**The relationship between morphology, syntax
and animacy in language change.
An Instruction Grammar perspective**

Seminar Script (2017)

Simon Kasper
www.simonkasper@info

Introduction: Interpreting who does what to whom in clauses

The microperspective on interpretation

We use language in order to inform others, request something from others or share feelings and attitudes with others – independently of whether language developed for these functions in the first place. That language actually satisfies these functions depends on one of the (few) absolute universals of language, which could be argued to belong to the definition of language: All (natural) languages are successfully interpretable in terms of "what stands in which relation to what", or, simplified, "who does what to whom" for their users.

The semantic relations of "who does what to whom" are often described using predicate–argument structures of the following kind:

❖ Speaker's concept:
   SEE (3SGF, man, binoculars)
          AG   PAT   INST

This is one possible (though simplified) representation of a speaker's concept of an event. This concept is invisible to his/her interlocutors. In order to communicate the concept, it must be expressed by means of a linguistic utterance.

Grammatical devices

To express such relations by means of a clause, there are several "grammatical" devices by which the semantic relations are expressed and the utilization of which allows the identification of semantic relations (who does what to whom) for an interpreter.

❖   i) morphology
              a) grammatical (case and agreement)
              b) lexical (adpositions)
        ii) element order and
        iii) prosody

The utterances expressing semantic relations can be described as verb–complement structures, where subjects and all kinds of objects count as complements. The following abstract linguistic structure represents the clause that unambiguously expresses the speaker's event concept.
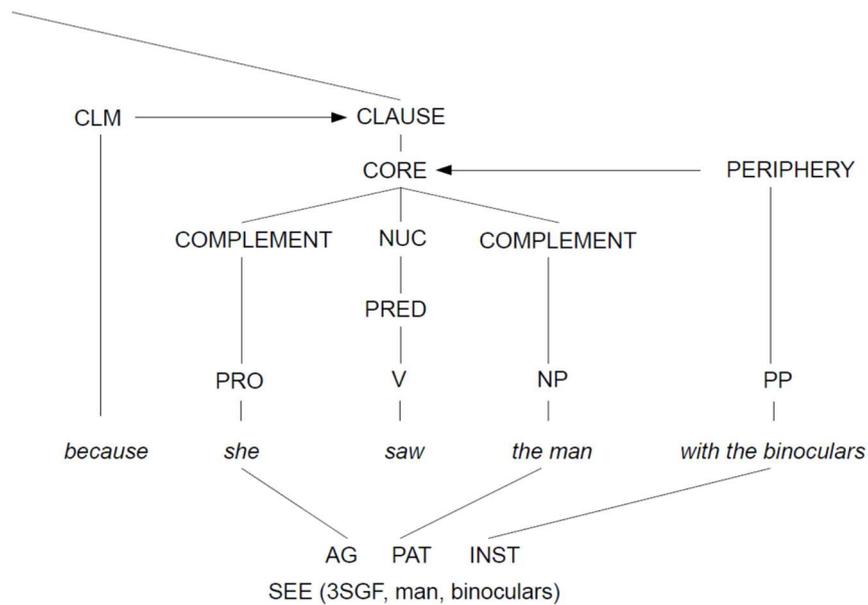
An unambiguous structure as represented by the linguist

However, this structure is not what the interpreter is confronted with. Rather, he/she is confronted with a linear sequence of sounds, graphs or gestures, around which clever linguists build hierarchical structures the "reality" of which is far from clear (e.g. MacWhinney, Bates & Kliegl 1984).

❖ Utterance as perceived by the interpreter:
   … because she saw the man with the binoculars

This linear ordering allows the interpreter (at least) two different interpretations with respect to semantic relations, i.e. the conceptualization of two different events. The first interpretation is that of the speaker.

❖ Interpreter's concept (possibility 1):
   SEE (3SGF, man, binoculars)
        AG   PAT   INST

The alternative event structure and the one differing from the speaker's event concept is the following:

❖ Interpreter's concept (possibility 2):
   SEE (3SGF, man) & POSS (man, binoculars)
        AG   PAT

The unambiguous abstract syntactic structure which corresponds to this event concept is this:
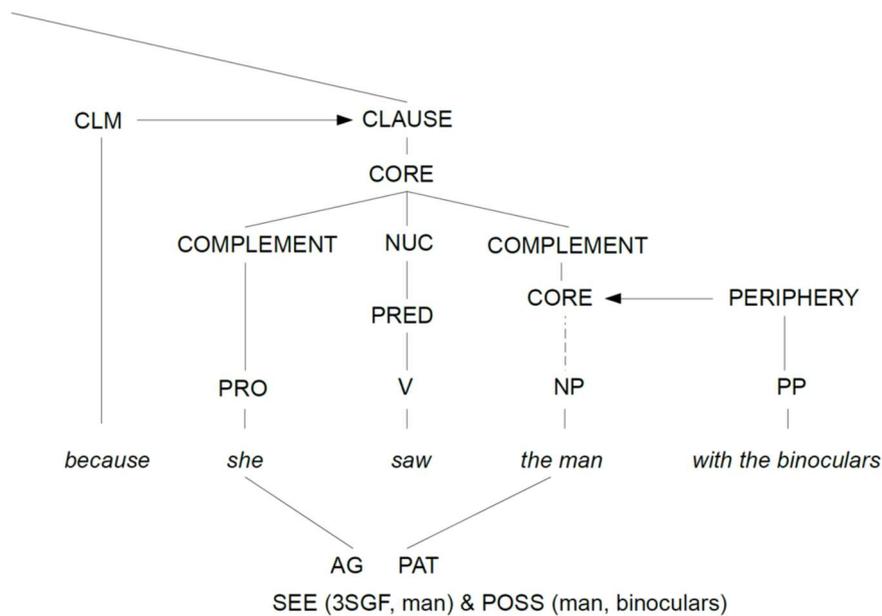
Unambiguous structure as represented by the linguist

Thus, informing an interlocutor, sharing feelings and attitudes with him/her and requesting something from him/her requires that the interlocutors have sufficiently similar event concepts in terms of "who does what to whom". However, whereas the speaker has a unique event concept to express, the interpreter may "read" more than one event concept "off" the utterance.

Speaker's concept	⟹	utterance	⟹	Interpreter's concept
PRED (AG$_i$, PAT$_j$, ...$_k$)		*... {V}... COMP1... {V}... COMP2... {V}*		PRED (AG$_i$, PAT$_j$, ...$_k$)
				or
		i) morphology		PRED (AG$_j$, PAT$_i$, ...)
		a) grammatical (case/agreement)		...
		b) lexical (adpositions)		
		ii) element order and		
		iii) prosody		
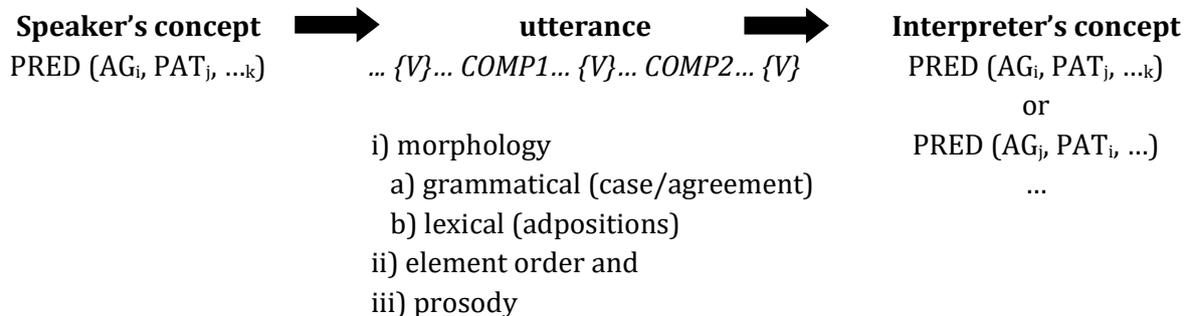
Grammatical (under)specification in interpretation

