

# German *nach*-Particle Verbs in Semantic Theory and Corpus Data

Boris Haselbach, Wolfgang Seeker, Kerstin Eckart

Institute for Natural Language Processing  
University of Stuttgart, Germany  
{haselbbs,seeker,eckartkn}@ims.uni-stuttgart.de

## Abstract

In this paper, we present a database-supported corpus study where we combine automatically obtained linguistic information from a statistical dependency parser, namely the occurrence of a dative argument, with predictions from a theory on the argument structure of German particle verbs with *nach*. The theory predicts five readings of *nach* which behave differently with respect to dative licensing in their argument structure. From a huge German web corpus, we extracted sentences for a subset of *nach*-particle verbs for which no dative is expected by the theory. Making use of a relational database management system, we bring together the corpus sentences and the lemmas manually annotated along the lines of the theory. We validate the theoretical predictions against the syntactic structure of the corpus sentences, which we obtained from a statistical dependency parser. We find that, in principle, the theory is borne out by the data, however, manual error analysis reveals cases for which the theory needs to be extended.

**Keywords:** German particle verbs, database, corpus study

## 1. Introduction

German particle verbs are in a syntactic and semantic gray area which is mirrored by a broad range of approaches to particle verb constructions; see Dehé et al. (2002) for an overview. One major challenge is the organization of arguments by the particle, especially if the argument structure of the particle verb deviates from the one of the underlying verb. In (1) the verb particle *nach* (“after”) creates an argument slot for a dative DP, whereas in (2) it does not.

- (1) *Der Hund rannte dem<sub>DAT</sub> Hasen nach.*  
“The dog chased the hare.”
- (2) *Die Banane reifte nach.*  
“The banana continued ripening.”

There is also a huge class of particle verbs with *nach* that allow several argument patterns, which might trigger different interpretations, such as in (3).

- (3) a. *Der Schüler tanzte der<sub>DAT</sub> Lehrerin nach.*  
1<sup>st</sup> interpretation:  
“The student copied the teacher’s dancing.”  
2<sup>nd</sup> interpretation:  
“The student followed the teacher dancing.”
- b. *Der Schüler tanzte der<sub>DAT</sub> Lehrerin den<sub>ACC</sub> Tango nach.*  
“The student copied the teacher’s dancing of the tango.”
- c. *Der Schüler tanzte der<sub>DAT</sub> Lehrerin ins<sub>P+ACC</sub> Zimmer nach.*  
“The student followed the teacher into the room dancing.”
- d. *Der Schüler tanzte den<sub>ACC</sub> Tango nach.*  
“The student copied the tango.”
- e. \* *Der Schüler tanzte nach.*  
the student danced after

The particle *nach* in example (3-a) is ambiguous between a directional reading, namely that the student followed the teacher dancing, and a “copy” reading, namely that the student copied the teacher’s dancing manner. In (3-b), i.e. with a dative and a VP-internal accusative object, *nach* can only be interpreted as copying the dancing manner. The sentence in (3-c), where a directional accusative assigning *in*-PP modifies the VP, can only be interpreted as the student following the teacher, i.e. *nach* has a directional interpretation (as in the second reading of (3-a)). With a VP-internal accusative object only, as in (3-d), *nach* can only be interpreted as copying the tango. However, without an accusative and a dative object, as in (3-e), *nach* is uninterpretable in this example.

Haselbach (to appear) predicts that this is due to the properties available in the predication that *nach* accesses.

In this corpus study, we validate our theoretical hypothesis by relating the theoretical predictions to automatically dependency parsed corpus data within a database infrastructure, the B3-Database<sup>1</sup> (B3DB); cf. Eckart et al. (2010).

