The conceptual inactiveness of implicit arguments: Evidence from particle verbs and object categorization

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ABSTRACT
The linguistic system generalizes over rich conceptual structures and, at the same time, has to guarantee that the correct inferences can be drawn as to what the message is intended to convey. In this context the question needs to be answered whether entities not realized in grammar, i.e. implicit arguments, are a necessary part of the interpretation of the expression. In this paper it will be shown that this is not the case with particles (as in 'stick s.th. on'), which do not realize a reference object as their prepositional pendants do ('stick s.th. on s.th.'). The findings lead to the conclusion that any truth-conditional description of implicit arguments should discard them as being conceptually inactive and information-structurally irrelevant. As will be shown, it is only under specific contextual conditions that a construal of the corresponding argument is coerced. Only then the semantic representation needs to be adjusted, which can be characterized as an instance of lexical re-analysis. Departing from theoretical evidence it will be shown that with particles no reference object is conceptually active on the basis of two reaction time studies with an object categorization task: It is only full prepositions that prime a potential reference object which is revealed by the reaction to conceptually congruous target line drawings presented just after both prepositions and particles. In this context, two additional aspects will be dealt with. First, the type of priming triggered by inherent sortal information (as in stick the label on the …) needs to be discussed. It will be shown that a semantic fit between the sortal restrictions activated by the preposition and a depicted object results in inhibitory effects. Second, there is evidence that certain grammatical information (such as gender) about an object expression does not enter the conceptual processing of a corresponding target object drawing, which is revealed by the fact that modifying grammatical information in the linguistic prime material proves to be irrelevant for the procedural effort the categorization task requires.

1. Introduction
One of the main functions of language is to generalize over complex non-verbal message structures. The language system generates highly compact linguistic material which, however, must still enable the recipient of the corresponding linear grammatical sequence to fully infer the intended message. Departing from this assumption it is evident that a definition of the generali-
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underlying the linguistic representations of (1b–d). Generally, in the linguistic as well as the psycholinguistic literature implicit arguments are considered a necessary part of the interpretation of the predicate and its grammatical (i.e. lexical or syntactic) representation (cf. e.g. Mauner et al. (1995); Roeper (1987); Williams (1987)). To prove this, with most of these analyses tests are applied that force a construal of the implicit argument by means of specific contextual embeddings (cf. Section 2.2 also). No evidence can be given, however, whether these readings of the predicates under debate are based on a default representation or whether they derive from the particular contextual requirements the structures are subject to and are thus to be considered the result of lexical re-analysis operations.

In the current paper this issue will be addressed with regard to the phenomenon of compositional particle verbs, where the particle denotes a spatial relation in a fully transparent manner. They represent an interesting test case because particles in German, in contrast to the structures in (1), do not participate in an alternation but are identical in form to their prepositional pendants, which exhibit a more complex argument structure:

\[(2) \quad \begin{align*}
\text{a. Er lehnte das Fahrrad an.} \\
& \text{he leant the bike against} \\
& \text{He leant the bike on.} \\
\text{b. Er lehnte das Fahrrad an die Wand.} \\
& \text{he leant the bike against the wall} \\
& \text{He leant the bike on the wall.}
\end{align*}\]

While the full prepositional phrase *an die Wand* in (2b) involves a reference object (*the wall*) no such argument is predicated over with particles.\(^1\) The particle and the verb arguably form a morphological unit in German (cf. Dehé (2001); Olsen (1997a), (1997b); Stiebels & Wunderlich (1994); Witt (1998) among others). This becomes evident in subordinate verb-final clauses, where the particle remains combined with the verb form (*anlehnen*, ‘against-lean’).

It is clear now that in contrast to most prepositions particles are intransitive. While prepositions denote a situation where an entity (*the bike* as the theme in (2b)) is localized with regard to a region (the an-region in (2)), which is provided by a specific reference object (*the wall*), with particles the theme is localized in a region of a reference object not specified. Although spatial particles and their prepositional counterparts express analogous local situations, the generalization function offers the option of leaving a possible reference object unexpressed thus inducing

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\(^1\) Note that the relation between particle and full prepositional phrase shown in (2) is characteristic of compositional, i.e. semantically transparent expressions only, which are in the center of interest here. In the case of non-compositional particle verbs like *anfeuchten* (‘on-wet’, *moisten*), which express specific event structural conditions (Aktionsart) or lexicalized but still transparent local particle verbs like *anrempeln* (‘on-bump’, *bump into s.o.*) an explicaton of a reference object is blocked (cf. Dehé (2001); Härtl & Witt (1998)). Note that from a procedural vantage point Zwitserlood et al. (1996) have shown that even with non-transparent particle verbs like *umbringen* (‘around-get’, *kill*) the actual semantics of the base verb (*bringen*, ‘get’) is primed. This finding weakens potential arguments brought up with regard to a certain level of lexicalization the transparent verbs examined in the current paper (like *aufrollen* (‘roll up’), see Section 3) might have reached in German.

a focusing on the theme and its localization in a mere region, which is provided by an undetermined object.

Against the background of our discussion the question to be asked here can be further specified: Do we have evidence that with particles a potential reference object is present in the actual underlying conceptual structure of the expression? Earlier studies\(^2\) also investigating the properties of unexpressed arguments have mostly focused on grammatical indications as to what the status of an implicit argument is. However, grammatical factors cannot give us clear evidence as to what the conceptual message underlying the expression accommodates because language-specific restrictions, which are independent of conceptual constellations, may force a certain linguistic realization of the message. This contrast is dealt with in the next section.

2. Implicit arguments: grammar and concepts

The problem just sketched becomes evident when looking at certain grammatical constructions and their apparent implications for corresponding conceptual constellations. Roeper's (1987) treatment of decausative (unaccusative) verbs implies that with them no agentive argument can be implicitly interpreted for no referential dependency can be established between a PRO referring to an obligatorily agentive entity in purpose clauses and a potential agentive entity of an unaccusative, decausative verb complex (3a). In contrast, with (short) passives a corresponding co-referential relation can be established (3b):

\[(3)\]
\[\begin{array}{ll}
\text{a.} & \text{The vase broke in order to PRO collect the insurance.} \\
\text{b.} & \text{The vase was broken in order to PRO collect the insurance.}
\end{array}\]

However, there is no clear indication that the ungrammaticality of (3a) is rooted in the conceptual non-existence of an entity causing the resulting *broken*-state. One could also assume that no referential relation between PRO and a potential causer can be established simply because there is no overt morpho-syntactic marking as is the case with passives formed with an auxiliary thus grammatically encoding a suppression of an agentive entity. Similarly, no referential relation can be established between an unrealized internal argument, which nevertheless is logically understood, of a transitive verb and a pronominal expression (see, however, the discussion in Section 2.2 also). Only by means of an explicit morpho-syntactic marking of the internal argument a corresponding co-reference can be established:

\[(4)\]
\[\begin{array}{ll}
\text{a.} & \text{John is reading. *It cost only $10.} \\
\text{b.} & \text{John is reading something. It cost only $10.}
\end{array}\]

From a procedural vantage point Mauner et al. (1995) and Mauner & Koenig (2000) have shown that information about implicit arguments is derived from linguistic form by measuring the reaction towards purpose clauses following either short passives or intransitivized verb complexes i.e. middles and decausatives. Only the latter, which do not denote an agentive entity, provoke processing difficulties. Again, this does not rule out a purely grammatical source for the ungrammaticality of sentences like (3a), which means that in their underlying conceptualization an agen-

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\(^2\) See Section 2 below.
tive entity could still be present. This is supported by the results in Mauner & Koenig (2000) showing that even if the short passives and middles (or decausatives, respectively) presented are equated for conceptual agent entailments the processing of purpose clauses following middles is made more difficult.