In spoken language it is possible that the speaker produces, and the interpreter utilizes, prosodic features, e.g., a small pause between over *the man* and *with the binoculars* or no pause and a single intonation contour for *the man with the binoculars*. The pause may trigger the interpreter to associate the PP with the verb and not with the adjacent object NP. The lack of a pause and a single intonation contour over NP and PP could trigger the association of the PP and the direct object NP. If such clues are there but invalid, the above utterance would be structurally ambiguous. If the clues are there and valid, this demonstrates the efficacy of the grammatical device "prosody" for the identification of semantic relations. The grammatical devices would disambiguate the clause. In diachronic studies prosody is mostly not available, anyway.

Interpreters can distinguish only particular types of semantic relations using prosodic cues but this is by the best of our knowledge not possible for the distinction between subjects and objects (S and O; A and P), i.e. in deciding whether the referent of *she* or *the man* is the S/A.

☞ Roughly, prosody may allow the identification of what belongs to what, but not "who does what to whom". A subject–object ambiguity cannot be resolved by prosodic cues.
☞ Identifying what is subject and object in a clause must therefore (at least) make use of morphology and element order.

From cross-linguistic and historical perspectives the presence of rich grammatical morphology and the rigidity of element order seem to depend on each other to some degree, but both the precise causal connection and the directness of the causal connection are matters of debate.

The macro-perspective on morphology and element order

Observed correlations

> Ein Monem, das seine Beziehungen zum Kontext nicht impliziert und sich nicht mit Monemen verbindet, durch die sie gekennzeichnet werden, muß durch seine Stellung angeben, in welchem Verhältnis es zu dem Rest der Äußerung steht: Paul wird in *Peter schlägt Paul* durch seine Stellung nach *schlägt* als Gegenstand der Mißhandlungen gekennzeichnet, in *Paul schlägt Peter* als ihr Urheber. (Martinet 1963: 99)
> [A moneme [~ morpheme or lexeme – SK] which neither makes its relation to the context clear by implication nor combines with marking monemes must indicate its relation to the context by means of position. In *Peter schlägt Paul* ['Peter hits Paul'] *Paul* is marked as the patient of hitting by means of its position after *schlägt*. In *Paul schlägt Peter* the position of *Paul* marks it as the causer. [my translation]]

> Syntactic (and morphological) processes which have the same 'function' covary in their distribution across languages. [...] By covary we mean that the more a language has one of the processes the less it need have the other. By 'have the same function' we mean something like 'code the same semantic or syntactic information'. [...] The principle predicts then that the more we assign a language overt case marking the freer can be its basic word order and conversely. (Keenan 1978: 120–121)

> It is plausible to argue that the case system of German is responsible for the greater clause-internal word order freedom of that language. Across languages the existence of rich surface case marking typically correlates with word order freedom of the kind we have seen in German. The reason most commonly advanced for this is that 'fixed' word order at the sentence level in a language like English encodes grammatical relations such as subject, direct object and indirect object, which are morphologically encoded in a case-marked language. And word order permutations are possible in a case-marked language since grammatical relations are recoverable morphologically. (Hawkins 1986: 40)

It has long been observed that the shift from an inflectional to a mainly isolating morphological type which affected several Indo-European languages took place at the same time as extensive syntactic restructuring, reflected in restrictions on constituent order […] and in the widespread use of analytic constructions. The apparent simultaneity of these two phenomena accounts for the general agreement found in traditional literature on the existence of a functionalist relation between case morphology and syntactic structures […]. (Polo 2002: 124)

There is a long tradition of attributing the fixing of word order (and the increase in the use of prepositions) in English to loss of case-marking distinctions or syncretism which led to a (nearly) compete absence of case morphology […]. However, these traditional treatments do not offer explanations of the specific mechanisms involved. (Allen 2006: 201).

Causal connections

[…] Ibn Khaldûn (1332–1406) observed that Arabic word order was substituted for lost case endings in order to distinguish 'agent' from 'object (Owens 1988: 270). […] J. C. Scaliger (1540) […] believed that cases emerge because of ambiguity, to make clear the role of nouns in a sentence, since, he believed, nouns originally lacked inflection (Breva-Claramonte 1983: 62). Lamy (1675) observed that French fixed word order has the function of replacing lost inflectional endings (Scaglione 1981: 41). Herder (1772) also held the view that the adoption of fixed word order avoids structural ambiguity, ambiguity being related to the limitations of inflection. (Harris & Campbell 1995: 24–25)

This brings us to the second of the major drifts, the tendency to fixed position in the sentence, determined by the syntactic relation of the word. We need not got into the history of this all-important drift. It is enough to know that as the inflected forms of English became scantier, as the syntactic relations were more and more inadequately expressed by the forms of the words themselves, position in the sentence gradually took over functions originally foreign to it. (Sapir 1921: 177–178)

This, then, is the conclusion I arrive at, that as simplification of grammatical structure, abolition of case distinctions, and so forth, always go hand in hand with the development of a fixed word order, this cannot be accidental, but there must exist a relation of cause and effect between the two phenomena. Which, then, is the prius or cause? To my mind undoubtedly the fixed word order, so that the grammatical simplification is the posterius or effect. It is, however, by no means uncommon to find a half-latent conception in people's minds that the flexional endings were first lost 'by phonetic decay,' or 'through the blind operation of sound laws,' and that then a fixed word order had to step in to make up for the loss of the previous forms of expression. But if this were true we should have to imagine an intervening period in which the mutual relations of words were indicated in neither way; a period, in fact, in which speech was unintelligible and consequently practically useless. The theory is therefore untenable. It follows that a fixed word order must have come in first. (Jespersen 1922: 361)

La réduction progressive de la flexion a eu en germanique les mêmes effets que partout ailleurs. Elle a conduit à employer l'ordre des mots comme un mode d'expression grammaticale et à développer l'usage des mots accessoires. En germanique commun, où la flexion était encore riche et variée, l'ordre des mots était souple et n'avait pas de valeur grammaticale. Aucune fonction grammaticale n'était marquée par la place du mot. (Meillet 1917: 187)
[The progressive reduction of inflection had the same effects in Germanic as it had anywhere else. It has brought about the use or word order as a means of grammatical expression, as well

as the use of auxiliary words. In common Germanic where inflection was still rich and varied, word order was free and did not have grammatical value. [my translation]]