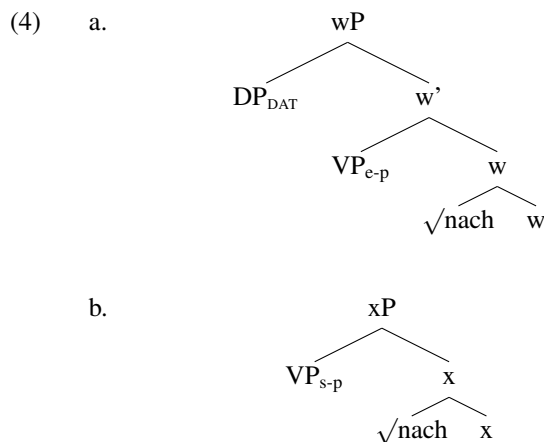
We first present Haselbach’s theory on the syntactico-semantic compositionality of German particle verbs with *nach* (section 2.). Then, we will briefly present the resources that we use, i.e. the B3DB, the parser, and the corpus (section 3.). Finally, we present the architecture (section 4.) before we give first results (section 5.). We conclude in section 6. and point out future work in section 7.

## 2. Theoretical Background

For a subclass of German particle verbs, Haselbach (to appear) suggests an approach that adopts the VP hypothesis by Larson (1990) and others, where arguments—predominantly the external argument—are not part of the lexical structure of the verb but are introduced by means of

<sup>1</sup>The B3-Database has been developed in the project B3 of the Collaborative Research Centre SFB 732 at University of Stuttgart.

a light verb on top of VP (e.g. Kratzer, 1996). Haselbach’s approach is akin, on the one hand, to the syntactic analysis of particle verbs by Nicol (2002) introducing (English) particles as realizations of a light verb on top of VP, and, on the other hand, to a high applicative (e.g. Pylkkänen, 2000), as it equally establishes a relation between an eventuality (contributed by VP) and an individual. *Nach* contributes a complex indirect relation between the eventuality by the VP and the dative argument. It triggers a temporally preceding presupposed eventuality in which the individual from the additional argument participated. The claim then is that if *nach* accesses event properties (e-p) of the VP an additional argument slot for the dative DP is created. However, if *nach* accesses state properties (s-p) available within the VP, e.g. result state properties, no dative DP is licensed as a presupposed state holds for the same individual or for an individual referring to the same concept. Haselbach then claims that the semantically-driven argument realization by the verb particle *nach* is reflected in syntax by virtue of two distinct functional heads in the extended VP-shell: w and x. In Haselbach’s approach, based on Distributed Morphology (Halle and Marantz, 1993), the root  $\sqrt{\text{nach}}$ , which is underspecified with respect to its possible readings as for example in (3), may either attach to w accessing event properties in the underlying VP and licensing a dative DP in Spec-wP, or to x accessing state properties and not licensing a dative DP; cf. (4).



Next to a core lexical component contributed by  $\sqrt{\text{nach}}$ , Haselbach provides five of presumably more contextual evolvments of *nach* resulting in different interpretations of the particle: (i) copy-direction, (ii) copy-manner, (iii) copy-object, (iv) once-more/restitution and (v) continuation; (i) and (ii) follow pattern (4-a) licensing a dative, while (iii)–(v) follow pattern (4-b) disallowing a dative. The idea is that the interpretation of *nach* evolves in the syntactic configuration depicted in (4) depending on the semantic contribution of the underlying VP. Figure 1 gives an overview of the readings suggested by Haselbach (to appear).

Returning to the example in (3), Haselbach predicts that a dative is licensed by *nach*, if it accesses event properties of the underlying *tanzen*-VP: the manner description as in (3-a)/(3-b) or the motion description and thus the direction of the event as in (3-a)/(3-c). If result-state properties are present in the VP—contributed by the culmination condition of the accusative object (e.g. Kratzer, 2004)—*nach*

either accesses the manner description of *tanzen* if the dative is also present as is (3-b), or *nach* accesses the result-state property of the tango itself if no dative is present, as in (3-d). Note that in both cases, the copy-direction reading is blocked. However, if neither result-state properties (by the accusative object) nor a dative argument are present, the sentence is ungrammatical (3-e).