2.1 Theoretical background

So what is the difference between the grammatical and conceptual factors just illustrated based on? Here, I will assume a serial modular model that strictly differentiates a purely linguistic from a conceptual level of language processing (cf. Bierwisch & Schreuder (1992); Härtl (2001); Herweg & Maienborn (1992); Levelt (1989)). The conceptual knowledge base CKB consists of sub-systems organizing language-independent knowledge structures, which are used by the conceptualizer in order to construct a pre-linguistic conceptual structure. This pre-linguistic structure encodes the propositional content CS of the linguistic structure, where referential and information structural values are assigned to the entities involved in an event conceptualization. This information is associated with contextual constellations, which as such are encoded in a contextual structure CT. In the CS/CT complex (or its decompositional structure, respectively) the two prototypical thematic relations PROTO-AGENT and PROTO-THEME are established on the basis of a rule system which processes primitive conceptual features (movement and causality) of entities thus reflecting the propositional function of the entities that are embedded in the conceptual structure (cf. Dowty (1991); Dowty (1998); Härtl (2001), (2002)).

The mapping between the conceptual and the linguistic representations is achieved by a specific interface mechanism—the thematic processor TP (cf. Frazier (1987)). TP operates on information that is associated with the strictly extra-linguistic thematic relations encoded in the CS/CT complex and relates this information to a grammatical representation of the linguistic system (or the formulator following Levelt's terminology). According to Bierwisch & Schreuder (1992) the linguistic system produces a lexico-semantic representation SR encoding all meaning components of the expression that are related to grammatical aspects and that can be derived from the overt, morpho-syntactic parts of it. The strictly linguistically based SR is generated on the basis of the lexicon, which organizes the context-independent meaning of lexical entries according to their argument structural, event structural, and idiosyncratic aspects. Decompositional semantic constants such as the predicates CAUSE, DO, or BECOME encoded in the lexical entries and operated on in SR are directly linked to the syntactic representations of the linguistic system. By means of the semantic constants the thematic constellations explicitly represented in the CS/CT complex are implicitly (configurationally) reflected in SR. The latter explicitly encodes the expression's event structural features (the Aktionsart) only, which are grammatically relevant and from which the thematic constellations can be inferred (cf. Härtl (2001)).

3 Note that here the term formulator is not supposed to imply any kind of processing direction. So far general aspects of language production as well as language comprehension are covered.

4 SR has been formulated within the so-called two-level-semantics approach (cf. Bierwisch (1983) and Bierwisch & Lang (1987)). It allows one to define exactly those components that are visible in syntax and prevents an inflation of meaning representations of lexical entries which adjust their meaning under certain contextual conditions.
2.2 Grammatical and conceptual indications to the status of the reference object

Several tests can be applied in order to reveal the grammatical status of the unrealized argument position in the lexico-semantic representation SR of particles. Consider, for instance, the following examples:

(5)  
   a. Er klebte Etiketten auf die Flasche und an den Projektor.  
       He stuck labels on the bottle and on the projector.
   b. *Er klebte Etiketten auf und an den Projektor.  
       He stuck labels on and on the projector.

In (5b) no conjoining relation between two (i.e. one implicit and one explicit) reference objects can be established, which seems to imply that there is no corresponding argument position present in the SR of the particle construction. The ungrammaticality is rooted in the fact that the conjunction *und* in (5b) illegally combines two expressions of different grammatical types: a dependent morphological unit *auf-* which is part of a complex verb, and a syntactically free prepositional form as the head of a phrasal projection.

Concerning conceptual/contextual constellations it is evident that with particle constructions no referring entity is introduced into the current discourse. Therefore, with fully compositional particle complexes a subsequent adversative constructions cannot involve a potential reference object, see (6a/a'). This is only possible with lexicalized particle constructions, which allow inferences as to what the functionally specified reference object of the prepositional relation (6b/b') is:

(6)  
   a. Maria wollte ein Preisschild aufkleben.  
       Maria wanted to stick on a price-tag.
   a.' #Aber die Flasche war zu glatt.  
       But the bottle was too smooth.
   b. Maria wollte eine Schallplatte auflegen.  
       Maria wanted to put on a record.
   b.' Aber das Gerät war defekt.  
       But the device was broken.

Furthermore, no co-referential relationship between a pronominal expression and a potential implicit reference object can be established (7a). This is possible only with predicates that are equipped with restricted sortal requirements on the entity left implicit in grammar (7b):

(7)  
   a. Hans wirft die Briefe ein. Der wird schon gelb sein.  
       Hans put the letters in. It will surely be yellow.⁵
   b. Sheila heiratet. Der wird schon ein Idiot sein.  
       Sheila gets married. He will surely be an idiot.

Note that in German weak "bridging" pronouns, which always receive their interpretation via implicatures drawn from domain-specific world knowledge⁶ and which are not subject to the

⁵ In Germany post boxes are yellow.
⁶ For a discourse-semantically oriented approach towards bridging see Asher & Lascarides (1998).
conditions of grammatical feature agreement for they occur in neuter only, are preferred with constructions where no nominal expression is explicitly introduced in the previous discourse:

(8) a. Sheila heiratet. Das wird schon ein Idiot sein.
    Sheila gets married. That-NEUTER will surely be an idiot.
    b. Peter liest. Das wird schon Unsinn sein.
    Peter is reading. That-NEUTER will surely be nonsense.

In the context of particle constructions, however, the interpretation of a weak pronoun referring to a potential reference object is blocked, which again suggests that particle complexes themselves do not denote a corresponding entity:7

(9) a. Hans wirft die Briefe ein. *Das wird schon gelb sein.
    Hans put the letters in. That-NEUTER will surely be yellow.
    b. Maria will eine Schallplatte auflegen. *Das wird schon nicht defekt sein.
    Peter wants to put on a record. That-NEUTER will surely not be broken.

On the other hand, though particle complexes do not introduce reference objects, even fully compositional particle constructions seem to have the information structural potential to denote an adequate background set containing the explicit reference object of a full prepositional phrase, as is shown e.g. with contrastive sentences (see (11)):

(10) A: Da ist ein Briefkasten.
    There is a post box.
    A: Wirf doch den Brief ein!
    Throw the letter in.
    A: Wirf doch den Brief rein!
    Throw the letter PRONOUN-in.

    He stuck a label on the PC.
    B: Nein, er klebte ein Namesticker auf.
    No, he stuck a Name sticker on.
    B: Nein, er klebte ein Namesticker drauf.
    No, he stuck a Name sticker PRONOUN-on.