The point that is important for our purpose is the question what consequences this morphological collapse [from the Old to the Middle English period – SK] had. After the collapse, it was no longer possible to identify the grammatical function of a noun by its case morphology. Therefore other ways had to be found to unambiguously express grammatical functions of nouns. In English two strategies came to be used, the replacement of case forms with prepositional phrases and the rigidification of word order. [...] Whereas in earlier stages of English it was possible to perform operations that moved e.g. one of the objects or both over the subject [= scrambling – SK], this option ceased to be possible in Middle English. This is because in Old English movement chains could be reconstructed due to the presence of case marking at the noun phrases. After the loss of case endings, however, the only way to identify e.g. a noun phrase as direct object was by its position after the subject [...]. [T]here are some problems with this scenario. The rigidification process seems to have set in already in the middle of the Old English period, when case morphology was still available. [...] Also, the fact that it appeared with pronouns too, although they kept their case marking, suggests that the connection between rigidification and the loss of case marking is not as immediate as one might want to believe. [...]
[Can] the decline in topicalization [...] be explained by the general tendency toward rigid word order[?] [...] [I]t is conceivable that the same argument that goes against scrambling could also apply to topicalization. [...] An immediate objection to this explanation is the fact that topicalization is still grammatical today, whereas scrambling is not. [...] We see that the explanation that topicalization went out of use because it interfered with the configurational marking of grammatical functions cannot be correct. (Speyer 2010: 44–49)

There are three basic ways of marking the function of a core argument.
(i) *Marking on an NP* [b]y choice from a system of case affixes or clitics, or by an adposition [...] which may be a separate word or a clitic [...].
(ii) *Marking by a bound pronominal* [...].
If both A and O have the same number and belong to the same gender or noun class, then some other mechanism needs to be brought in to distinguish them. This may be achieved by constituent order. Or, in some languages, an ergative or accusative case is optional, being used just to supplement bound pronouns when ambiguity would otherwise result.
(iii) *Constituent order*. (Dixon 2010–2012, I, 125–126)

Mechanisms

Implicational relationship
❖   no/few morphological differentiations -> (more) rigid element order
but not
❖   (more) rigid element order -> no/few morphological differentiations
(cf. Kiparsky 1997)

Case features percolate in the morphology from affixes to stems, and in the syntax from clitics to their hosts and from words to the phrases they head. Agreement morphology and structural licensing positions confer their case features upon the arguments which are respectively coindexed with them and positioned in them. [...] Morphosyntactic case feature values are normally negative, viz. [–LR] [lowest role – SK] and [–HR] [highest role – SK]. The effect of the

feature values [–LR] and [–HR] is to prohibit the arguments that bear them from being as-
signed the lowest- and highest-ranked available Th-role, respectively. [...] The same morpho-
syntactic case features induce a parallel intrinsic classification of agreement and position as
well. The familiar type of subject agreement is unspecified (i.e. nominative), but [...] dative
agreement ([–LR], [–HR]) also exist[s]. As for position, the feature values are assigned to in-
ternal argument positions as follows: [...] Complement positions are [–HR]. [...]
Non-final complement positions are [–LR]. (Kiparsky 1997)

There is an obvious inherent asymmetry between position and morphology in that the prop-
erty of linearity guarantees the availability of position as a potential licenser (whether reces-
sive or dominant), whereas case and agreement may simply be lacking in the morphology. A
language may lose its inflections but it cannot lose its word order in the same sense: it must
go on putting one word after another, even when it does not grammatically exploit or constrain
word order. A corollary is that position is always ready to pick up the licensing function when
morphology ceases to be able to handle it. Therefore, since Th-role assignment to arguments
must be licensed by case features, loss of inflections automatically brings about a shift to po-
sitional licensing, with all the consequences that this entails. (Kiparsky 1997)

Alterations of syntactic patterns takes place by means of specific mechanisms of change. We
hypothesize that there are only three basic mechanisms: reanalysis, extension, and borrowing.
(Harris & Campbell 1995: 50)

As the case and argument structure constructions in Germanic were partly synonymous, there
were two logical ways for the case and alignment system to develop: (i) by merging the argu-
ment structure constructions, with subsequent loss of case distinctions and case morphology,
and (ii) by eliminating the synonymous low type frequency constructions. A usage-based con-
structional approach, combined with a view of productivity based on type frequency, coher-
ence, and an inverse correlation between the two, predicts that high type frequency construc-
tions will gain in type frequency over time, as they attract new and existing verbs, at the cost
of low type frequency constructions. (Barðdal 2009: 124–125)

It is noteworthy that without further specification talk about causal connections and
mechanisms is ambiguous in at least two ways:
   ❖ Diachronic: The historical change in one grammatical device could be the cause or
      effect of the historical change in the other. (Sapir, Jespersen, Meillet, Speyer,
      Kiparsky, Harris & Campbell, Barðdal)
   ❖ Synchronic: Making use of one grammatical device in a language at a given point in
      time and space could be the cause or the effect of the unavailability of the other
      (Kiparsky, Dixon, Keenan, Hawkins).

Methodological (structuralist system, Generative competence) biases

Without exception, the scholars cited above talk about the relationship between morphol-
ogy and element order on the level of "language". One implication of such talk is that rich
morphology and constraints on element order are features of an abstract *langue* or of an
ideal speaker–listener's grammatical knowledge which holds language-wide. There are
two problems with this:

- ❖ Firstly, it neglects the fact that there is variation with respect to morphological differentiations especially *within* a language – as exemplified by their different inflectional paradigms – and that word order rigidity may, at least theoretically, differ from syntactic context to syntactic context within a language. Few, if any, languages exhibit a rigid element order in all syntactic contexts and at the same time lack morphological distinctions altogether.
- ❖ Secondly, and more importantly, it ignores the fact that language users – in our context: interpreters – are not confronted with abstract or ideal notions of languages but with concrete utterances. Different utterances from the *same* language may exhibit different degrees of morphological informativity and element order restrictions.

New High German: John 19, 27 and Matthew 26, 12

- ❖ S < O, morphologically informative:
  Da nahm der Jünger die Mutter Jesu zu sich [...].
  Then take.3SG DET.NOM disciple DET.NOM/ACC mother Jesus.GEN to him…
  'And from that hour that disciple took her (unto his own home).' (New King James)
  (Neue Genfer Übersetzung)

- ❖ O < S, morphologically informative:
  Und von jener Stunde an nahm sie der Jünger zu sich.
  And from that moment on took.3SG she.NOM/ACC DET.NOM disciple to him
  'And from that hour that disciple took her (unto his own home).' (New King James)
  (New High German, Einheitsübersetzung)

- ❖ O < S, morphologically uninformative:
  Das hat sie für mein Begräbnis getan.
  DEM.NOM/ACC.SG have.3SG she.NOM/ACC.SG for my burial do.PTCP
  'She did it for my burial.' (New King James)
  (Luther 1984)

Even if the scholars above acknowledge the fact that the grammatical devices serve the interpretability of utterances in terms of "who does what to whom", as Hawkins' statement demonstrates, they fail to address the fact that the correlation between the devices is hardly quantifiable on the level of a "language" and, as the examples above illustrate, that <u>there must be more to concrete successful interpretation than these grammatical devices</u>. Ambiguous clauses do not remain uninterpreted.

- ☞ Look at the interpretability/interpretation of actual utterances (micro-perspective)!
- ☞ Identify the factors in interpretation beyond the grammatical devices (beyond grammar)!

How much morphological ambiguity is possible (before… what)?