### 3. Resources

#### 3.1. Database for storing linguistic data

The B3DB (Eckart et al., 2010) has been created to hold different types of data that accumulate in linguistic research, such as (textual) primary data, multiple annotations and metadata about sources and tools that produced the annotations. The data structures themselves are generic, so different data can be stored and queried in a similar way, thereby supporting different dimensions of analysis-handling (vertical as in pipeline architectures, horizontal for analyses of the same level, and temporal for different versions of the same analysis), cf. Eberle et al. (to appear). The database also makes use of a type system such that it is easily extensible regarding new types of data. Structured objects, i.e. annotation layers, are represented as graphs in the database and linkings between annotations can be introduced either on the object level, or on the structured graph level. The B3DB is implemented as a PostgreSQL<sup>2</sup> database and queries are conducted via SQL. Due to the generic data structures information has to be extracted by specifying in detail which types of data to select. This requires the user to have a detailed understanding of the mapping of the annotations to the database structures and may result in expansive queries. The database infrastructure is therefore well suited to support internal workflow processes but does not include an external user perspective such as the ANNIS search and visualization infrastructure (Zeldes et al., 2009).

#### 3.2. Corpus

From an unparsed version of DeWaC (Baroni and Kilgarriff, 2006), we extracted a subset of about 4 M sentences that contain the string “nach”. To identify *nach* as a verb particle (as opposed to a preposition), we parsed the sub-corpus with Bohnet’s statistical parser<sup>3</sup> (Bohnet, 2010) and extracted ca. 280,000 sentences for ca. 1,800 putative *nach*-verb lemmas. From this lemma list, we manually selected 246 lemmas that belong to one of the *nach* classes presented above. Verbs that (also) show other *nach* readings, such as the propositional reading of *nach* as in *nachdenken* (“[to] cogitate/think about”) were excluded.

#### 3.3. Manually annotated lemma list

In parallel, we manually labelled the lemmas of *nach* verbs found in the corpus (cf. section 3.2.) with the possible categories predicted by Haselbach: copy-direction (DIR), copy-manner (MAN), copy-object (OBJ), once-more/restitution (OMR), continuation (CONT). DIR and MAN are predicted