Here, the particle construction can fulfill quite the same function as the corresponding adverbial expression rein- or drauf-, which explicitly denotes a reference object by means of a pronominal element. Another example which also seems to suggest that an argument denoting a potential reference object is provided by particle constructions is given in (12):

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7 Note that the usage of weak pronouns is not necessarily limited to entities placed in the object position of the preceding sentence:

    this journal is quite read. but that will surely be fanatics
Michael leans the bike on but I do not tell you where-ON.

In this sluicing construction the interrogative element *woran* refers back to a prepositional reference object, which might be taken as evidence that particles predicate over a corresponding argument and introduce an implicit entity into the discourse. Thus, it is apparent not only intuitively that under specific circumstances the truth conditions for particle constructions entail the conceptual existence of an entity corresponding to a reference object of a prepositional relation. However, the reference object cannot attain a referential value such that it is present in a set of prominent discourse entities. In the literature, this dichotomic behavior has led to the conclusion that implicit arguments are to be defined as so-called A-definites. The status of the discourse marker A-definites introduce is irrelevant since they are characterized by their inability to serve as antecedents for future reference (cf. Koenig & Mauner (1999)). Note that this does not necessarily imply that the corresponding argument position is not existent grammatically. As the examples above show, however, an existential binding of this position is excluded because A-definites are to be clearly distinguished from indefinites (cf. Härtl & Witt (1998)). Furthermore, the implicitness of the reference object of particle verbs is not optional as it is e.g. with intransitivized verbs like *heiraten* or *lesen* in (8a/b) and thus, it is doubtful whether the language system provides an argument slot which can never be realized. Härtl & Witt argue that there is no such argument predicated over either in the lexico-semantic representation of particles (cf. Stiebels (1996) also)) or in their underlying actual CS/CT complexes. The authors conclude that there is a separate lexical entry for particles to be distinguished from their prepositional counterparts. Under specific lexical conditions, with a particle construction the conceptualization of a prepositional reference object is nevertheless required as the examples above show.

Now, the crucial question is whether the conceptual activation of a corresponding entity is to be considered a canonical process or rather an operation of re-analysis which is achieved by means of meaning postulates anchored in the conceptual knowledge base and recruited to manage special contextual requirements. If the interpretation of a particle construction obligatorily requires the activation of a reference object even in null contexts, a corresponding semantic representation needs to reflect this circumstance. In this case, the recipient of a particle expression can derive a corresponding object compositionally from the particle's semantic form without the further employment of extra-linguistic knowledge via meaning postulates. If the reference object is not activated per default, we are led to conclude that a potential reference object has to be inferred non-compositionally on the basis of extra-linguistic domain knowledge as soon as the context

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8 Note that this perspective is compatible with the morphological 'complex-head analysis' (cf. e.g. Dehé (2001), Härtl & Witt (1998), Olsen (1997), Stiebels & Wunderlich (1994)) of particles rather than an analysis which defines particle verbs as constructions combined in syntax (cf. e.g. Emonds (1972), Müller (2001); for discussion see e.g. Dehé (2001), Dehé et al. (2002)). Only the latter analysis implies that particles are (intransitivized) prepositions, which as such can provide a complement referring to the internal argument just as any other preposition (for discussion see Lüdeling (2001)). From a procedural vantage point Schreuder (1990) argues for a morphological integration strategy where a structural node is established as soon as the first lexical constituent of a phrasal verb is encountered. The remaining constituent (here: the separated particle) can then be attached to that node kept active to allow the composite meaning of the complex to be fully constituted.

requires this. Then, the truth-conditions underlying particle verbs themselves would not require the existence of a corresponding entity, which per se would not be part of the conventionalized interpretation of particle expressions. Consequently, this leads to a semantic analysis which makes use of contextually adjusted representations such that they reflect the truth-conditions underlying the corresponding communicative act at the moment of perception/speech.\(^9\)

In order to answer the question whether particles conceptually activate a potential reference in a similar way as prepositions do, two reaction time studies with an object categorization task were conducted. According to the theoretical evidence presented above it is hypothesized here that particle constructions do not prime an entity equivalent to the reference object of full prepositional phrases.

3. Experimental indications of the implicit argument's status

To test the hypothesis that no reference object is active in the actual CS/CT complex of particle constructions a word-by-word reading study with an object categorization task of line drawings was conducted. Two sets of German sentences were created: a set of sentences that contain prepositional phrases and another set containing corresponding particle constructions (see the appendix section):

(13) a. PARTICLE:
   Maria klebt das Etikett auf nachdem (*) der Winzer den Wein verkostete.
   Maria sticks the label on after the wine-grower tasted the wine.

b. PREPOSITION:
   Maria klebt das Etikett auf den (*) Karton und betrachtet das Bild.
   Maria sticks the label on the cardboard box and watches the picture.

The grammatical function of \(\text{auf}\) is disambiguated by the element that directly follows the prepositional element (\(\text{den or nachdem}\), respectively) such that it is to be processed either as an intransitive particle (13a) or a transitive preposition (13b): A preposition cannot be followed by a conjunction (\(\text{nachdem}\)) since this would violate the adjacency condition that holds on prepositions and their complements in German. Similarly, the article (\(\text{den}\)) following \(\text{auf}\) triggers the generation of a full prepositional phrase since the article indicates the existence of a prepositional complement/object, which, in accordance with the minimal attachment principle (cf. Frazier (1987)), is to be canonically processed in this position.\(^{10}\) The construction of a full prepositional phrase triggered by the article induces the conceptual system to activate the sortal and ontological restrictions the preposition imposes on its prepositional complement. Besides the specific

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\(^9\) An appropriate framework which can be used to represent contextual parameters in the intended way has been formulated in Dölling (2002).

\(^{10}\) Notice that there is a secondary reading of the article conceivable at this position: It can introduce an adverbial phrase like \(\text{den ganzen Nachmittag lang}\) (\'the whole afternoon long\', \textit{for the whole afternoon}) also thus still preserving the particle meaning. This, however, would produce a reading of the whole sentence that is procedurally more costly since the resulting structure is coerced into an event structurally shifted (repetitive) construction (see Dölling (2002); Pinaño (2002)).
spatial features that characterize a potential auf-region the conceptual system has to activate plausibility attributes which determine the range of possible reference objects (cf. Urban (2001)) such that it is more plausible for a label (i.e. German 'Etikett') to be stuck on a bottle than on a motorbike.

Proceeding from the assumption that the grammatical function of the prepositional element is clearly determined we can conclude that the conceptual processing of a target which is presented right after the disambiguating element (*) and which matches a potential reference object differs for the two constructions. As targets a set of line drawings from the picture corpus from Snodgrass and Vanderwart (1980) were chosen. Each drawing was semantically related to the sentence such that it fits the sortal requirements of the prepositional element. For instance, in the case of example (13) a line drawing of a bottle was presented at the positions right after the disambiguating element (*). In order to ensure conceptual access to the extra-linguistic representation of the object denoted by the drawing, participants were asked to categorize the corresponding object with regard to its size, i.e. whether the object fits on a sheet of paper (A4) in the real world. To compare the ease of the conceptual access for both the particle and the preposition condition, reaction times that the participants took for categorizing was measured.

