

# Syntactic Characteristics of Particle Verbs: Empirical Evidence for Complex Predicate Processing in German

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## Abstract

In this study, we explore empirical aspects of the processing of particle verbs in German from a syntactic-topological point of view. Particle verbs in German form a very heterogeneous group and have given rise to a long-term and still ongoing linguistic debate. The particle and the verb split apart in main clauses, but movement of the particle seems to be very restricted – especially in the middle field – compared to normal phrasal constituents in a sentence. In a series of experiments, we tested empirically the conditions allowing particles to appear in different positions in a sentence, contrasting them to phrasal constituents. In one of these experiments, we tested this difference by applying a self-paced reading paradigm combined with acceptability judgements. Results show that semantically transparent adjectival particles behave differently from phrases both in terms of acceptability ratings and particle/phrasal constituent reading times. Overall, particles occurring in the middlefield are judged as rather non-acceptable compared to phrases. In the prefield, however, readers seem to be uncertain about the status of the particles, judging them as more acceptable than in the middlefield but less acceptable than in the default position and showing longer reading times for particles than in the other topological positions. This underlines the special status of particle verbs and the need of syntactic description of this verbal class.

## 1 Introduction

This paper has as its subject the group of verbs in Germanic languages that are known as particle verbs (for German cf. Lüdeling 2001; Zeller 2001; Heine & al. 2010, Dutch: Booij 2002; English: Olsen 1998; McIntyre 2001). They consist of at least two parts, a particle and a full verb, where the particle can be of any word class, i.e.

prepositional (*untergehen*), nominal (*kopfrechnen*), adjectival (*schönreden*), adverbial (*zusammenkommen*) or verbal (*kennlernen*). These verbs are known to be problematic for a systematic morphosyntactic analysis. They have lexical entries as complex constructions, their special characteristics, however, cannot be described but in terms of syntactic distribution. The relevant features of particle verbs are (Oehl 2009):

(1) In contrast to morphologically complex verbs like prefixed verbs, the particle separates from the verb in V2-sentences:

*Sie boten dort Waren an.*  
they offered there goods PTC

(2) In contrast to phrasal constituents like the directional adverbial in (b.) below, particles seem to be blocked from movement within the middle field of a sentence. This is the topological position that spans from the finite verb to the end of the verbal bracket in main clauses or from the conjunction to the end of the verb complex.

\*...weil sie *ein* nie zuvor gereist sind  
\*...because they in(PTC) never before travel-  
PART-PERF AUX

(3) However, in all kinds of texts, we find particles that appear in the prefield (the position before the finite verb in V2-sentences; Heine & al. 2010; Zeller 2001) as in

*Auf ging die Tür, zu ging das Fenster*  
open(PTC) went the door, closed(PTC) went  
the window)

Thus, as a rule, these particles are heads forming a syntactically complex predicate together with the main verb. Only in specific cases like (3) above, however, they can be positioned in the prefield. To our knowledge, no empirical evi-

dence has been given showing how permutation of particles is constrained, that is to say, evaluated by listeners in online processing. What we suppose on the grounds of the state of the art and what has to be evaluated by empirical testing is that this is determined by three criteria (Oehl, 2009). These are:

- Phrasal status: A particle can be analysed as heading a phrase in that position.
- Semantic transparency: the meaning of both components is transparent, such that the particle verb can be decomposed without losing its referential properties.
- Discourse semantic markedness: movement of the particle implies focus or contrastiveness.

Since common phrasal constituents like adverbials or depictive secondary predicates are necessarily semantically transparent and can be permuted with less restrictions, we started out exploring the empirical correlates of the distinction between such autonomous phrases and particles belonging to the complex predicate. In order to find out whether reading times reflect the distinction or/and are correlated with the (grade of) acceptance, we used a self-paced reading paradigm in combination with an acceptability judgement task.

## 2 Experiment

In the following experiment, we are testing two hypotheses:

- (1) Phrasal constituents should be more acceptable in fronted positions within the middle field than particles which – in linguistic descriptions – are blocked from that position. Phrases are less restricted in their ability to move throughout the middlefield. Overall, higher processing costs are predicted for the middlefield vs. default position in either phrasal constituent or particle condition (Bader & Meng, 2000; Bader, Meng & Bayer, 1999; Bornkessel, Schleewsky, 2006).
- (2) Concerning movement to the prefield position, we do not expect differences between particles and phrasal constituents as long as the criteria above, i.e. semantic transparency and phrasal status, apply (cf. Oehl: 2009).