> „Die morphologische Symbolisierung von Merkmalen grammatischer Kategorien ist keine not-
> wendige Eigenschaft von Sprachen. Gleichwohl haben die Sprecher der meisten Sprachen ein
> Bedürfnis nach dem formalen Ausdruck grammatischer Basiskonzepte am Wort, deren Folge
> die Entwicklung flexionsmorphologischer Systeme ist. […] Neben den morphologische[n] Mar-
> kierungen werden auch die Serialisierung und die Prosodie als formale syntaktisches [sic] Mit-
> tel eingesetzt. Weil die Wortstellung aber im Deutschen – sowohl in der Standardsprache als
> auch in den Dialekten – in den Grenzen der topologischen Felderstruktur relativ frei ist und
> die Prosodie nur in seltenen Fällen syntaktische Disambiguierungen leistet, kommt den mor-
> phologischen Markierungen bei der Identifizierung der syntaktischen Struktur entscheidende
> Bedeutung zu." (Rabanus 2007: 256)
> ["The morphological symbolization of categorial features is not a necessary property of lan-
> guages. Nonetheless, speakers of most languages feel the desire to attach basic grammatical
> concepts to the word, leading to the development of inflectional morphological systems. Ele-
> ment order and prosody are utilized as syntactic devices besides morphological markers. But
> because element order in terms of topological fields is relatively free in the standard language
> as well as in the dialects, and because prosody allows disambiguation only in few cases, mor-
> phological marking is the most important grammatical device for the identification of syntactic
> structure." [my translation]]

> „Die Fälle zeigen, dass es im Sprachwandel eine Tendenz zur Reduzierung der Redundanz sol-
> cher Doppelmarkierungen gibt, Doppelmarkierungen aber keineswegs ausgeschlossen sind."
> (258)
> ["The cases demonstrate that there is a tendency towards the reduction of redundancy in lan-
> guage change, when categorial features are double-marked, but also that double-marking is
> possible." [my translation]]

> „Das Bedürfnis der Sprecher nach einem morphologischen Mininum [sic] sollte dazu führen,
> dass im Sprachwandel Strukturen […], die aufgrund zu vieler Synkretismen syntaktisch und
> semantisch ambig sind, abgebaut werden." (260)
> ["In the course of language change speakers' need for a morphological minimum should dispel
> syntactically and semantically ambiguous structures which have arisen due to syncretism."
> [my translation]]

German has retained its relatively free element order between S and O. Rabanus' morpho-
logical minimum in a minimal sentence is a valid functional constraint on varieties of Ger-
man – if viewed against the background of a flexible element order.

☞ However, German and English share a common ancestry, and in the history of English
    element order was rigidified (roughly: {O}SV{O}) between Old English and Middle
    English, although the Middle English minimal sentence still satisfied the morphologi-
    cal minimum. Why? Speakers of Middle English could afford abandoning the morpho-
    logical minimum.

A role for extra-grammatical devices

Actual language use does not (only) consist in minimal sentences making use of the word
classes with the fewest degree of syncretism (i.e. pronouns). Adverbal S and O comple-

ments may also be expressed as NPs containing articles, demonstratives, possessives, adjectives and nouns. Each of the inflectional paradigms allows for syncretism. Where this is the case, the probability of a morphologically ambiguous S or O constituent rises. Where S and O complements are morphologically ambiguous with respect to their status as S and O, and where the verb agrees with both of them morphologically, the clause becomes morphologically ambiguous. If in addition element order is (relatively) free, the clause becomes structurally ambiguous. How will an interpreter determine S and O/A and P, then?

> "The fewer grammatical devices a language or an actual syntactic structure provides for the identification of semantic roles, the higher is the share of extra-grammatical devices that are utilized in interpretation."
> "From the perspective of language comprehension specific cognitive processes play a crucial role. If a language exhibits case syncretism and at the same time a relatively free element order, this eventually results in ambiguity, i.e. the semantic relations cannot be 'read off' the (linear) morphosyntactic structure. At this point other clues to the correct interpretation must be found."
> "Our hypothesis is that the scales postulated in the functional-typological tradition include those units which provide a successful interpretation." (cf. Kasper 2012–2015: 3–4)

☞ For any given clause, if the interpreter cannot identify semantic relations by means of grammatical devices, he/she will assume

(a) that the referent higher on the following scales is the subject, or agent.
   ❖ Semantic scale (animacy or empathy)
      self > kin > human > animate > inanimate > location > abstract > mass
   ❖ Accessibility scale
      zero > verbal person > clitic pronoun > unstressed pron. > stressed pron. > prox. demonstrative > dist. dem. > prox. dem. + modifier > dist. dem. + mod. > first name > last name > short definite description > long definite description > full name > full name + modifier > indefinite description
   ❖ Discourse-pragmatic scale
      Speech-act participant > Non-speech-act participant
   ❖ Specificity scale
      individuated > non-individuated & countable > non-individuated & non-countable
                                                                    (cf. Kasper 2012–2015: 37ff.)

(b) that the first-mentioned participant is the subject, or agent.
                                          (cf. Bornkessel-Schlesewsky & Schlesewsky 2009)

☞ What is more, the interpreter will interpret the utterance correctly by doing so.

Speaker's concept ➡ **utterance** ➡ **Interpreter's concept**
PRED (AG$_i$, PAT$_j$)   *... V... COMP1... V... COMP2... V*   PRED (AG$_i$, PAT$_j$)
                                                                    or
                                                                    PRED (AG$_j$, PAT$_i$)
                                                                    ...

grammatical clues
i) morphology
  a) grammatical (case/agreement)
  b) lexical (adpositions)
ii) element order and
iii) prosody

extra-grammatical clues
iv) referential scales
v) S/A-1st
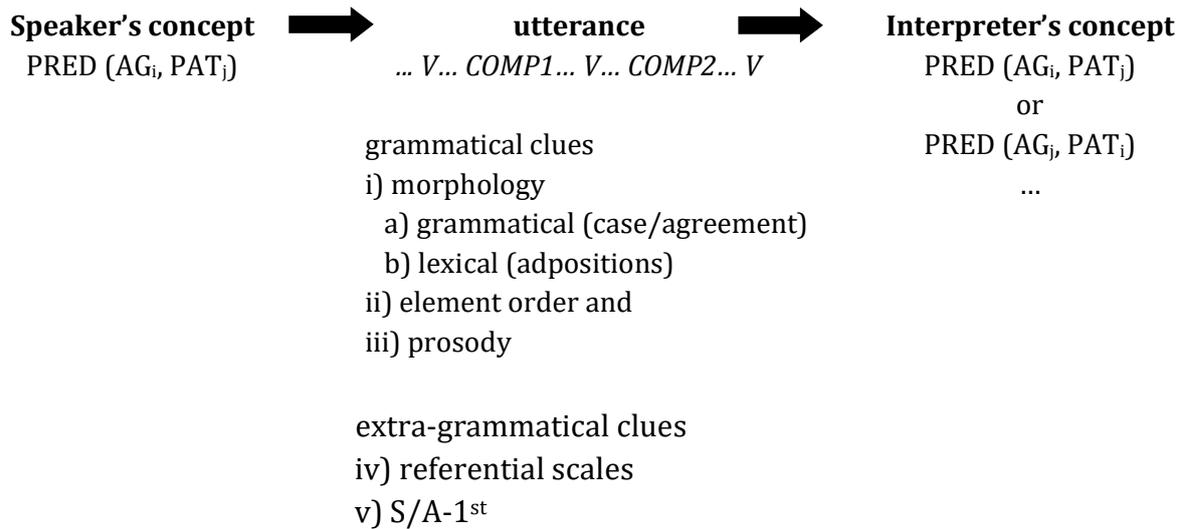
Grammatical and extra-grammatical (under)specification in interpretation

There is a (more or less) hidden assumption in this hypothesis. It says that the correct interpretation of a clause in terms of who does what to whom need not make reference to what is generally referred to as "context". In fact, in testing this hypothesis we can also test how far an interpreter gets in interpretation, if he or she relies on the information present in the clause alone instead of relying on co-text, situational context and encyclopedic knowledge.