<sup>2</sup>URL (07.03.2012): <http://www.postgresql.org/>

<sup>3</sup>URL (07.03.2012): <http://code.google.com/p/mate-tools/>

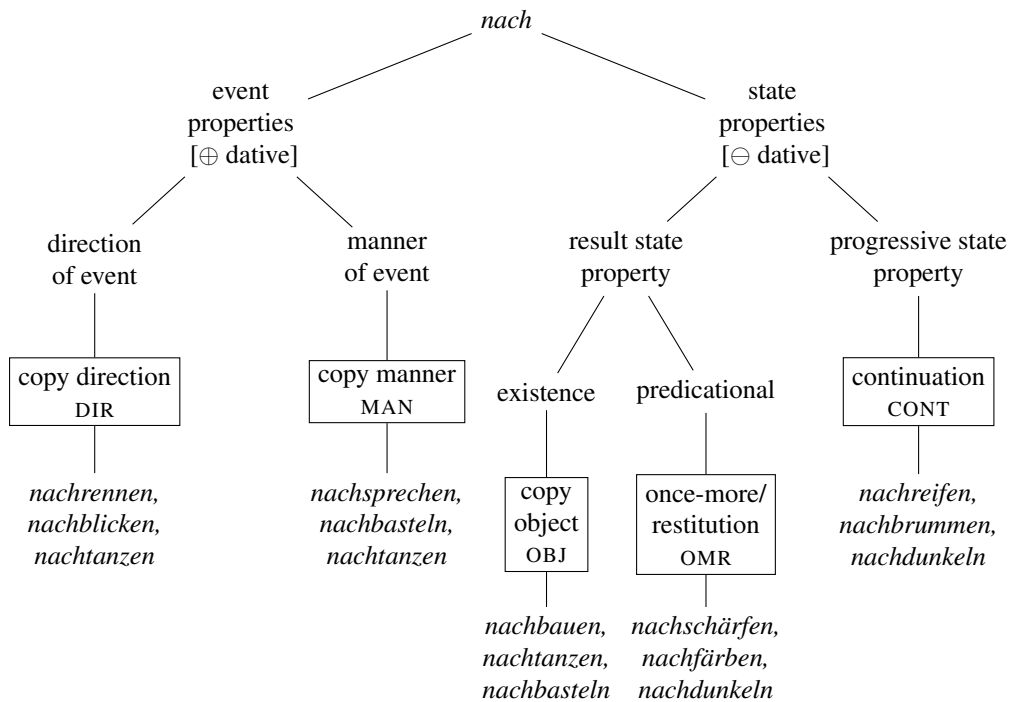


Figure 1: Classification of readings of *nach*

to license a dative object, whereas OBJ, OMR, and CONT do not. Note that verb stems are also allowed to alternate between these classes, as it is for example the case with *tanzen* (“[to] dance”) in example (3).

Up to now, we only took the classification of one annotator into account. However, we will enlarge the number of annotators for future analyses. The classification was carried out introspectively along certain criteria for each class. For the class DIR it is necessary for the predicate to express directionality, either as a verb of agentively controlled motion (e.g. unergatives such as *rennen*, “[to] run”, or verbs of perception that can be ascribed a direction such as *blicken*, “[to] look”). All verbs that show a manner description, such as *tanzen* (“[to] dance”), *lallen* (“[to] babble”), or *basteln* (“[to] tinker”) are labelled with MAN. The label OBJ was assigned to verbs that describe the coming into existence of an individual by an agentively controlled process, e.g. *bauen* (“[to] build”) or *kochen* (“[to] cook”). Usually these verbs take with an incremental theme and are thus telic predicates conveying an result state. Verbs expressing an externally caused change of state, such as *füllen* (“[to] fill”) or *schärfen* (“[to] sharpen”) received the label OMR. The label CONT was assigned to ‘anticausative’ verbs expressing an internally caused change of states, such as *blühen* (“[to] blossom”), or to verbs expressing an ‘internally caused’ process such as *brummen* (“[to] buzz” in the context of a broken fan of a computer) or *fließen* (“[to] flow”).

#### 4. Architecture

For each sentence, we store the dependency syntactic analysis by produced by Bohnet’s statistical parser in the B3DB. We define syntactic features that can be identified by the parser, such as the occurrence of a dative object subcategorized by the verb under consideration. The feature [+/-

DAT] is then automatically annotated to each sentence next to its *nach*-verb lemma and to its parse tree.

By storing and combining manual and automatic analyses in the relational database B3DB, Haselbach’s hypotheses can be validated, via database queries, against large amounts of corpus data, cf. Figure 2.

#### 5. Results and examples

From the 246 verbs classified according to Haselbach’s hypothesis (cf. section 3.2.), 58 verbs are labelled exclusively with OBJ, OMR, CONT, or a combination of these, thus they are predicted to occur only without a dative argument. From these 58 verbs, 38 have a higher frequency than 5 in our corpus and are therefore taken into account (Evert, 2004, p. 132). Table 1 gives the 38 verbs (1st column) together with their predicted class(es) according to Haselbach’s hypothesis (2nd column) and the actual occurrences in our corpus with (3rd column) and without (4th column) a dependent dative argument.

In the following, we take a closer look at the verbs with more than 5 counterexamples: *nachfüllen* (“[to] refill”, 9 counterexamples), *nachgießen* (“[to] refill (by pouring)”, 5 counterexamples), *nachhallen* (“[to] resonate”, 5 counterexamples), *nachklingen* (“[to] linger/echo”, 13 counterexamples), and *nachwachsen* (“[to] grow again”, 50 counterexamples). We manually inspected the counterexamples and categorized them in the following way:

- I: the automatic analysis is erroneous  
(→ false negative for Haselbach’s hypothesis),
- II: the dative is not triggered by *nach*  
(→ false negative for Haselbach’s hypothesis), or
- III: the example is an instance against hypothesis  
(→ true negative for Haselbach’s hypothesis).