### 2.1 Method

#### 2.1.1 Material

The particles used in the first experiment are adjectival and semantically transparent. They com-

bine with the positional verb *halten* ('hold'). This verb was chosen because it can be used with a modal adverbial (phrasal constituent) instead of the particle. 16 particles were used in this experiment: *warm, hoch, still, feucht, dicht, frisch, wach, rein, frei, bereit, gesund, sauber, ruhig, heilig, trocken, geheim*<sup>1</sup>. 16 adjectival modal adverbials were: *vorsichtig, lässig, zitternd, mühe-los, mühsam, achtsam, behutsam, unbeholfen, zärtlich, sanft, stolz, liebevoll, ungeschickt, geduldig, widerwillig, lustlos*<sup>2</sup>. Test sentences were created by permutating phrasal constituents and particles between the following positions in the sentence:

- Base/Default Position (Df): Ich habe die Fahne **hoch** (PTC)/**stolz** (adverbial) gehalten.  
*I – have – the – flag – **high/proudly** – held*
- Middlefield Position (Mf): *Ich habe **hoch/stolz** die Fahne gehalten.*
- Prefield Position (Pf): ***Hoch/Stolz** habe ich die Fahne gehalten.*

We created 16 sentences that we tested on the basis of two factors (Syntactic Status, Topology) with 2 (particle, phrase) and 3 conditions (Def, Mf, Pf) respectively. Overall, 96 test sentences resulted from that. Furthermore, we added 102 filler sentences. The material was organised in 4 lists, each containing 150 sentences in three blocks of 50 sentences which were randomised per participant. Each participant was tested on 48 test sentences (only one sentence per topological condition) to avoid repetition priming. In a pre-test, two people judged the default sentences for their semantic comprehensibility.

#### 2.1.2 Procedure

We used a word-by-word self-paced reading paradigm (moving window, Just et al., 1982) using the DMDX software. Participants read sentences word-by-word in their own reading speed on a monitor. They pressed a key to get each word of the sentence. The word was uncovered by the key press and by the next press, it was again replaced by dashes. The key press after the last word of the sentence either revealed a ques-

<sup>1</sup> Translation: warm, high, calm, humid, leak-proof, fresh, awake, clean, free, ready, sane, neat, quiet, holy, dry, secret.

<sup>2</sup> Translation: carefully, casually, trembling, effortlessly, drudgingly, attentively, cautiously, awkwardly, tenderly, gently, proudly, lovingly, clumsily, patiently, grudgingly, half-heartedly.

tion that asked the participant to judge the acceptability of the previously read sentence (4-point scale: 1 = very acceptable, 2 = acceptable, 3 = less acceptable, 4 = not acceptable) or the next test trial. Before the test started, participants went through 12 training sentences.

### 2.1.3 Participants

32 students of the university of Munich (LMU) participated in the experiment.

## 2.2 Results

### 2.2.1 Acceptability judgements

A repeated measures ANOVA (subject-based) with the Factor Topology and dependent variable Acceptability rating was conducted overall and for each Syntactic Status condition separately. We found significant differences in the particle condition, but not in the phrasal constituent condition (s. figure 1). In the particle condition ( $F=128.51$ ,  $df = 2$ ,  $p < 0.001$ ) all three topological positions differed significantly from one another with the lowest acceptability rates for the middlefield.

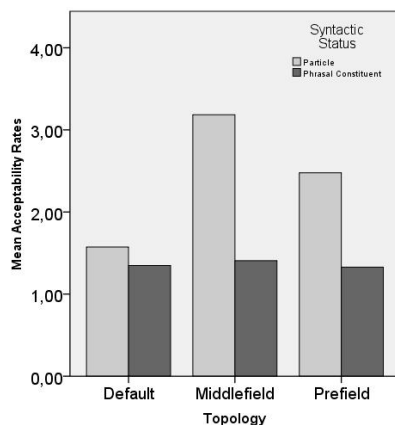


Figure 1: Mean acceptability rates according to Syntactic Status.

Furthermore, in the Particle condition, some of the 16 items showed deviant acceptability rates (see Fig. 2) which resembled the results for phrasal constituents for the particle *still* ('calm') with very high acceptability but non-significant throughout the topological conditions, furthermore *gesund* ('healthy') and *heilig* ('holy') had non-significant and very low acceptability rates.

### 2.2.2 Reading Times

The reading times of each word of the sentence were cumulated to a whole sentence reading time. Particle/phrasal constituent reading times and verb reading times were also taken into ac-

count. First, a repeated measures ANOVA (Factors: Topology, Syntactic Status) was performed for the variables overall reading time and particle/phrasal constituent and verb reading time. No significant effects were found for overall reading times and verb reading times. However, particle/phrasal constituent reading times differed according to topological position ( $F=3.225$ ,  $df=2$ ,  $p < 0.05$ ).