3.1 Two aspects: Facilitated object integration and type of priming

The experimental strategy just sketched raises two crucial issues. First, in the case of full prepositions (cf. (14b) below) accessing the conceptual representation of the drawing might be facilitated simply by the agreement between the grammatical category of the article functioning as a noun determiner and the ontological category of the drawing (that is an object) linguistically denoted by a noun as well. Thus, a potential categorization difference between the particle and the preposition condition might be rooted in a simpler integration of the picture representation in the case of full prepositions. In the material just sketched, the full prepositional phrase is accompanied with a linguistic form—an article indicating a noun phrase—which parallels the linguistic features of the picture expression realized as a noun as well. To weaken the interfering factor of a facilitated picture integration for the preposition condition, the material was constructed such that the grammatical gender of the article in the preposition condition differed systematically from the gender of the canonical object expression (14b):11

\[(14)\]

\begin{enumerate}
  \item \textbf{PARTICLE:}
  
  Maria klebt das Etikett auf nachdem [FLASCHE] der Winzer den Wein verkostete.
  
  Maria sticks the label on after [BOTTLE] the wine-grower the wine tasted
  
  \item \textbf{PREPOSITION:}
  
  Maria klebt das Etikett auf den [FLASCHE] Karton und betrachtet das Bild.
  
  Maria sticks the label on the [BOTTLE] card-board box and watches the picture
\end{enumerate}

11 Although the Snodgrass and Vanderwart corpus is standardized with regard to conceptual features like familiarity, the canonical verbal realization of each picture was determined in a brief pre-test. For the experimental material only those pictures were chosen to which identical nouns were assigned in at least 80 per cent of all observations.
The idea is that now with regard to the grammatical integration of the picture representation into the running sentence processing is nearly equated for both the particle and the preposition condition. However, this still does not exclude the possibility of a specific interference stemming from the article's grammar: Now a potential difference between the two conditions might be put down to a more difficult processing of the picture which could be based in the gender mismatch between the article presented visually and the canonical picture expression. Therefore, a second experiment in which the gender of the article in the preposition condition and the gender of the picture expression agreed was conducted.

A difference in the results of experiment I and II would then have far-reaching consequences for the modeling of conceptual processing since it would imply that a corresponding lexical entry (i.e. grammatical information including gender features) for a pictorial representation is accessed in the course of processing extra-linguistic features like object size. Indications that this could be the case indeed are discussed by West & Holcomb (2000). The authors argue that simple grayscale line drawings are easily labeled and, thus, possibly named internally because of the weak referential potential the objects are equipped with. Consequently, as an instance of language production processes an internal naming of the object representation would give access to linguistic information such as the grammatical gender of the “name” of the object. However, in accordance with the modular model sketched in Section 2.1 above it is assumed here that no grammatical information is available or used while processing conceptual material. Therefore, a difference in the results of the two studies is not expected. Furthermore, in the literature on language production little evidence can be found that information about grammatical gender is accessed when a bare noun as a name for a pictorial representation is being produced (see e.g., Schriefers (1993); La Heij et al. (1998)).

The second issue to be clarified concerns the type of priming expected with the specific material presented. It is a well-known fact that a semantic priming effect occurs if a prime and a target item have certain semantic features in common which results in a faster processing of the target stimulus (e.g., Meyer & Schvaneveldt (1971); Neely (1976)). Analogous results have been reported for mixed paradigms (i.e. a pictorial prime and a verbal target and vice versa; cf. Pratarelli (1994) making use of the ERP technique)). In the literature investigating event-related brain potentials (ERP), the component of an electrophysiological negativity indicating a more difficult semantic integration has mainly been reported when testing incongruencies between a sentence and a picture replacing a word of that sentence (cf. Kutas & Hillyard (1984)). Substituting a sentence-final word with a semantically incongruous word (e.g., I take cream and sugar with my dog; cf. Kutas & Hillyard (1984)) triggered a negativity (at 400ms) temporally and topographically distinct from the component which is elicited by incongruous or novel pictures (triggering a negativity at 320ms).

As the substitution paradigm parallels the technique used in the current study, at first glance we could expect facilitory effects as well for the integration of a pictorial representation of a semantically matching reference object (cf. (13) above) and inhibitory effects for incongruent objects. Notice, however, that the facilitory effects reported in the literature are based on a strong semantic relation between the prime and the congruous target. In contrast, since local prepositions predicate over a wide range of possible reference objects, their sortal restrictions are much
weaker than that of verbs like read or marry (cf. the discussion on the underspecified spatial characteristics of prepositional reference objects in Härtl & Witt (1998); Jackendoff & Landau (1993)). Furthermore, in the current study participants had to solve a specific categorization task which relates to a particular ontological feature (like object size) of the corresponding object instead of a stop-making-sense task or a simple speeded yes/no object identification decision. Therefore, it is probable that the semantic congruency between a potential implicit argument (the prepositional reference object) and the pictorial representation presented elicits inhibitory effects as a reflex of the competition of two conceptual representations for conceptual activation, which requires the suppression of the irrelevant representation in order to verify the actual conceptual features.

In summary, the following three hypotheses can be formulated:

I No entity corresponding to a reference object of a preposition is activated conceptually in the actual course of processing particle constructions. Therefore, for particles, in contrast to prepositions, no effect is expected for the presentation of a pictorial representation related/congruous to a potential reference object.

II No grammatical information is available while processing conceptual features. Therefore, a gender mismatch between the article (determining the prepositional reference object) and the canonical picture name does influence conceptual processing.

III In an object categorization task, the semantic relation between implicit argument and pictorial representation elicits inhibitory rather than facilitory effects.

3.2 Experiment I

The experiment was conducted to determine if particles prime a potential reference object like full prepositions are expected to. This was tested by presenting participants with line drawings right after the position disambiguating both the prepositional element, i.e. after the conjunction nachdem indicating a particle reading or after an article triggering a prepositional reading. The depicted objects were either congruous/related to a potential reference object or not. For this and the following experiment verbal stimuli were presented visually in a word-by-word manner. Besides the primary task of categorizing the depicted object with regard to its size, a secondary task regarding the content of the stimulus sentences had to be performed by the participants. In order to equalize the procedural effort of integrating a pictorial object representation into the running sentence presentation for the particle as well as the preposition condition, the gender of the article, indicating a following prepositional object, was varied systematically from the gender of the canonical object expression.

METHOD

Participants. Twenty-six native German speaking students (between 20 and 31 years of age) participated in the study. They were offered partial course credit for their participation.