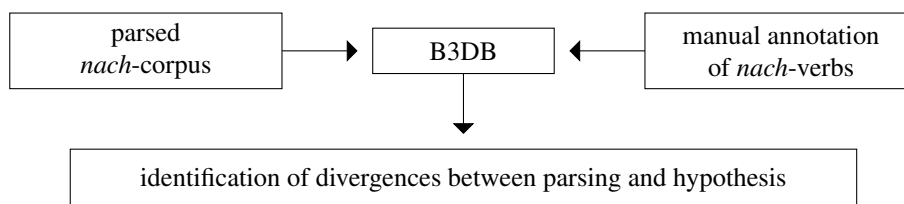


Figure 2: Architecture for hypothesis testing

Lemma	Prediction	Occurrences	
		[+DAT]	[-DAT]
nachbeben	CONT	1	5
nachblühen	CONT	0	10
nachbluten	CONT	0	16
nachbrechen	OMR	0	6
nachbrennen	OBJ CONT	1	13
nachbrüten	OMR CONT	0	6
nachcolorieren	OMR	0	8
nachcremen	OMR	0	26
nachdiplomieren	OMR	0	6
nachdüngen	OMR	0	44
nachdunkeln	OMR CONT	0	77
nacheichen	OMR	0	8
nachfärben	OMR CONT	0	15
nachfertigen	OBJ OMR	1	20
nachfetten	OMR	0	27
<b>nachfüllen</b>	OMR	<b>9</b>	694
nachgaren	OMR CONT	0	9
nachgären	CONT	0	26
<b>nachgießen</b>	OBJ OMR	<b>5</b>	177
<b>nachhallen</b>	CONT	<b>5</b>	216
nachhärten	OMR	0	6
nachimpfen	OMR	1	36
<b>nachklingen</b>	CONT	<b>13</b>	327
nachlösen	OMR	0	29
nachölen	OMR	0	9
nachpflanzen	OMR	1	63
nachquellen	CONT	0	13
nachreifen	CONT	0	122
nachreinigen	OMR	0	18
nachsalzen	OMR	0	30
nachschärfen	OMR	0	60
nachsickern	CONT	0	6
nachsortieren	OMR	2	32
nachsüßen	OMR	0	25
<b>nachwachsen</b>	CONT	<b>50</b>	1,249
nachweißen	OMR	0	20
nachwärzen	OMR	0	201
nachzuckern	OMR	0	7

Table 1: Corpus occurrences of *nach* verbs predicted not to license a dative argument

Table 2 shows the distribution of the apparent counterexamples with respect to above-mentioned categorization.

### 5.1. Erroneous automatic analyses

Cases for erroneous automatic analyses might be as in (5) and (6).

Lemma	Sum	I	II	III
nachfüllen	9	7	2	0
nachgießen	5	0	4	1
nachhallen	5	1	2	<b>2</b>
nachklingen	13	8	0	<b>5</b>
nachwachsen	50	8	40	2

I = erroneous automatic analysis,  
 II = dative is not licensed by *nach*,  
 III = counterexample for hypothesis

Table 2: Distribution of apparent counterexamples

- (5) *Nach 1.000 km mußte ich den ersten Liter\*<sub>DAT</sub> vollsynthetisches Öl nachfüllen, die Kosten wurden über einen Gutschein abgedeckt.*  
 “After 1,000 km, I had to refill the first liter of fully synthetic oil; the expenses were reimbursed by means of a voucher.”
- (6) a. *Zumindest klang es dem Tonfall<sub>DAT</sub> nach\*<sub>SVP</sub> wie eine Standpauke, denn die Drachin zeterte, mit flatternden Flügeln, ziemlich heftig auf den Junior ein.*  
 “At least according to the tone of the dragon mother’s voice, it sounded like roasting, because she addressed her offspring vociferating quite vigorously with clapping wings.”
- b. *Die internationalen Finanzströme wachsen dem Volumen<sub>DAT</sub> nach\*<sub>SVP</sub> und berühren auch die Privathaushalte.*  
 “The international financial flows grow with respect to capacity and also affect private households.”

