

The Case of German Two-Way Prepositions

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Ger	Eng
<i>an</i>	"at"
<i>auf</i>	"on"
<i>hinter</i>	"behind"
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A Peculiar Case

- (1) Najara ging **zu dem** alten Mann hinüber.
PR went **to the-DAT** old man over

“Najara went to the old man.”

- (2) Der Wind rauschte **um das-ACC** Haus
the wind rushed **around the-ACC** house

“The wind rushed around the house.”

- (3) a. Susi reist **in die** Heimatländer der Schulkinder.
PR travels **in the-ACC** homelands of the school children

“Susi travels into the homelands of the school children.”

- b. Susi reist **in den** Heimatländern der Schulkinder.
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① What Determines Case?

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Section 1

What Determines Case?

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Meaning difference

- (3) a. Susi reist **in die** Heimatländer der Schulkinder.
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“Susi travels into the homelands of the school children.”
- b. Susi reist **in den** Heimatländern der Schulkinder.
PR travels **in the-DAT** homelands-DAT of the school children
“Susi travels in the homelands of the school children.”

accusative	:	“directional” meaning
dative	:	“locational” meaning

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Meaning difference

- (3) Susi reist **in die/den** Heimatländer/n ...
PR travels **in the-ACC/DAT** homelands/-DAT ...

"Susi travels in(to) the homelands"

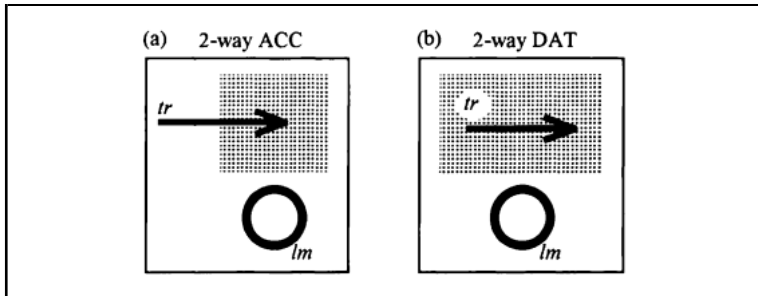


Figure: Trajector entering search domain (accusative) or not (dative)
(Langacker, 1999, p. 35)

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Exceptions to the rule and influencing factors

- other prepositions

(1) Najara ging **zu dem** alten Mann hinüber.
PR went **to the-DAT** old man over

“Najara went to the old man.”

- multiword units with non-local meanings (Baten, 2009)

(4) Er **verliebt sich in das** Mädchen.
he **falls in love REFL in the-ACC** girl

“He falls in love with the girl.”

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Exceptions to the rule and influencing factors

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- Verb classes attract different cases (De Knop, 2008)

(5) Ich **setze** mich in **meinen** Wagen.
I **sit down** me in **my-ACC** car

"I sit down into my car.

(6) Ich **sitze** in **einem** Kästchen.
I **sit** in **a-DAT** box

"I sit in a box."

- Other verb classes, syntactic role of PP, particle verbs, transitivity, voice, POS of lexical head, ... (Rehbein and Genabith, 2006; Rys, Willems, and De Cuypere, 2014; Smith, 1995; Willems, 2011; Willems, De Cuypere, and Rys, 2018)

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Limits of previous studies

- Introspective
- Very small sample sizes
- Cover only handful of lexically specific contexts
- Little detail and explanation

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Section 2

The Current Study

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Subsection 1

Method

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Sample Preparation

- Leipzig Corpus Collection (Goldhahn, Eckart, and Quasthoff, 2012)
- 1-million-sentence corpus of mixed German
- POS-tagged and parsed with Zurich Dependency Parser (Sennrich, Volk, and Schneider, 2013)
- Sampled 1,000 sentences for each of nine two-way preposition

Table: Distribution of prepositions in the sample

	an	auf	hinter	in	neben	über	unter	vor	zwischen	Total
n	1186	1083	970	1396	966	956	931	975	869	9332
p	12.71	11.61	10.39	14.96	10.35	10.24	9.98	10.45	9.31	100

Note n = number, p = proportion in %

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Coding and Statistical Analysis

Sample was coded for...