Materials. 20 sentence pairs such as those illustrated in (14) above and (15) were constructed:12

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12 The frequency of the particle verbs did not need to be controlled because frequency effects would occur in a time window which is irrelevant here.
The two sentence types agreed in word number. As pictorial targets, 40 line drawings (20 congruous and 20 incongruous) from the standardized Snodgrass & Vanderwaart (1980) corpus were chosen for the critical items. They were selected on the basis of a subjective decision by two independent persons. Here, two conditions needed to be fulfilled: The depicted objects have to match the sortal properties of the prepositional element and no part of the object must occur in the verbal stimuli so that no combinations of sentences like *He sews the button on* with objects depicting e.g., a shirt with buttons occurred in the material. In a pre-test the uniqueness of the name for the depicted object was determined. For the material only those pictures were chosen that showed an 80 per cent agreement in naming. The article's gender in the preposition condition differed systematically from the gender of the canonical object name. Furthermore, in the material only those depicted objects were included that were clearly judged (by 80 per cent agreement) to fit or not to fit on a paper sheet in the real world, which is important for the categorization task since it is not to be artificially made more difficult by irrelevant factors. To avoid animacy effects only pictures of inanimate objects were selected. For instance, at the critical position indicated by the asterisk * in (9) the line drawing of an envelope was presented as a congruous object and as an incongruous object a metal nut was shown. In order to diminish the influence of a difference between yes- and no-responses the size of objects was nearly balanced across the whole set of pictures such that participants had to respond positively almost as much as they had to respond negatively. In order to avoid repetition effects the material was split up into two versions such that there was no sentence being repeated in one version. In one version only a repetition across the levels of the conditions occurred: For instance, in version 1 sentence (15a) accompanied with a congruous object and sentence (15b) with the corresponding incongruous object was presented. Material repetition was controlled such that the first occurrence of either sentence type per sentence pair was balanced.

For each sentence a content question was constructed and presented at the end of each sentence thus ensuring the participant's attention. The questions alternately referred to the first part or the second part of the sentence. Yes/no responses for questions were balanced.

To distract the participant's attention from the critical items half of the material was constructed as filler sentences. Their overt form was identical to the critical sentences, however, with the fillers the line drawings (different from those defined above) were presented at a different position (the ninth) in the sentence. In addition, the drawings used for the fillers did not match any special sortal requirements apart from the inanimacy feature.

**Procedure.** The material was presented visually on a video monitor of an IBM PC. The experimental procedure was set up by using the PRESENTATION software. The beginning of each sentence trial was signaled by a centered fixation point. Immediately after the word that follows

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13 E.g., to categorize a base ball with regard to the question whether it fits on a paper sheet causes difficulties which are due to the elliptic form of the object.
the prepositional element a black and white line drawing was presented, i.e. after the sixth word in the presentation of the critical sentences, the screen was cleared and the drawing occurred. The drawing disappeared either after participants responded by pressing a button or after 1400ms. Only then the sentence presentation was continued. Participants were instructed to read the sentences and to answer the questions as carefully and quickly as possible. Participants had to solve two tasks: First, they were asked to decide instantly whether in the real world the depicted object occurring on the screen fits on the sheet of paper (A4) that was placed beside the screen. Participants had to respond by pressing the CTRL-LEFT button (for 'no') or the CTRL-RIGHT button (for 'yes') on the keyboard. The function of the two buttons was marked clearly. In the same manner participants had to answer the yes/no content question which occurred on the screen after each sentence trial.

Each word was presented for 400ms followed by a break (blank screen) that lasted 200ms. This relatively slow presentation rate was chosen for two reasons: First, the dual task to be solved requires additional processing capacities, thus, in order to make sure that participants solve both tasks as correctly as possible and in order to avoid a speed-accuracy trade-off, a presentation rate was chosen that allows efficient memorizing. Second, for the issue to be tested access needed to be guaranteed to i.) the lexico-semantic representation of the linguistic material in question and ii.) to the extra-linguistic conceptual features of object representations. According to Urban (2001) (cf. Kutas & Hillyard (1984a) and McElree & Griffith (1995) also) lexico-semantic features as they relate to the thematic and the argument structure of lexical items are activated at ca. 400ms after perceptual input. To this adds the processing cost that is required to compute the pictorial representation per se (ca. 200ms) and the object features related to it while lexical information needs to be kept active.

Before the experimental block participants were trained by means of one demonstration block and one training block. The entire experiment lasted for about 20 minutes.

RESULTS
For each critical drawing, reaction times were measured that the participants took to answer the categorization question. In the statistical analysis only correct responses were included. Three participants were excluded from the analysis because they showed an error rate higher than 20 per cent. Furthermore, two sentences had to be excluded from the analysis because the drawings shown with them elicited unexpected difficulties in categorization.

Recall the factors: Two different types of drawings (factor 'drawing type' with two levels: congruent and incongruent objects) were presented immediately after the position of the two dif-
different types of prepositional elements (factor 'prepositional element' with two levels: particle vs. preposition). For the statistical analysis the MINITAB software was used. The analysis of variance (a 2 × 2 ANOVA) indicates a main effect for the factor 'drawing type'. This general difference in reaction time for congruent and incongruent drawings was reliable across subjects, $F_1(1,22) = 10.3, p < .002$, and reached marginal significance in the item analysis, $F_2(1,17) = 2.6, p < .1$. No main effect was detected for the factor 'type of prepositional element' in either analysis. Consider the following table, which shows the reaction time mean values together with the standard deviation in round brackets and the mean error rates\(^\text{15}\) in square brackets:

<table>
<thead>
<tr>
<th>PREPOSITIONAL ELEMENT</th>
<th>DRAWING TYPE</th>
<th>Particle</th>
<th>Preposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congruent object</td>
<td>808 (87.5) [87.7]</td>
<td>830 (75.1) [89.8]</td>
<td></td>
</tr>
<tr>
<td>Incongruent object</td>
<td>799 (83.1) [87.1]</td>
<td>786 (91.3) [89.9]</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: RT in ms for 'drawing congruency' * 'prepositional element type' with standard deviation and error rates in Exp. 1

The 'type of prepositional element' by 'drawing type' interaction reached statistical significance in the subject analysis, $F_1(1,22) = 7.0, p < .01$, but not in the item analysis, $F_2(1,17) = 1.5, p < .22$. The general difference between yes- and no-responses to the question on the drawings was also tested. It proved to be statistically non-significant, $F_1(1,22) = .77, p < .38$. Furthermore, for the error rate data the 'type of prepositional element' by 'drawing type' interaction was also tested. The results show that the number of errors was not dependent on the conditions: $F_2(1,17) = .01, p < .9$.

Planned pairwise comparisons (Bonferroni simultaneous tests) among the levels of the two factors indicate that the main effect for 'drawing type' is mainly realized in the preposition condition. Thus, there is a significant difference in reaction time when categorizing incongruent vs. congruent drawings with the prepositional constructions, $t_1(22) = 4.14, p < .0006$, but not with the particle constructions, $t_1(22) = .39, p < 1.0$. Finally, only when categorizing congruent pictures, the difference between the particle vs. the preposition condition just reached significance, $t_1(22) = 2.5, p < .08$, in the subject analysis. No such difference was detected for incongruent object drawings.

DISCUSSION
The data from Experiment 1 demonstrate that participants were sensitive to the difference between particles and prepositions at the position immediately following the word disambiguating the prepositional element. This is revealed by the difference in reaction time for categorizing incongruous vs. congruous objects with regard to the conceptual property of their size in the case of full prepositions. Thus, as the difference in congruency played no role in the case of particles,\(^\text{15}\) For the error rates (= percentage of correct answers) incorrect as well as missing answers are counted as incorrect.