Ambiguity classification

understanding

morphologically unambiguous
clauses
via

S and/or
AUX and/or   morphologically ambigous
V and/or   clauses
DO and/or
...

grammatical clues

structurally unambiguous
clauses
via

construction and/or
structure (S-O, SV) and/or   structurally ambiguous
V's case frame   clauses
...

inference

using

referential scales,
S/A-1st,
then
V's case frame,
co-text,
context,
encycl. knowledge,

extra-grammatical clues

+ certainty

- certainty

no understanding

Research questions

Part I: Analysis – Morphology, word order and referential scales in interpretation	
1. Corpus study: Change and variation in English and German	(1) How many morphologically ambiguous clauses are there (morphology fails)? (2) How many morphologically ambiguous clauses are also structurally ambiguous (element order fails)?
2. Corpus study: The role of referential scales	(3) *Could* extra-grammatical devices aid the interpretation of structurally ambiguous clauses? (4) What about extra-grammatical devices in formally unambiguous clauses?
3. Neurolinguistic study: Interpretation of case and word order information	(5) How do morphology and element order interact in incremental interpretation? (6) *Do* extra-grammatical devices aid the interpretation of structurally ambiguous clauses? (7) Are there (neuro-)cognitive effects of extra-grammatical devices in formally unambiguous clauses?
Part II: Synthesis – Understanding grammar by understanding interpretation	
1. Basic assumptions and theoretical apparatus of Instruction Grammar 2. Interpreting the corpus and neurolinguistic results 3. A re-evaluation of morphology, word order and animacy	(8) What does it mean for the theory of language (competence)?

Part I: Analysis – Morphology, word order and referential scales in interpretation

1. Corpus study: Change and variation in English and German

Materials

The corpus study will only look at clauses with overt S and O. The number of clauses satisfying these conditions amounts to 339 on average (across languages).

There is, however, a wealth of clauses with either S or O or both not realized due to reduction in coordination, ellipsis and topic or pro-drop (especially Old High German). These clauses will be analyzed with respect to their interpretability in my upcoming book. We will also analyze only subject–object ambiguities. The corpora also contain many clauses with more than one object, so that object–object ambiguities arise as well. These ambiguities also await analysis.

Procedure

Database front-end home:

(a) Code of practice:

LOEWE Fundierung linguistischer Basiskategorien
Syntax/Semantik-Schnittstelle

ReffMech Version 1.0

Die Relation von formalen und funktionalen Mechanismen
in der Form/Inhalts-Zuordnung.

Leitfaden zur Datenbank der LOEWE Syntax/Semantik-Schnittstelle
http://www.regionalsprache.de/loewe/main.aspx

©Simon Kasper
technische Umsetzung: Frank Nagel, Slawomir Messner und Raphael Stroh
am Konzept beteiligt: Magnus Birkenes, Felix Esser, Giulia Grassi, Sara
Hayden, Axel Harlos, Julia Schüler, Paul Widmer

Philipps-Universität Marburg, 2012ff.

(b) Sentence level:

Sätze

Text-Info ▾ Übersetzung ▾

Aktionen	C	Dha nam pilatus thone haelend and Øswang hyne
Aktionen	C	and tha thenas wundon thyrnenne cynehelm. and Øasetton hyne on his heafod. and Øscryddon hyne mid pu[r]puran reafe
Aktionen	C	and hi comon |to hym. and Øcwaedon; *
Aktionen		Hal beo dhu iudea cyning
Aktionen	C	and hi plaetton hyne mid hyra handum;
Aktionen	C	Dha eode pilatus eft ut and Øcwaedh; *
Aktionen	C	Nu ic hyne laede hider ut to eow *thaet ge ongyton *thaet ic ne funde nanne gylt on him;
Aktionen	C	tha eode se haelend ut and Øbaer thyrnenne cynehelm and ØØpurpuren reaf and Øsaede him. *
Aktionen		her is mann.

17

(c) Clause level (*đa nam pilatus þone hælend and swang hyne* 'Then Pilate therefore took the savior, and scourged him')

(d) Clause classification

(e) Phrase level

(f) Phrase classification (*nam* 'took')

(f) Phrase classification (*þone hælend* 'the savior')

(f) Phrase classification (Ø in *and Ø scourged him*)

(g) Database query

West-Saxon Gospels (OE, ~ 990)

NOUNS			strong m.	weak m.
	Nom.	Sg.	dæg 'day'	cempa 'soldier'
	Gen.	Sg.	dæges	cempan
	Dat.	Sg.	dæge	cempan
	Acc.	Sg.	dæg	cempan
	Inst.	Sg.	dæge	cempan
	Nom.	Pl.	dagas	cempan
	Gen.	Pl.	daga	cempena
	Dat.	Pl.	dagum	cempum
	Acc.	Pl.	dagas	cempan

→ Thing expressions are shaded if their morphological form can figure as either subject or object in a clause.
→ Eventuality expressions are shaded if their morphological form can represent either singular or plural number and if it agrees with more than one person (syncretism between tense or mood is unimportant).

DEMONSTRATIVE PRONOUN/ARTICLE			m.	f.	n.	'THIS'/'THESE'	m.	f.	n.
	Nom.	Sg.	se	seo	þæt		þes	þēos	þis
	Gen.	Sg.	þæs	þære	þæs		þisses	þissere	þisses
	Dat.	Sg.	þam	þære	þam		þysum	þissere	þysum
	Acc.	Sg.	þone	þa	þæt		þisne	þās	þis
	Inst.	Sg.	þy, þon		þy, þon		þys, þis		þys, þis
	Nom.	Pl.	þa	þa	þa		þās	þās	þās
	Gen.	Pl.	þæra	þæra	þæra		þissa	þissa	þissa
	Dat.	Pl.	þam	þam	þam		þissum	þissum	þissum
	Acc.	Pl.	þa	þa	þa		þās	þās	þās

'I'/'YOU'			Sg.	Dual	Pl.	'HE'/'SHE'/'IT'		m.	f.	n.
	Nom.	1st	ic	wit	wē		Sg.	hē	hēo	hyt
	Gen.	1st	mīn	uncer	ūre		Sg.	hys	hire	hys
	Dat.	1st	mē	unc	ūs		Sg.	him	hire	him
	Acc.	1st	mē	unc	ūs		Sg.	hyne	hīe	hyt
	Inst.									
	Nom.	2nd	þū	git	gē		Pl.	hi	hi	hi
	Gen.	2nd	þīn	incer	ēower		Pl.	hira	hira	hira
	Dat.	2nd	þē	inc	ēow		Pl.	him	him	him
	Acc.	2nd	þē	inc	ēow		Pl.	hi	hi	hi