In (5), the noun *Liter* (“liter”) belonging to the complex direct object *den ersten Liter vollsynthetisches Öl* (“the first liter of fully synthetic oil”) is erroneously analyzed as dative. The examples in (6) show cases where *nach* is erroneously analyzed as a separable verb particle (svp) of the verbs *klingen* (“[to] sound” in example (6-a)) and *wachsen* (“[to] grow”, in example (6-b)). In these cases, *nach* is a postposition meaning “according to”.

### 5.2. Datives not licensed by *nach*

Datives that are not triggered by *nach* can be for example benefactive (ben) datives such as in (7) and (8). For the verb *nachwachsen*, as in (8), the high number of datives that are not licensed by *nach* is not surprising, as this verb is commonly used with a benefactive dative.

- (7) *Unaufgefordert goß ihm<sub>DAT:ben</sub> der Wirt Wein nach und schaute erwartungsvoll auf den Erzähler, der*

erst weitersprach, als sich der Humpen bis zum Rand gefüllt hatte.

“Without being asked, the bartender refilled his glass of wine and looked eagerly at the narrator who only continued talking when the glass was full to the brim.”

- (8) a. *Denn diesem mexikanischen Salamander<sub>DAT:ben</sub> wachsen verlorene Gliedmaßen wieder vollständig nach.*  
 “The limbs of this Mexican salamander grow back completely.”  
 b. *Ich danke dem Haargott, dass den Menschen<sub>DAT:ben</sub> immer wieder die Haare nachwachsen.*  
 “I thank the god of hair that humans’ hair grows again and again.”

### 5.3. Counterexamples for Haselbach’s hypothesis?

#### 5.3.1. Coercion and poetic style

The passive sentence in (9) gives rise to a figurative interpretation of the verb *gießen* (“[to] pour”), namely that an implicit agent pours hatred and lies in the direction of the individual denoted by the dative pronoun *ihm* (“him”). Additionally, the interpretation of *nach* entails that the individual in the direction of whom the bad things are poured undergoes movement, which is predicted by Haselbach. We consider this instance of the verb *gießen* as being coerced to a directional reading and thus compatible with a DIR-reading of *nach*. However, this usage of *nachgießen* appears to us as poetic style.

- (9) *Haß und Lügen werden ihm<sub>DAT</sub> nachgegossen.*  
 fig.: “Hatred and lies were poured after him.”

Within the *nachwachsen*-examples, we also find two instances of datives not denoting the benefactive relation present in example (8). The examples in (10) and (11) are cases where the authors interpret *wachsen* (“[to] grow”) as an agentively controllable activity that has a certain manner, as in (10), or that can be steered in a certain direction which is provided by *nach* and the dative argument. However, we consider these interpretations as quirky.

- (10) *Sie braucht nicht viel Regen, aber starke Wärme; anfangs hat sie ein sehr zartes Blatt, aber sie wächst dem Weizen<sub>DAT</sub> nach und macht sich zuletzt sehr stark.*  
 “It doesn’t need much rain, but strong heat; in the beginning, it has tender leaves but it grows like wheat and becomes strong in the end.”  
 (11) *Die Wurzeln wachsen dem Wasser<sub>DAT</sub> nach, und der Rasen bildet so einen tieferreichendes Wurzelwerk; wird resistenter gegen Trockenheit.*  
 “The roots grow towards the water and thus the lawn develops deep roots; it gets more drought-resistant.”