\(^{15}\) For the error rates (= percentage of correct answers) incorrect as well as missing answers are counted as incorrect.
we can conclude that with prepositions but not with particles participants seem to have been aware of the procedural necessity to conceptually activate an entity that matches the sortal and ontological requirements of a potential reference object. Furthermore, with this kind of extra-linguistic task, a conceptual fit between the sortal requirements on a potential reference object being conceptually activated and an overt object representation seems to result in inhibitory effects. This is indicated by the longer reaction times for the congruous objects in the case of prepositions. Considering longer reaction times a reflex of certain processing difficulties, from this a competition for conceptual activation between two conceptual entities can be inferred. This might be so because both these entities—the one implicitly activated and the one explicitly represented by the drawing—equally match the sortal and ontological requirements of the predicate thus providing two object representations both striving for conceptual activation.

For now, hypothesis I and III formulated in Section 3.1 are confirmed. However, the inhibitory effect found for the preposition condition might also be attributed to the fact that there is a mismatch between the gender of the canonical object expression and the article presented after the prepositional element (cf. (15b) above). This is tested in a second experiment, where articles were used that agreed in gender with the canonical object expression.

### 3.3 Experiment II

The second experiment was conducted to test whether a modification of the grammatical gender feature results in a difference in reaction times taken for categorizing the depicted objects used in Experiment I. If this can be excluded we can assume that the difference in categorization time is to be attributed to conceptual constellations indeed. At the same time, the irrelevance of grammatical information would imply that no linguistic information is accessed in the process of conceptualizing line drawings, which can be considered an argument for the modular model sketched in 2.1.

#### METHOD

**Participants.** Twenty-one native German speaking students (between 21 and 33 years of age) participated in the study. They did not participate in Experiment I and they were again offered partial course credit for their participation. The procedure was identical to that of Experiment I.

**Materials.** For this study, the material used in Experiment I was modified. The article in the preposition condition had to agree in gender with the canonical object expression such that a set of sentences as in (16) was created:

\[(16) \quad \begin{align*}
\text{a. PARTICLE:} & \\
& \text{Maria klebt das Etikett auf nachdem [FLASCHE] der Winzer den Wein verkostete.} \\
& \text{Maria sticks the label on after [BOTTLE] the wine-grower the wine tasted}
\end{align*}
\]

\[(16) \quad \begin{align*}
\text{b. PREPOSITION:} & \\
& \text{Maria klebt das Etikett auf die [FLASCHE] Ware und betrachtet das Bild.} \\
& \text{Maria sticks the label on the [BOTTLE] product and watches the picture}
\end{align*}
\]

The same set of drawings was used, with the exception that the two drawings that elicited categorization difficulties were replaced.
RESULTS

Three participants had to be excluded from the analysis because they showed an error rate higher than 20 per cent. As in Experiment 1, the analysis of variance (ANOVA) indicates a main effect for 'drawing type' in both the analyses across items and across subjects, $F_1(1,17) = 12.3, p < .001$, $F_2(1,19) = 3.2, p < .07$. Again, no main effect for 'type of prepositional element' was detected:

<table>
<thead>
<tr>
<th>PREPOSITIONAL ELEMENT</th>
<th>Particle</th>
<th>Preposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congruent object</td>
<td>833 (85.2) [91.1]</td>
<td>853 (109.6) [89.4]</td>
</tr>
<tr>
<td>Incongruent object</td>
<td>801 (99.8) [88.3]</td>
<td>808 (114.5) [85.4]</td>
</tr>
</tbody>
</table>

Table 2: RT in ms for 'drawing congruency' * 'prepositional element type' with standard deviation and error rates\textsuperscript{16} in Exp. 2

The 'type of prepositional element' by 'drawing type' interaction did not reach the conventional level of significance in either analyses, $F_1(1,17) = .16, p < .68$, $F_2(1,19) = .12, p < .72$. Pairwise comparisons, however, reveal a behavioral pattern similar to the one determined in the first experiment: Incongruous objects were categorized faster than congruous object in the context of a full preposition only, $t_1(17) = 2.7, p < .04$. As in the first study, no statistically reliable difference in categorizing congruous vs. incongruous objects was found with particles, $t_1(17) = 2.2, p < .19$. Furthermore, for the error rate data the 'type of prepositional element' by 'drawing type' interaction was also tested. The results show that the number of errors was again not dependent on the conditions: $F_2(1,17) = .15, p < .69$.

In order to make sure that gender information did not influence reaction times in both experiments another ANOVA was conducted, where the interaction between the two factors 'drawing type' and 'gender agreement' was tested. For this analysis, the particle data can be ignored and the data from the preposition condition in both Experiment 1 and Experiment 2 were combined (Remember that there is gender agreement of the preposition condition in Experiment 2 but no agreement in Experiment 1). The results indicate no significant interaction of the two factors, $F_1(1,40) = .07, p < .79$. This supports the finding that in both cases—the condition where the prepositional article agreed with the gender of the object's name and the condition where the article did not agree—incongruous objects were categorized faster than congruent objects. Furthermore, it was tested whether gender (dis-)agreement did have any influence on the error rate. The corresponding 'gender agreement' by 'error rate' interaction in the data taken from the preposition conditions in Experiment 1 and 2 proved to be statistically non-significant, $F_2(1,37) = .9, p < .33$.\textsuperscript{17}

\textsuperscript{16} cf. footnote 15

\textsuperscript{17} The relatively large difference between the error rates for the congruent vs. incongruent objects in the preposition condition in Experiment 2 (cf. Table 2) is not significant, $t_2 = 1.3, p < .2$. 

DISCUSSION
The correspondences of the behavioral data detected in both Experiment I and II as well as the direct comparision of the data from both the preposition condition with gender disagreement (i.e. Experiment 1) and the preposition condition with gender agreement (i.e. Experiment 2) indicate the following: Grammatical information like the gender feature is not used in the conceptual process of categorizing a gray-scale line drawing with regard to the ontological feature of the size of the depicted object. Thus, a comparison of the results of Experiment 1 and 2 can be considered evidence for the model sketched in Section 2.1. More importantly, it can be concluded that the inhibitory effects for the categorization of congruous objects detected with full prepositions are indeed based on a conceptual process rather than on grammatical interferences. Thus, hypotheses II and III formulated in Section 3.1 are (re-) confirmed.

3.4 Conclusion
Against the background of the basic issue—the generalization function of language—the theoretical and experimental evidence presented here support two conclusions. First, with intransitivized prepositional functions, i.e. particles, no entity correspondent to a prepositional object denoting a reference object is activated in the actual CS/CT complex underlying the expression. This implies that the truth-conditions underlying particle verbs themselves do not require the existence of a corresponding entity, which thus does not contribute to the conventionalized interpretation of particle expressions. This allows us to assume an economic semantic representation not referring to a reference object thus appropriately reflecting the truth-conditions underlying the corresponding communicative act at the moment of perception/speech. Second, as was illustrated above (cf. the examples in (10), (11) & (12)), under specific contextual conditions a conceptual re-analysis of a corresponding entity is required. Considering the experimental data presented here, it can be concluded that in these cases a corresponding entity has to be exceptionally activated from the conceptual knowledge base. This implies that a lexical entry of a particle is to be represented as an intransitive predicate, which means that it does not encode an argument slot for a corresponding nominal expression. Therefore, constructions like the ones in (10) and (11) and the sluicing structures in (12) have to be characterized as cases of lexical re-analysis, where an argument slot is coerced into the lexico-semantic representation of the predicate in question, i.e. the particle. This coercion operation is triggered by contextual requirements.