'TO SAY'/'TO HAVE'						
	Pres.	Indic.	Sg.	1st	secge	hæbbe
	Pres.	Indic.	Sg.	2nd	segst	hafast / hæfst
	Pres.	Indic.	Sg.	3rd	segþ	hafaþ /hæfþ
	Pres.	Indic.	Pl.	1st	secgeaþ	habbaþ
	Pres.	Indic.	Pl.	2nd	secgeaþ	habbaþ
	Pres.	Indic.	Pl.	3rd	secgeaþ	habbaþ
	Pres.	Subj.	Sg.	1st	secge	hæbbe
	Pres.	Subj.	Sg.	2nd	secge	hæbbe
	Pres.	Subj.	Sg.	3rd	secge	hæbbe
	Pres.	Subj.	Pl.	1st	secgen	hæbben
	Pres.	Subj.	Pl.	2nd	secgen	hæbben
	Pres.	Subj.	Pl.	3rd	secgen	hæbben
	Past	Indic.	Sg.	1st	cwæd	hæfde
	Past	Indic.	Sg.	2nd	cwæde	hæfdest
	Past	Indic.	Sg.	3rd	cwæd	hæfde
	Past	Indic.	Pl.	1st	cwædon	hæfdon
	Past	Indic.	Pl.	2nd	cwædon	hæfdon
	Past	Indic.	Pl.	3rd	cwædon	hæfdon
	Past	Subj.	Sg.	1st	cwæde	hæfde
	Past	Subj.	Sg.	2nd	cwæde	hæfde
	Past	Subj.	Sg.	3rd	cwæde	hæfde
	Past	Subj.	Pl.	1st	cwæden	hæfden
	Past	Subj.	Pl.	2nd	cwæden	hæfden
	Past	Subj.	Pl.	3rd	cwæden	hæfden

Wycliffe (ME, 1395)

NOUNS	Nom.	Sg.	prince 'chief priest'
	Gen.	Sg.	princes
	Dat.	Sg.	prince
	Acc.	Sg.	prince
	Inst.	Sg.	███████
	Nom.	Pl.	princes
	Gen.	Pl.	princes
	Dat.	Pl.	princes
	Acc.	Pl.	princes

			m.	f.	n.		m.	f.	n.
ARTICLE	Nom.	Sg.	the	the	the		this	this	this
	Gen.	Sg.	███	███	███		███	███	███
	Dat.	Sg.	the	the	the		this	this	this
	Acc.	Sg.	the	the	the		this	this	this
	Inst.	Sg.	███	███	███		███	███	███
	Nom.	Pl.	the	the	the		these	these	these
	Gen.	Pl.	███	███	███		███	███	███
	Dat.	Pl.	the	the	the		these	these	these
	Acc.	Pl.	the	the	the		these	these	these

('THIS'/'THESE')

			Sg.	Dual	Pl.			m.	f.	n.
'I'/'YOU'	Nom.	1st	Y, I		we		Sg.	he	sche	it
	Gen.	1st	my		oure		Sg.	his	hir	his
	Dat.	1st	me		us		Sg.	hym	hir	it
	Acc.	1st	me		us		Sg.	hym	hir	it
	Inst.									
	Nom.	2nd	thou		ʒe		Pl.	thei	thei	thei
	Gen.	2nd	thi		ʒoure		Pl.	her	her	her
	Dat.	2nd	thee		ʒou		Pl.	hem	hem	hem
	Acc.	2nd	thee		ʒou		Pl.	hem	hem	hem

('HE'/'SHE'/'IT')

'TO SAY'/'TO HAVE'	Pres.	Indic.	Sg.	1st	seie	haue
	Pres.	Indic.	Sg.	2nd	seist	hast
	Pres.	Indic.	Sg.	3rd	seith	hath
	Pres.	Indic.	Pl.	1st	seien	han
	Pres.	Indic.	Pl.	2nd	seien	han
	Pres.	Indic.	Pl.	3rd	seien	han
	Pres.	Subj.	Sg.	1st	seie	haue
	Pres.	Subj.	Sg.	2nd	seie	haue
	Pres.	Subj.	Sg.	3rd	seie	haue
	Pres.	Subj.	Pl.	1st	seie	haue
	Pres.	Subj.	Pl.	2nd	seie	haue
	Pres.	Subj.	Pl.	3rd	seie	haue
	Past	Indic.	Sg.	1st	seide	hadde
	Past	Indic.	Sg.	2nd	seidist	haddest
	Past	Indic.	Sg.	3rd	seide	hadde
	Past	Indic.	Pl.	1st	seiden	hadden
	Past	Indic.	Pl.	2nd	seiden	hadden
	Past	Indic.	Pl.	3rd	seiden	hadden
	Past	Subj.	Sg.	1st	seide	hadde
	Past	Subj.	Sg.	2nd	seide	hadde
	Past	Subj.	Sg.	3rd	seide	hadde
	Past	Subj.	Pl.	1st	seide(n)	hadde(n)
	Past	Subj.	Pl.	2nd	seide(n)	hadde(n)
	Past	Subj.	Pl.	3rd	seide(n)	hadde(n)

Tatian (OHG, ~ 830)

NOUNS

		strong m.	weak m.
Nom.	Sg.	tag	kempho 'soldier'
Gen.	Sg.	tages	kemphen
Dat.	Sg.	tage	kemphen
Acc.	Sg.	tag	kemphon
Inst.	Sg.	tagu	
Nom.	Pl.	taga	kemphon
Gen.	Pl.	tago	kemphono
Dat.	Pl.	tagum	kemphom
Acc.	Pl.	taga	kemphon

DEMONSTRATIVE SIMPLE/ARTICLE — **DEMONSTRATIVE COMPLEX**

		m.	f.	n.		m.	f.	n.
Nom.	Sg.	ther	thiu	thaz, daz		these, theser	thisiu	thiz
Gen.	Sg.	thes	thera	thes		thesses	thesera, therra, therro	thesses
Dat.	Sg.	themo	theru, thero	themo		thesemo	theseru, therru	thesemo
Acc.	Sg.	then	thia	thaz, daz		thesan	thesa	thiz
Inst.	Sg.	thiu		thiu				
Nom.	Pl.	thie	thio	thiu		these	theso	thisiu
Gen.	Pl.	thero	thero	thero		thesero, therro	thesero, therro	thesero, therro
Dat.	Pl.	then	then	then		thesen	thesen	thesen
Acc.	Pl.	thio	thio	thio		these	theso	thisiu

'I'/'YOU' — **'HE'/'SHE'/'IT'**

		Sg.	Dual	Pl.			m.	f.	n.
Nom.	1st	ih		wir		Sg.	(h)er	siu	iz
Gen.	1st	mīn		unsēr		Sg.	sīn	ira	es
Dat.	1st	mīr		uns		Sg.	imu, imo	iru	imu, imo
Acc.	1st	mih		unsih		Sg.	inan, in	sia	iz
Inst.									
Nom.	2nd	dū		ir		Pl.	sie	sio	siu
Gen.	2nd	dīn		iuwēr		Pl.	iro	iro	iro
Dat.	2nd	dir		iu		Pl.	im, in	im, in	im, in
Acc.	2nd	dich		iuwih		Pl.	sie	sio	siu

'TO SAY'/'TO HAVE'