- Syntactic role of PP
- POS of lexical head and complement
- Particle verbs
- Voice
- Transitivity
- ...
- Individual prepositions
- Lexical heads and complements

Coded sample was analyzed using ...

- Collostructional analysis (Gries and Stefanowitsch, 2004)
- Mixed-effects logistic regression (Johnson, 2008, pp. 216–258, Levshina, 2015, pp. 253–276)

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Prepositions Attract Case

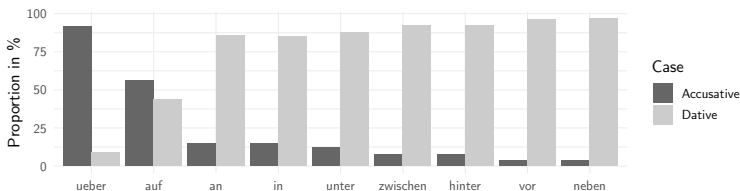


Figure: Distribution of prepositions across accusative and dative

Table: Results of collocation analysis of case and individual prepositions

Preposition	über	auf	an	in	unter	zwischen	hinter	vor	neben
Preferred case	Accusative	Accusative	Dative	Dative	Dative	Dative	Dative	Dative	Dative
$-\log_{10}(p)$	Inf	139.14	15.13	17.64	18.47	37.57	41.93	71.76	72.69
ΔP	0.76	0.37	-0.1	-0.1	-0.12	-0.18	-0.18	-0.22	-0.22

Note: Statistical significance at $-\log_{10}(p) \geq 1.3$.

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Lexical Heads Attract Case

... V Prep NP

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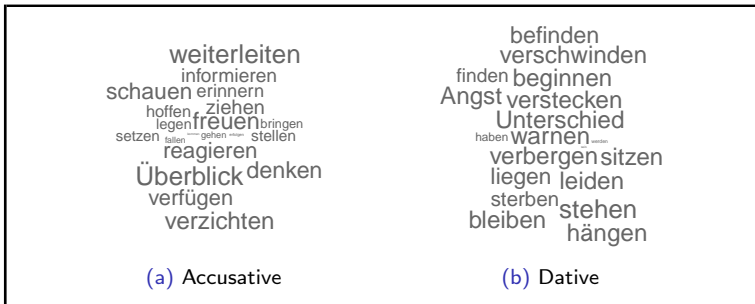
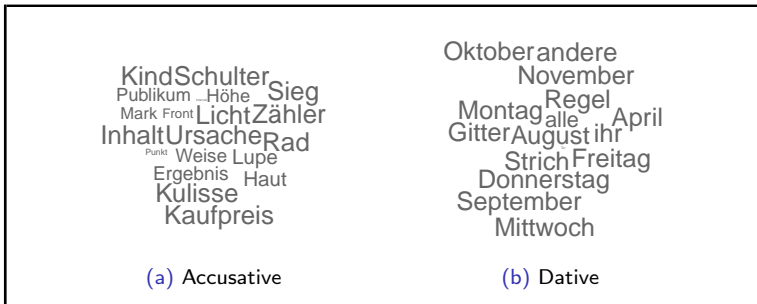


Figure: Results of collocation analysis of case and lexical heads (with all $p < 0.05$ and size indicating ΔP)

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Lexical Complements Attract Case

... V Prep **NP**



(a) Accusative

(b) Dative

Figure: Results of collocation analysis of case and lexical complements (with all $p < 0.05$ and size indicating ΔP)

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Little influence of other factors

Table: Results of logistic regression analysis predicting dative case

	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>
Intercept	2.15	0.62	3.46	***
Contracted (vs stand-alone) preposition	1.63	0.15	11.11	***
Transitive (vs intransitive) verb	-0.39	0.08	-4.86	***
Location	-0.79	0.05	-15.35	***
Past participle (vs no past participle)	-0.53	0.09	-5.83	***
Particle verb (vs no particle verb)	-0.31	0.15	-2.06	*
Adjunct (vs object)	1.17	0.08	14.3	***
Complement cue validity	0.1	0.01	7.37	***
Number of observations	9332			
Kappa	8.48			
Predictive accuracy	0.88			
Predictive accuracy (no prepositions)	0.77			
Predictive accuracy (naive)	0.77			