The findings presented here can be considered a first attempt to formulate a more fine-grained analysis of implicit arguments in general. In the linguistic as well as the psycholinguistic literature (cf. e.g. Mauner et al. (1995); Williams (1987); Roeper (1987)) it is a wide spread assumption that implicit arguments are somehow covertly present as unlinked thematic roles in the lexical representation and that they are nevertheless somehow part of the interpretation of the predicate. Reflecting on the current findings, however, this perspective must result in a severe overgeneralization as to what the structural properties of the expressions under debate are. The alternative analysis, which is proposed here, is qualified to ignore implicit arguments as information-structurally irrelevant and—if required—to enrich the corresponding lexical representation and its argument structure, respectively, under specific contextual conditions only.
The discussion in the current paper is rooted in the insight that any description of language has to differentiate between semantic/conceptual information recruited at the moment of the actual computation and provided in order to meet the requirements of a communicative act on the one hand and, on the other, information that is stored in a knowledge base, which organizes general knowledge structures that do not refer to current situational entities. Here, the notion of conceptual activeness becomes relevant: The conceptualizer activates only those pieces of information from the conceptual knowledge base that are essential in order to adequately relate linguistic data and extra-linguistic message structures thus ensuring an efficient extraction of meaningful units from linguistic information. It is in this sense that the notion of unspecified argument (variable, see Jacobs (1993)) is underpinned with regard to its procedural implications: Unspecific variables neither require nor prohibit the presence of its denotation in the current universe of discourse, which implies that the denotation of the implicit argument is not necessarily unbound. As it was shown here, in neutral contextual constellations there is no need to conceptually activate a prepositional reference object with particles. This can be considered a reflex of economical and efficient conceptualization procedures that result in the conceptualization of a generalized localization situation which adequately fulfills the contextual requirements that determine the verbalization of the conceptual structure. The question that needs to be addressed in future work is whether other types of reduced linguistic forms relate to conceptualizations similar to those determined here. Intransitivized verbs like in John is reading, for instance, show a behavior quite different from particles e.g., because of the contextual and information structural potential a possible direct object like (such as e.g., book) can bear in the current discourse.

The studies presented here reveal two other important aspects. First, a semantic fit between an argument to be expected in the immediate course of comprehension and an object representation results in processing difficulties such that categorizing the depicted target object with regard to a specific conceptual feature like size is slowed as compared to the categorization of an unrelated object. Thus, instead of a conceptual spreading of activated information and a corresponding facilitation of the categorization of an analogous object, in the case of implicitly activated information there seems to be a competition for conceptual activation of two entities. Second, grammatical information about the gender of the name of the object depicted does not enter the conceptual processes in question here, which can be seen as evidence for a modular model of language comprehension thus supporting the view that conceptual and linguistic computation are to be characterized as two distinct, computationally encapsulated processes.

In sum, the current research provides a clear demonstration that for at least one specific class of unrealized arguments, language does not trigger a conceptual activation of information canonically associated with the compressed linguistic form. It is in this sense that language fulfills its generalization function to efficiently realize conceptual configurations the extra-linguistic message structures are endowed with.

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Acknowledgements
The work reported on here has been supported by the project OL 101/2-2 (Prof. Dr. S. Olsen) of the DFG priority program 'Language production' at Leipzig University and the DFG project 'Copulative-predicative constructions' (Prof. Dr. E. Lang) at ZAS, Berlin. The paper itself has been completed during a research stay at the MIT, Dept. of Linguistics and Philosophy (Cambridge, MA). For discussion, useful comments, and support I wish to thank Nicole Dehé, Andrew McIntyre, Sue Olsen, Heike Tappe, Silke Urban, Jim Witt, and the participants of the semantics colloquium at ZAS and the annual meeting of the DFG priority program 'Language production', Berlin 2001, and the two JoS reviewers—Robert Schreuder and an anonymous one.
Appendix

Experiment I

| PART REL: | particle construction with congruent picture |
| PP REL:   | preposition construction with congruent picture |
| PART UREL: | particle construction with incongruent picture |
| PP UREL: | preposition construction with incongruent picture |

**PART REL.** Andrea strickt das Teil an nachdem die Tante das Geld holte.
PP REL. Andrea strickt das Teil an die Weste und verschiebt den Abwasch.
PART UREL. Andrea strickt das Teil an nachdem die Tante das Geld holte.
PP UREL. Andrea strickt das Teil an die Weste und verschiebt den Abwasch.

**PART REL.** Anne steckt den Ring an nachdem die Schwester die Angestellte tadelte.
PP REL. Anne steckt den Ring an das Objekt und beobachtet die Reaktionen.
PART UREL. Anne steckt den Ring an nachdem die Schwester die Angestellte tadelte.
PP UREL. Anne steckt den Ring an das Objekt und beobachtet die Reaktionen.

**PART REL.** Axel nagelt den Absatz an nachdem der Kunde die Beschwerde einlegte.
PP UREL. Axel nagelt den Absatz an die Sandale und benachrichtigt den Meister.
PART UREL. Axel nagelt den Absatz an nachdem der Kunde die Beschwerde einlegte.
PP UREL. Axel nagelt den Absatz an die Sandale und benachrichtigt den Meister.

**PART UREL.** Chris baut den Erker an nachdem der Architekt den Plan brachte.
PP UREL. Chris baut den Erker an die Kaserne und deckt das Dach.
PART UREL. Chris baut den Erker an nachdem der Architekt den Plan brachte.
PP UREL. Chris baut den Erker an die Kaserne und deckt das Dach.

**PART UREL.** Georg leimt den Henkel an nachdem der Nachbar das Geschirr besichtigte.
PP UREL. Georg leimt den Henkel an den Krug und schreibt eine Karte.
PART UREL. Georg leimt den Henkel an nachdem der Nachbar das Geschirr besichtigte.
PP UREL. Georg leimt den Henkel an den Krug und schreibt eine Karte.

**PART UREL.** Gerda koppelt den Waggon an nachdem die Lieferung verfrachtet worden war.
PP UREL. Gerda koppelt den Waggon an das Fahrzeug und beendet ihre Arbeit.
PART UREL. Gerda koppelt den Waggon an nachdem die Lieferung verfrachtet worden war.
PP UREL. Gerda koppelt den Waggon an das Fahrzeug und beendet ihre Arbeit.

**PART UREL.** Gisela zieht das Garn durch nachdem die Mutter die Schere reichte.
PP UREL. Gisela zieht das Garn durch das Loch und erkennt den Fehler.
PART UREL. Gisela zieht das Garn durch nachdem die Mutter die Schere reichte.
PP UREL. Gisela zieht das Garn durch das Loch und erkennt den Fehler.

**PART UREL.** Hans schreibt die Worte auf nachdem der Chef die Schreibkraft instruierte.
PP UREL. Hans schreibt die Worte auf den Zettel und betritt das Zimmer.
PART UREL. Hans schreibt die Worte auf nachdem der Chef die Schreibkraft instruierte.
PP UREL. Hans schreibt die Worte auf den Zettel und betritt das Zimmer.
Hans schreibt die Worte auf den Zettel und betritt das Zimmer.

Henry druckt die Adresse auf nachdem der Computer repariert worden war.

