object (DO)	not identical
double object (DO)	prepositional obj. (PO)	not identical

Four sentence pairs per prime-target combination.

### Materials

- transfer datives
  - Die Airlines übermitteln den USA eine Menge Daten. (The airlines transmit [the US]-Dat [a lot data]-Acc. *The airlines send the US a lot of data.* (double object (DO) structure)
  - Die Airlines übermitteln eine Menge Daten an die USA. (The airlines transmit [a lot data]-Acc to the US. *The airlines send a lot of data to the US.* (prepositional object (PO) structure)
- benefactive datives
  - Der Friedrich zeichnet dem Robert eine Illustration. ([The Friedrich]-Nom draws [the Robert]-Dat [an illustration]-Acc. *Friedrich is drawing Robert an illustration.* (double object (DO) structure)
  - Der Friedrich zeichnet eine Illustration für den Robert. ([The Friedrich]-Nom draws [an illustration]-Acc for [the Robert]-Acc. *Friedrich is drawing an illustration for Robert.* (prepositional object (PO) structure)

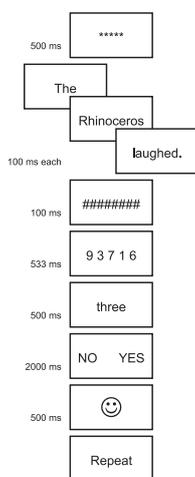
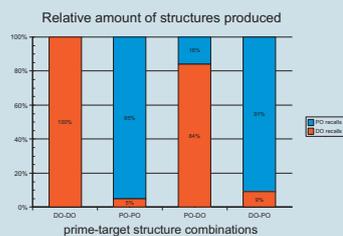
In order for critical items not to stand out too much from the other sentences, two different types of dative construction were used: 'transfer' datives and 'benefactive' datives (cf. Chang et al., 2003). However, both types were not combined in prime-target sentence pairs.

### Results

For the statistical analysis the four conditions were collated into two, 'identical' and 'not identical'. **Sign test:** subject-specific analysis ( $N=13$ )  $p<0.01$  (one-tailed); item-specific analysis ( $N=15$ )  $p<0.01$  (one-tailed).

### Discussion

The outcome corroborates the results of earlier studies on the priming of the dative alternation in English and German (cf. Melinger & Dobel, 2005, who used a different paradigm, however). The sentence recall paradigm appears to be suited to demonstrate syntactic priming effects.



Trial scheme, adapted from Chang et al. (2003)

### Procedure

- 33 subjects were tested;
- both experiments were effectively carried out in one session;
- each experiment's items served as fillers for the other experiment;
- 192 additional designated filler sentences;
- items for experiment 1 were adapted from the materials used by Loebell and Bock (2003) and Chang et al. (2003);
- dependent variable: count of (semantically correct) repetitions of the target sentence in one of the two structures in question;
- the statistical analysis was carried out using a sign test (cf. Siegel, 1987).

### Problems

- Data obtained was not normally distributed and did not show any variance under some conditions (no analysis of variance possible);
- low number of cases used for calculation of significance.

## Experiment 2: voice alternation

### Critical conditions

Prime sentence	Target sentence	Prime and Target structure are
active	active	identical
passive	passive	identical
passive	active	not identical
active	passive	not identical

Four sentence pairs per prime-target combination.

### Materials

- inanimate CAUSE/animate PATIENT
  - Der Feuerwehrmann wurde von dem Hydranten nassgespritzt. ([The fireman]-Nom was by [the hydrant]-Dat drenched. *The fireman was drenched by the hydrant.* (passive structure)
  - Der Feuerwehrmann hat der Hydrant nassgespritzt. ([The fireman]-Acc has [the hydrant]-Nom drenched. *It was the fireman whom the hydrant drenched.* (active structure)
- inanimate CAUSE/inanimate PATIENT
  - Der Apfel wurde von dem Pfeil durchbohrt. ([The apple]-Nom was by [the arrow]-Dat pierced. *The apple was pierced by the arrow.* (passive structure)
  - Der Apfel hat der Pfeil durchbohrt. ([The apple]-Acc has [the arrow]-Nom pierced. *It was the apple that the arrow has pierced.* (active structure)