#### 5.3.2. Refinement for Haselbach’s hypothesis

However, we also find cases that provide useful data for a refinement of Haselbach’s hypothesis. The examples (12)–(17) show unpredicted usages of the sound existence verbs

(Levin, 1993, pp. 252–253) *hallen* (“[to] echo”) and *klingen* (“[to] sound”) in combination with the particle *nach*.

- (12) *Meine Klamotten flogen hinter mir her und mit ihnen tausend üble Verwünschungen, die mir<sub>DAT</sub> höhnisch durchs Treppenhaus nachhallten.*  
 “My cloths were thrown after me and with them thousands of curses that followed me derisively through the stairway.”  
 (13) *Seine Schmerzensschreie hallten mir<sub>DAT</sub> nach.*  
 fig.: “His screams of agony pursued me.”  
 (14) *Ich blicke dich an, der Text klingt mir<sub>DAT</sub> nach ...*  
 fig.: “I look at you, the text resonates <sup>2</sup>within/<sup>2</sup>after<sup>2</sup>... me.”  
 (15) *Als er mit den Bratschen haderte, sprang der Stein fort, spritzte über den Weg, die Zinken klangen ihm<sub>DAT</sub> nach wie Stimmgabeln.*  
 fig.: “When he quarreled with the violas, the stone jumped away, spurted across the way, (and) the cornetti sounded after him like tuning forks.”  
 (16) *Ihr Begeisterungsjubel klingt uns<sub>DAT</sub> bis in die Kabine nach.*  
 fig.: “Their cheering followed us into the locker room.”  
 (17) *Aus beiden Gemeinden klingt ihm<sub>DAT</sub> Gutes nach.*  
 “He was appreciated in both congregations.”

These cases clearly show that the verbs *hallen* and *klingen* (both non-agentive) can be interpreted as directional in German. Thus, it seems that directionality is a hard constraint for the DIR-reading of *nach*, whereas the agentivity constraint for the DIR-reading can be rejected for this interpretation of *nach*, which is against the prediction by Haselbach.

Another unpredicted instance of *nachklingen* is found in example (18).

- (18) *Gedoppelt wird der Orchesterklang durch eine Elektronik, welche sich direkt aus dem Instrumentalklang entwickelt und als mehrminütiges Echo dem schattenhaften Orchesterspiel<sub>DAT</sub> nachklingt.*  
 “The sound of the orchestra is doubled by electronic means that evolve directly from the sound of the instruments and the sound lasts longer than the hazy playing of the orchestra, like an echo that lasts for several minutes.”

Here, *nachklingen* plus dative might be interpreted as “sounding longer than something”. However, we consider this usage of *nachklingen* as exceptional.

## 6. Conclusions

In this paper, we presented a corpus study, where we validated Haselbach’s hypothesis on German *nach*-particle verbs against automatically dependency parsed corpus data. It has turned out that, in principle, the theory makes correct predictions, however needs some refinements for the category of sound existence verbs, on top of those which we have yet to take into account.

Nevertheless, we can identify classes of verbs where neither the verb itself nor the particle *nach* license a dative argument, i.e. verbs labelled exclusively with OBJ, OMR, CONT, or a combination of these. This information could be used for machine translation systems to identify benefactive datives, which might require a different translation (e.g. a *for*-PP in English) as a dative argument triggered by *nach*.

Overall, our architecture proves useful for the exploration of large amounts of corpus data needed for hypothesis testing in theoretical linguistics.

## 7. Future work

In this corpus study we presented the cases of *nach*-particle verbs where a dative is not expected. For these cases, the comparison between the predictions and the corpus data syntactically analyzed by Bohnet's parser turned out to yield promising results. For the other side however, i.e. the cases where a dative **is** expected, a first data inspection showed a less clearer picture, which seems to be due, in many cases, to the fact that the parser often cannot correctly identify dative arguments. This is not surprising, as the German noun phrase is often ambiguous with respect to case, and as dative is more infrequent than nominative and accusative. For a detailed discussion thereof, see Seeker and Kuhn (2011).