Henry druckt die Adresse auf das Papier und versorgt die Kollegen.

Henry druckt die Adresse auf nachdem der Computer repariert worden war.

Henry druckt die Adresse auf das Papier und versorgt die Kollegen.

Ines flechtet den Zopf an nachdem der Hausmeister den Spiegel befestigte.

Ines flechtet den Zopf an die Frisur und kehrt den Boden.

Ines flechtet den Zopf an nachdem der Hausmeister den Spiegel befestigte.

Ines flechtet den Zopf an die Frisur und kehrt den Boden.

Karl bindet das Namensschild an nachdem die Mutter das Essen servierte.

Karl bindet das Namensschild an das Paket und bestaunt die Ausstattung.

Karl bindet das Namensschild an nachdem die Mutter das Essen servierte.

Karl bindet das Namensschild an das Paket und bestaunt die Ausstattung.

Laura näht den Saum an nachdem der Gast eine Beschwerde einlegte.

Laura näht den Saum an das Hemd und verlangt den Betrag.

Laura näht den Saum an nachdem der Gast eine Beschwerde einlegte.

Laura näht den Saum an das Hemd und verlangt den Betrag.

Maria klebt das Etikett auf nachdem der Winzer den Wein verkostete.

Maria klebt das Etikett auf den Karton und betrachtet das Bild.

Maria klebt das Etikett auf nachdem der Winzer den Wein verkostete.

Maria klebt das Etikett auf den Karton und betrachtet das Bild.

Mario stellt die Pyramide auf nachdem das Radio eingeschaltet worden war.

Mario stellt die Pyramide auf das Regal und erfreut die Kinder.

Mario stellt die Pyramide auf nachdem das Radio eingeschaltet worden war.

Mario stellt die Pyramide auf das Regal und erfreut die Kinder.

Peter lehnt das Fahrrad an nachdem die Lehrerin den Jungen rief.

Peter lehnt das Fahrrad an die Laterne und geht ins Haus.

Peter lehnt das Fahrrad an nachdem die Lehrerin den Jungen rief.

Peter lehnt das Fahrrad an die Laterne und geht ins Haus.

Siegfried schließt die Antenne an nachdem der Lieferant das Gerät brachte.

Siegfried schließt die Antenne an die Flimmerkiste und erwartet viel Beifall.

Siegfried schließt die Antenne an nachdem der Lieferant das Gerät brachte.

Siegfried schließt die Antenne an die Flimmerkiste und erwartet viel Beifall.

Sigrid heftet den Aufruf an nachdem der neue Minister vereidigt wurde.

Sigrid heftet den Aufruf an die Tafel und nimmt die Tasche.


PART UREL Sigrid heftet den Aufruf an nachdem der neue Minister vereidigt wurde.
PP UREL Sigrid heftet den Aufruf an die Tafel und nimmt die Tasche.

PART UREL Silke streicht den Lack auf nachdem der Schlosser das Gitter lieferte.
PP UREL Silke streicht den Lack auf den Schrank und verkauft den Leuchter.

PART REL Silke streicht den Lack auf nachdem der Schlosser das Gitter lieferte.
PP REL Silke streicht den Lack auf den Schrank und verkauft den Leuchter.

PART UREL Thomas montiert den Beschlag an nachdem der Tisch repariert worden war.
PP UREL Thomas montiert den Beschlag an das Fenster und schreibt dem Vermieter.

PART REL Thomas montiert den Beschlag an nachdem der Tisch repariert worden war.
PP REL Thomas montiert den Beschlag an das Fenster und schreibt dem Vermieter.

PART UREL Tino wickelt den Faden auf nachdem die kleine Katze eingeschlafen war.
PP UREL Tino wickelt den Faden auf den Stab und beseitigt die Unordnung.

PART REL Tino wickelt den Faden auf nachdem die kleine Katze eingeschlafen war.
PP REL Tino wickelt den Faden auf den Stab und beseitigt die Unordnung.

Experiment II

PART Andrea strickt das Teil an nachdem die Tante das Geld holte.
PP Andrea strickt das Teil an den Bezug und verschiebt den Abwasch.

PART Anne steckt den Ring an nachdem die Schwester die Angestellte tadelte.
PP Anne steckt den Ring an den Gegenstand und beobachtet die Reaktionen.

PART Axel nagelt den Absatz an nachdem der Kunde die Beschwerde einlegte.
PP Axel nagelt den Absatz an den Stiefel und benachrichtigt den Meister.

PART Chris baut den Erker an nachdem der Architekt den Plan brachte.
PP Chris baut den Erker an das Bauwerk und deckt das Dach.

PART Georg lehnt den Henkel an nachdem der Nachbar das Geschirr besichtigte.
PP Georg lehnt den Henkel an die Kanne und schreckt eine Karte.

PART Gerda koppelt den Wagen an nachdem die Lieferung verfrachtet worden war.
PP Gerda koppelt den Wagen an die Zugmaschine und bemüht ihre Arbeit.

PART Hans schreibt die Worte auf nachdem der Chef die Schreibkraft instruierte.
PP Hans schreibt die Worte auf das Bild und berät das Zimmer.

PART Henry drückt die Adresse auf nachdem der Computer repariert worden war.
PP Henry drückt die Adresse auf den Briefbogen und versorgt die Kollegen

PART Ines hängt den Karren an nachdem der Buchmeister die Spiegels befestigte.
PP Ines hängt den Karren an das Geöffnete und kehrt den Boden.

PART Karl bindet das Namensschild an nachdem die Mutter das Essen servierte.
PP Karl bindet das Namensschild an den Rucksack und bestätigt die Ausstattung.

PART Laura näht den Saum an nachdem der Gast eine Beschwerde einlegte.
PP Laura näht den Saum an die Kutte und verlangt den Betrag.

PART Maria klebt das Etikett auf nachdem der Winzer den Wein verkostete.
PP Maria klebt das Etikett auf die Ware und betrachtet das Bild.

PART Peter lehnt das Fahrrad an nachdem die Lehrerin den Jungen rief.
PP Peter lehnt das Fahrrad an den Schuppen und geht ins Haus.

PART Siegfried schließt die Antenne an nachdem der Lieferant das Gerät brachte.
PP Siegfried schließt die Antenne an den Rekorder und erwartet viel Beifall.

PART Sigrid heftet den Aufruf an nachdem der neue Minister vereidigt wurde.
PP Sigrid heftet den Aufruf an den Verschlag und nimmt die Tasche.

PART Silke streicht den Lack auf nachdem der Schlosser das Gitter lieferte.
PP Silke streicht den Lack auf die Platte und verkauft den Leuchter.

PART Thomas montiert den Beschlag an nachdem der Tisch repariert worden war.
PP Thomas montiert den Beschlag an die Klappe und schreibt dem Vermieter.

PART Tino wickelt den Faden auf nachdem die kleine Katze eingeschlafen war.
PP Tino wickelt den Faden auf die Stange und beseitigt die Unordnung.

18 Remember that in Exp. II the drawings from Exp. I were used again, cf. Section 3.3.
References


Dehé, Nicole (2001), Syntactic, phonological and information structural aspects of particle verbs in English. Benjamins. Amsterdam/Philadelphia. (appears)


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