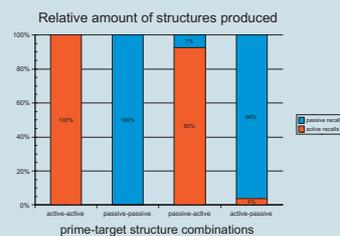
We assumed that events with animate AGENT and inanimate PATIENT would lead to a strong bias in favour of active sentences (cf. Bock et al., 1992). For this reason only events with inanimate AGENT and animate PATIENT, as well as events with inanimate AGENT/CAUSE and inanimate PATIENT were used for this experiment. The two animacy options were treated separately and were not combined in pairs.

### Results

Again, for the statistical analysis the four conditions were collated into two, 'identical' and 'not identical'. **Sign test:** subject-specific analysis ( $N=5$ )  $p<0.05$  (one-tailed); item-specific analysis ( $N=9$ )  $p<0.01$  (one-tailed).

### Discussion

The result basically supports the assumption that voice of a sentence can be primed, and that this is possible in German as well. To our knowledge, the immediate recall paradigm has so far not been applied to show syntactic priming of voice, even in English.



## Conclusions

- Experiment 1, testing dative alternation items, provides evidence that the sentence recall method is a valid means for testing structural priming effects in German;
- the results of experiment 2 indicate that active and passive voice can be primed in German and that priming of the voice alternation can be shown using the sentence recall paradigm.

Syntactic priming effects can be explained within a representational framework, like WEAVER++ (Levett, Meyer, & Roelofs, 1999) with additional assumptions made by Pickering and Branigan (1998) and Hartsuiker, Pickering and Veltkamp (2004).

## Questions for further research

- Is an experimental separation of functional and positional processing possible? German might pose a suitable research subject, since it allows word order variations that are not possible in English and that let experimenters control the order of arguments independently of their syntactic function;
- why is priming of voice alternation more difficult to show than priming of the dative alternation?

## References

Bock, K. (1986). Syntactic Persistence in Language Production. *Cognitive Psychol*, 18, 355-87.  
 Bock, K. & Loebell, H. (1990). Framing Sentences. *Cognition*, 35(1), 1-39.  
 Bock, K., Loebell, H. & Morey, R. (1992). From conceptual roles to structural relations: bridging the syntactic cleft. *Psychol Rev*, 99(1), 150-71.  
 Chang, E., Bock, K. & Goldberg, A. E. (2003). Can thematic roles leave traces of their places? *Cognition*, 90, 29-49.  
 Hadelich, K., Crocker, M. W. & Scheepers, C. (2003). *Patients first: Visual versus syntactic priming in German*. Poster presented at 16th CUNY Conference on Human Sentence Processing, Boston, USA (Reproduction, retrieved 14 May, 2006 from [http://www.coli.uni-sb.de/~hadelich/docs/kerstin\\_cunypdf](http://www.coli.uni-sb.de/~hadelich/docs/kerstin_cunypdf)).  
 Hartsuiker, R. J., Pickering, M. J. & Veltkamp, E. (2004). Is syntax separate or shared between languages? Cross-linguistic syntactic priming in Spanish-English bilinguals. *Psychol Sci*, 15(6), 409-14.  
 Levett, W. J. M., Roelofs, A. & Meyer, A. S. (1999). A theory of lexical access in speech production. *Behav Brain Sci*, 22(1), 1-38.  
 Loebell, H. & Bock, K. (2003). Structural priming across languages. *Linguistics*, 41(5), 791-824.  
 Melinger, A. & Dobel, C. (2005). Lexically-driven syntactic priming. *Cognition*, 98(1), B11-B20.  
 Pickering, M. J. & Branigan, H. P. (1998). The representation of verbs: Evidence from syntactic priming in language production. *J Mem Lang*, 39(4), 633-51.  
 Potter, M. C. & Lombardi, L. (1998). Syntactic priming in immediate recall of sentences. *J Mem Lang*, 38(3), 265-82.  
 Siegel, S. (1987). *Nicht-parametrische statistische Methoden* (3rd ed.). Eschborn: Fachbuchhandlung für Psychologie.