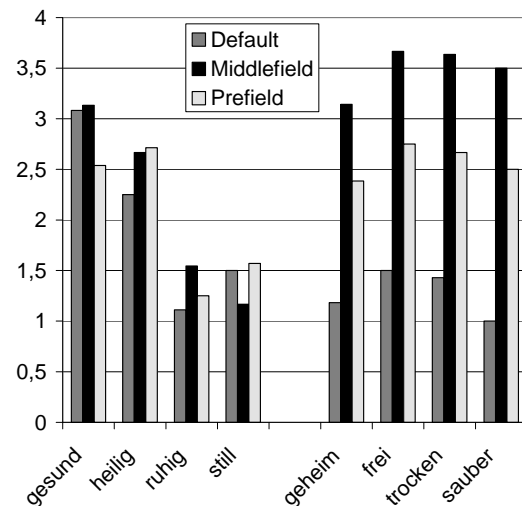


Figure 2: Deviant acceptability ratings of the four particles *gesund*, *heilig*, *ruhig*, *still* contrasted to four particles (*geheim*, *frei*, *trocken*, *sauber*), following the general response pattern.

A repeated measures ANOVA (Factor: Topology) was conducted for each Syntactic Status condition separately and revealed the following highly significant effects: in the particle condition particle reading times differed significantly ( $F=6.35$ ,  $df=2$ ,  $p < 0.005$ ), pairwise comparison of the topological positions shows that this is due to significantly longer reading times for the particle in the prefield (mean = 448 ms) compared to middlefield (mean = 390 ms) and default (mean = 393 ms), but no difference was found between middlefield and default position. In the phrasal constituent condition, the constituent reading times show a different picture: the overall significant difference between the topological positions ( $F = 3.91$ ,  $df = 2$ ,  $p = 0.05$ ) is due to significantly longer reading times of the phrasal constituent in the middlefield (mean = 475 ms) compared to the default (mean = 398 ms) and prefield (mean = 421 ms).

## 3 Discussion and Conclusions

Results confirm parts of our first hypothesis, namely that particles are less to non-acceptable

when fronted in the middlefield compared to phrasal constituents that are highly acceptable in this position. However, only phrasal constituents – as already shown in the literature – and not particles showed significantly longer reading times in this position. We hypothesize that this is the case because readers, in the specific task of this experiment, instantly evaluate the non-acceptability of a particle when encountering it in the middlefield. Our second hypothesis that the prefield condition should be comparable for both particles and phrasal constituents was not confirmed. Whereas phrasal constituents were highly acceptable in this position, particles were yet judged better than in the middlefield but less acceptable than in the default position. Furthermore, reading times for particles in the prefield increase significantly compared to the default or middlefield position. One reason for this pattern could be that readers are somehow uncertain about the status of the particles in the prefield. This might be due to the fact that in this experiment, one of the criteria for fronting of particles to the prefield (Oehl, 2009) – discourse semantic markedness – might not have been as obvious to the readers as it should be for full acceptability of particles in the prefield. We think that emphasis of potential discourse semantic features of those particles (focalizing, contrasting with other particles, addition of more contextual information) might further improve their acceptability, as their phrasal status would be more obvious. This has to be left for further testing.

Some particles showed a pattern in acceptability rates divergent from that of other particles. The particle *still* ('calm') for example which had overall high acceptability rates in all topological positions seems to be ambiguous: it follows the phrasal constituent pattern and seems to be interpreted as a modal adverbial in those positions that were dispreferred for a particle reading. The different pattern found with the particle verbs *gesund halten* and *heilig halten* may be due to the fact that they are relatively infrequent and therefore might have been judged as rather unacceptable due to non-familiarity with the construction. Thus, frequency and semantic content of individual particle verbs should be considered in further testing.

One restriction of the experiment was the exclusive use of the verb *halten* 'hold', which may be semantically bleached if combined with particles. We therefore conducted another experiment (which we have not the space to present here, but see Oehl & Falk (forthcoming), where we in-

cluded additional verbs with semantically more concrete meanings as *trinken*, *bügeln*, *binden*, *schlagen*, *klopfen*, *kochen*<sup>3</sup>. This experiment replicated the results described above in terms of acceptability ratings in the different topological positions found with the verbal base *halten*. We therefore think that our results are valid and generalizable to the whole class of particle verbs. To conclude, this study shows that particle reading times combined with acceptability judgements constitute empirical correlates that can be employed for further testing of syntactic characteristics of particle verbs. The topological options distinguish the verbal particles from common phrasal constituents. This underlines their special status as parts of syntactically complex predicates and the need for a differentiated syntactic description of the class of particle verbs.

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<sup>3</sup> Translation: drink, iron, bind, beat, knock, cook.

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