Note * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

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Model Estimates for Prepositions

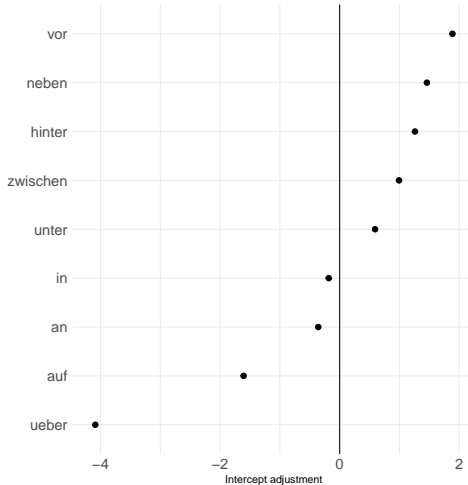


Figure: Intercept adjustments for individual prepositions in the regression model predicting dative case

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Usage-based Constructions

Results indicate that ...

- Case of two-way prepositions depended on lexical context
- Higher-level factors had little influence on case

... suggesting a **usage-based grammar network** (Diessel, 2019).

- Language use shapes linguistic structures.
- Linguistic structures are symbolic constructions.
- Constructions are connected to each other (network).
- Connection strength depends on frequency of co-occurrence.

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Low-level Chunked Lexical Strings

Invariant lexical strings are chunked and stored at low levels of representation.

denken an → NP_{Acc}
("think of")

Angst vor → NP_{Dat}
("fear of")

freuen über → NP_{Acc}
("be glad about")

warnen vor → NP_{Dat}
("warn about")

verzichten auf → NP_{Acc}
("relinquish")

sterben an → NP_{Dat}
("die from")

...

...

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Mid-level Prototypes

Accusative and dative attract different groups of meaning-related verbs and specific prepositions. Language users extract these distributional usage patterns from their input.

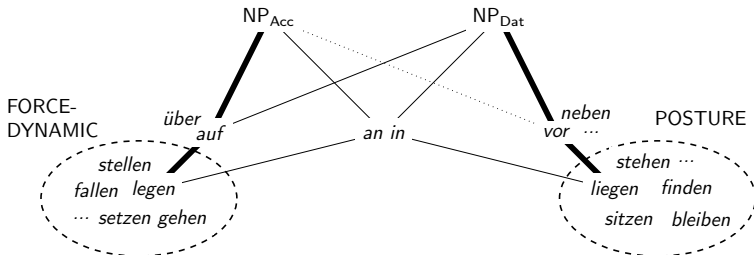


Figure: Network of case constructions and associated lexical items; line strength indicates strength of associative connection

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Prototypes Determine Case in Similar Contexts

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- (7) Mitten **im** Ort **befindet** sich ein
in the middle **in-the-DAT** village **is located** REFL a
Campingplatz.
camping site

"There is a camping site located in the middle of the village."

- (8) Das Unternehmen **tritt** **auf die** Kostenbremse.
the company **steps on the-ACC** cost breaks

"The company cuts down costs."

- (9) Ich **wartete** jetzt jeden Tag **auf das** Ergebnis.
I **waited** now every day **on the-ACC** results

"I waited for the results every day."

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Productive Extensions to Case in Novel Contexts

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Conclusion

- Case of two-way prepositions depends on lexical context
- Lexicogrammatical constructions connect lexical items and case at different levels of schematicity
- Item-specific prototypes associate cases with groups of meaning-related verbs

Two-way prepositions are no grammatical “misfits” anymore but part of network in which case is connected to prepositions and other lexical items depending on their use.

Future studies should focus on effects of lexical strings on case and in general the sequential predictability of case from lexical context.

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