To improve the reliability of the automatic analysis, we plan to integrate the analyses of other parsers, such as the rule-based FSPar (Schiehlen, 2003). We think that the database architecture is able to capture this, cf. Eckart et al. (2010). Thus, we would also be able to identify false positives. In Table 1, these are the cases that apparently occur without a dative according to the automatic analysis, but where the parser failed to identify a dative.

Additionally, we plan to enlarge the number of annotators for the manual annotation of Haselbach's classes to obtain a more reliable classification of the lemmas.

## 8. Acknowledgements

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## 9. References

- Marco Baroni and Adam Kilgarriff. 2006. Large linguistically-processed web corpora for multiple languages. In *Proceedings of EACL-2006*, pages 87–90, Trento.
- Bernd Bohnet. 2010. Top accuracy and fast dependency parsing is not a contradiction. In *Proceedings of COLING-2010*, pages 89–97, Beijing.
- Nicole Dehé, Andrew McIntyre, Ray Jackendoff, and Silke Urban, editors. 2002. *Verb-Particle Explorations*. Mouton de Gruyter, Berlin.
- Kurt Eberle, Kerstin Eckart, Ulrich Heid, and Boris Haselbach. to appear. A tool/database interface for multi-level analyses. In *Proceedings of LREC-2012*, Istanbul.
- Kerstin Eckart, Kurt Eberle, and Ulrich Heid. 2010. An infrastructure for more reliable corpus analysis. In *Proceedings of the Workshop on Web Services and Processing Pipelines in HLT of LREC-2010*, pages 8–14, Valletta.
- Stefan Evert. 2004. *The Statistics of Word Cooccurrences: Word Pairs and Collocations*. Ph.D. thesis, IMS, Universität Stuttgart.
- Morris Halle and Alec Marantz. 1993. Distributed Morphology and the pieces of inflection. In Kenneth Hale and Samuel Jay Keyser, editors, *The View from Building 20*, Current Studies in Linguistics, pages 111–176. MIT Press, Cambridge/MA.
- Boris Haselbach. to appear. Deconstructing the German verb particle *nach* at the syntax-semantics interface. *GG@G-7*.
- Angelika Kratzer. 1996. Severing the external argument from its verb. In Johan Rooryck and Laurie Zaring, editors, *Phrase structure and the lexicon*, volume 33 of *Studies in Natural Language and Linguistic Theory*, pages 109–138. Kluwer, Dordrecht.
- Angelika Kratzer. 2004. Telicity and the meaning of objective case. In Jacqueline Guéron and Jacqueline Lecarme, editors, *The Syntax of Time*, pages 389–424. MIT Press, Cambridge/MA.
- Richard K. Larson. 1990. Double object revisited: Reply to Jackendoff. *Linguistic Inquiry*, 21(4):589–632.
- Beth Levin. 1993. *English Verb Classes and Alternations: A Preliminary Investigation*. University of Chicago Press, Chicago/London.
- Fabrice Nicol. 2002. Extended VP-shells and the verb-particle construction. In Dehé et al. (2002), pages 165–190.
- Liina Pykkänen. 2000. What applicative heads apply to. In Fox et al., editor, *Proceedings of the 24th Annual Penn Linguistics Colloquium*.
- Michael Schiehlen. 2003. A cascaded finite-state parser for German. In *Proceedings of EACL-2003*, pages 163–166, Budapest.
- Wolfgang Seeker and Jonas Kuhn. 2011. On the role of explicit morphological feature representation in syntactic dependency parsing for German. In *Proceedings of the International Workshop on Parsing Technology (IWPT 2011)*, pages 58–62, Dublin. Association for Computational Linguistics.
- Amir Zeldes, Julia Ritz, Anke Lüdeling, and Christian Chiarcos. 2009. ANNIS: A search tool for multi-layer annotated corpora. In *Proceedings of Corpus Linguistics 2009*, Liverpool, July 20–23.

<sup>4</sup>URL (07.03.2012): <http://www.uni-stuttgart.de/linguistik/sfb732/>