Pres.	Indic.	Sg.	1st	quid	haben
Pres.	Indic.	Sg.	2nd	quidis	habes(t)
Pres.	Indic.	Sg.	3rd	quidit	habet
Pres.	Indic.	Pl.	1st	quedemes	habemes
Pres.	Indic.	Pl.	2nd	quedet	habet
Pres.	Indic.	Pl.	3rd	quedent	habent
Pres.	Subj.	Sg.	1st	quede	habe
Pres.	Subj.	Sg.	2nd	quedes	habes(t)
Pres.	Subj.	Sg.	3rd	quede	habem
Pres.	Subj.	Pl.	1st	quedemes	habemes
Pres.	Subj.	Pl.	2nd	quaedet	habet
Pres.	Subj.	Pl.	3rd	quaeden	haben
Past	Indic.	Sg.	1st	quad	habeta
Past	Indic.	Sg.	2nd	quadi	habetos
Past	Indic.	Sg.	3rd	quad	habeta
Past	Indic.	Pl.	1st	quadum	habetum
Past	Indic.	Pl.	2nd	quadut	habetut
Past	Indic.	Pl.	3rd	quadun	habetun
Past	Subj.	Sg.	1st	quadi	habeti
Past	Subj.	Sg.	2nd	quadis	habetis
Past	Subj.	Sg.	3rd	quadi	habeti
Past	Subj.	Pl.	1st	quadim	habetim
Past	Subj.	Pl.	2nd	quadit	habetit
Past	Subj.	Pl.	3rd	quadin	habetin

Beheim (MHG, 1395)

NOUNS	Nom.	Sg.	tac 'day'
	Gen.	Sg.	tages
	Dat.	Sg.	tage
	Acc.	Sg.	tac
	Inst.	Sg.	■
	Nom.	Pl.	tage
	Gen.	Pl.	tage
	Dat.	Pl.	tagen
	Acc.	Pl.	tage

			m.	f.	n.		m.	f.	n.
DEMONSTRATIVE SIMPLE / ARTICLE	Nom.	Sg.	der	di	daz	**DEMONSTRATIVE COMPLEX**	dirre	dise	diz
	Gen.	Sg.	des	der	des		dises	diser	dises
	Dat.	Sg.	dem	der	dem		disem	diser	disem
	Acc.	Sg.	den	di	daz		disen	dise	diz
	Inst.	Sg.	■	■	■		■	■	■
	Nom.	Pl.	di	di	di		dise	dise	dise
	Gen.	Pl.	der	der	der		diser	diser	diser
	Dat.	Pl.	den	den	den		disen	disen	disen
	Acc.	Pl.	di	di	di		dise	dise	dise

			Sg.	Dual	Pl.			m.	f.	n.
'I' / 'YOU'	Nom.	1st	ich	■	wir	**'HE' / 'SHE' / 'IT'**	Sg.	her	si	iz
	Gen.	1st	mîn		unser		Sg.	sîn	ir	es, sîn
	Dat.	1st	mir		uns		Sg.	ime	ir	ime
	Acc.	1st	mich		uns		Sg.	en	si	iz
	Nom.	2nd	du, dû		ir		Pl.	si	si	si
	Gen.	2nd	dîn		ûwer		Pl.	ir	ir	si
	Dat.	2nd	dir		ûch		Pl.	en	en	en
	Acc.	2nd	dich		ûch		Pl.	si	si	si

'TO SAY' / 'TO HAVE'	Pres.	Indic.	Sg.	1st	spreche	habe, hân
	Pres.	Indic.	Sg.	2nd	spriches(t)	hâst
	Pres.	Indic.	Sg.	3rd	sprichet	hât
	Pres.	Indic.	Pl.	1st	sprechin	habin
	Pres.	Indic.	Pl.	2nd	sprechit	habit, hât
	Pres.	Indic.	Pl.	3rd	sprechin	habin
	Pres.	Subj.	Sg.	1st	spreche	habe
	Pres.	Subj.	Sg.	2nd	sprechis(t)	hast
	Pres.	Subj.	Sg.	3rd	spreche	habe
	Pres.	Subj.	Pl.	1st	sprechin	habin
	Pres.	Subj.	Pl.	2nd	sprechit	habit
	Pres.	Subj.	Pl.	3rd	sprechin	habin
	Past	Indic.	Sg.	1st	sprach	hatte
	Past	Indic.	Sg.	2nd	sprachis(t)	hattis(t)**
	Past	Indic.	Sg.	3rd	sprach	hatte
	Past	Indic.	Pl.	1st	sprâchin	hatten
	Past	Indic.	Pl.	2nd	sprâchit	hattet
	Past	Indic.	Pl.	3rd	sprâchin	hatten
	Past	Subj.*	Sg.	1st	spreche	hette
	Past	Subj.	Sg.	2nd	spreches(t)	hettis(t)
	Past	Subj.	Sg.	3rd	spreche	hette
	Past	Subj.	Pl.	1st	sprechin	hetten
	Past	Subj.	Pl.	2nd	sprechit	hettet
	Past	Subj.	Pl.	3rd	sprechin	hetten

Luther (ENHG, 1545)

NOUNS	Nom.	Sg.	Priester 'priest'
	Gen.	Sg.	Priesters
	Dat.	Sg.	Priester
	Acc.	Sg.	Priester
	Inst.	Sg.	■
	Nom.	Pl.	Priester
	Gen.	Pl.	Priester
	Dat.	Pl.	Priestern
	Acc.	Pl.	Priester

				m.	f.	n.		m.	f.	n.
DEMONSTRATIVE SIMPLE/ARTICLE	Nom.	Sg.		der	die	das	**DEMONSTRATIVE COMPLEX**	dieser	diese	dieses
	Gen.	Sg.		des	der	des		dieses	dieser	dieses
	Dat.	Sg.		dem	der	dem		diesem	dieser	diesem
	Acc.	Sg.		den	die	das		diesen	diese	dieses
	Inst.	Sg.		■	■	■		■	■	■
	Nom.	Pl.		die	die	die		diese	diese	diese
	Gen.	Pl.		der	der	der		dieser	dieser	dieser
	Dat.	Pl.		den	den	den		diesen	diesen	diesen
	Acc.	Pl.		die	die	die		diese	diese	diese

			Sg.	Dual	Pl.			m.	f.	n.
'I'/'YOU'	Nom.	1st	Jch	■	wir	**'HE'/'SHE'/'IT'**	Sg.	er	sie	es
	Gen.	1st	meiner		unser		Sg.	seiner	jr	sein, es
	Dat.	1st	mir		uns		Sg.	jm	jr	jm
	Acc.	1st	mich		uns		Sg.	jn	sie	es
	Nom.	2nd	du		jr		Pl.	sie	sie	sie
	Gen.	2nd	deiner		euer		Pl.	jrer	jrer	jrer
	Dat.	2nd	dir	■	euch		Pl.	jnen	jnen	jnen
	Acc.	2nd	dich		euch		Pl.	sie	sie	sie

'TO SAY'/'TO HAVE'	Pres.	Indic.	Sg.	1st	spreche	habe
	Pres.	Indic.	Sg.	2nd	sprichst	hast
	Pres.	Indic.	Sg.	3rd	spricht	hat
	Pres.	Indic.	Pl.	1st	sprechen	haben
	Pres.	Indic.	Pl.	2nd	sprecht	habt
	Pres.	Indic.	Pl.	3rd	sprechen	haben
	Pres.	Subj.	Sg.	1st	spreche	habe
	Pres.	Subj.	Sg.	2nd	sprechest	habest
	Pres.	Subj.	Sg.	3rd	spreche	habe
	Pres.	Subj.	Pl.	1st	sprechen	haben
	Pres.	Subj.	Pl.	2nd	sprecht	habet
	Pres.	Subj.	Pl.	3rd	sprechen	haben
	Past	Indic.	Sg.	1st	sprach	hatte
	Past	Indic.	Sg.	2nd	sprach(e)st	hattest
	Past	Indic.	Sg.	3rd	sprach	hatte
	Past	Indic.	Pl.	1st	sprachen	hatten
	Past	Indic.	Pl.	2nd	sprach(e)t	hattet
	Past	Indic.	Pl.	3rd	sprachen	hatten
	Past	Subj.*	Sg.	1st	spreche	hette
	Past	Subj.	Sg.	2nd	sprechst	hettest
	Past	Subj.	Sg.	3rd	spreche	hette
	Past	Subj.	Pl.	1st	sprechen	hetten
	Past	Subj.	Pl.	2nd	sprecht	hettet
	Past	Subj.	Pl.	3rd	sprechen	hetten

Luther (NHG, 1984)

NOUNS	Nom.	Sg.	Priester 'priest'
	Gen.	Sg.	Priesters
	Dat.	Sg.	Priester
	Acc.	Sg.	Priester
	Inst.	Sg.	■■■
	Nom.	Pl.	Priester
	Gen.	Pl.	Priester
	Dat.	Pl.	Priestern
	Acc.	Pl.	Priester

			m.	f.	n.		m.	f.	n.
DEMONSTRATIVE SIMPLE/ARTICLE	Nom.	Sg.	der	die	das	**DEMONSTRATIVE COMPLEX**	dieser	diese	dieses
	Gen.	Sg.	des	der	des		dieses	dieser	dieses
	Dat.	Sg.	dem	der	dem		diesem	dieser	diesem
	Acc.	Sg.	den	die	das		diesen	diese	dieses
	Inst.	Sg.	■	■	■		■	■	■
	Nom.	Pl.	die	die	die		diese	diese	diese
	Gen.	Pl.	der	der	der		dieser	dieser	dieser
	Dat.	Pl.	den	den	den		diesen	diesen	diesen
	Acc.	Pl.	die	die	die		diese	diese	diese

			Sg.	Dual	Pl.			m.	f.	n.
'I'/'YOU'	Nom.	1st	ich	■	wir	**'HE'/'SHE'/'IT'**	Sg.	er	sie	es
	Gen.	1st	meiner		unser		Sg.	seiner	ihrer	seiner
	Dat.	1st	mir		uns		Sg.	ihm	ihr	ihm
	Acc.	1st	mich		uns		Sg.	ihn	sie	es
	Nom.	2nd	du		ihr		Pl.	sie	sie	sie
	Gen.	2nd	deiner		euer		Pl.	ihrer	ihrer	ihrer
	Dat.	2nd	dir		euch		Pl.	ihren	ihren	ihren
	Acc.	2nd	dich	■	euch		Pl.	sie	sie	sie

'TO SAY'/'TO HAVE'	Pres.	Indic.	Sg.	1st	spreche	habe
	Pres.	Indic.	Sg.	2nd	sprichst	hast
	Pres.	Indic.	Sg.	3rd	spricht	hat
	Pres.	Indic.	Pl.	1st	sprechen	haben
	Pres.	Indic.	Pl.	2nd	sprecht	habt
	Pres.	Indic.	Pl.	3rd	sprechen	haben
	Pres.	Subj.	Sg.	1st	spreche	habe
	Pres.	Subj.	Sg.	2nd	sprechest	habest
	Pres.	Subj.	Sg.	3rd	spreche	habe
	Pres.	Subj.	Pl.	1st	sprechen	haben
	Pres.	Subj.	Pl.	2nd	sprecht	habet
	Pres.	Subj.	Pl.	3rd	sprechen	haben
	Past	Indic.	Sg.	1st	sprach	hatte
	Past	Indic.	Sg.	2nd	sprachst	hattest
	Past	Indic.	Sg.	3rd	sprach	hatte
	Past	Indic.	Pl.	1st	sprachen	hatten
	Past	Indic.	Pl.	2nd	spracht	hattet
	Past	Indic.	Pl.	3rd	sprachen	hatten
	Past	Subj.	Sg.	1st	spräche	hätte
	Past	Subj.	Sg.	2nd	sprächst	hättest
	Past	Subj.	Sg.	3rd	spräche	hätte
	Past	Subj.	Pl.	1st	sprächen	hätten
	Past	Subj.	Pl.	2nd	sprächt	hättet
	Past	Subj.	Pl.	3rd	sprächen	hätten

Weber (HALEM, 1997)

NOUNS			
Nom.	Sg.	Prieschter 'priest'	
Gen.	Sg.	▇	
Dat.	Sg.	Prieschter	
Acc.	Sg.	Prieschter	
Inst.	Sg.	▇	
Nom.	Pl.	Prieschter	
Gen.	Pl.	▇	
Dat.	Pl.	Prieschter	
Acc.	Pl.	Prieschter	

ARTICLE		m.	f.	n.	DEMONSTRATIVE		m.	f.	n.
Nom.	Sg.	de	d	s		Sg.	dèè	die	daas
Gen.	Sg.	▇	▇	▇		Sg.	▇	▇	▇
Dat.	Sg.	em	de	em		Sg.	dem	dere	dem
Acc.	Sg.	de	d	s		Sg.	dèè	die	daas
Inst.	Sg.	▇	▇	▇		Sg.	▇	▇	▇
Nom.	Pl.	d(i)	d(i)	d(i)		Pl.	die	die	die
Gen.	Pl.	▇	▇	▇		Pl.	▇	▇	▇
Dat.	Pl.	de	de	de		Pl.	dene	dene	dene
Acc.	Pl.	d(i)	d(i)	d(i)		Pl.	die	die	die

'I'/'YOU'		Sg.	Pl.	'HE'/'SHE'/'IT'		m.	f.	n.
Nom.	1st	i(i)(ch)	mi(i)r, mer		Sg.	èèr, er	s(i)	(e)s
Gen.	1st	▇	▇		Sg.	▇	▇	▇
Dat.	1st	mi(i)r, mer	öis		Sg.	im, em	ire	im, em
Acc.	1st	mi(i)(ch)	öis		Sg.	in, en	si	(e)s
Nom.	2nd	d(u)(u), de	i(i)r, er		Pl.	s(i)	s(i)	s(i)
Gen.	2nd	▇	▇		Pl.	▇	▇	▇
Dat.	2nd	di(i)r, der	öi		Pl.	ine, ene	ine, ene	ine, ene
Acc.	2nd	di(i)(ch)	öi		Pl.	s(i)	s(i)	s(i)

'TO SAY'/'TO HAVE'					
Pres.	Indic.	Sg.	1st	sägen	ha
Pres.	Indic.	Sg.	2nd	säisch	häsch
Pres.	Indic.	Sg.	3rd	säit	hät
Pres.	Indic.	Pl.	1st	säged	händ
Pres.	Indic.	Pl.	2nd	säged	händ
Pres.	Indic.	Pl.	3rd	säged	händ
Pres.	Subj.	Sg.	1st	sägi	hei(g), heb
Pres.	Subj.	Sg.	2nd	sägisch	hei(g)isch, hebisch
Pres.	Subj.	Sg.	3rd	sägi	hei(g), heb
Pres.	Subj.	Pl.	1st	sägid	hei(g)id, hebid
Pres.	Subj.	Pl.	2nd	sägid	hei(g)id, hebid
Pres.	Subj.	Pl.	3rd	sägid	hei(g)id, hebid
Past	Indic.	Sg.	1st	▇	▇
Past	Indic.	Sg.	2nd	▇	▇
Past	Indic.	Sg.	3rd	▇	▇
Past	Indic.	Pl.	1st	▇	▇
Past	Indic.	Pl.	2nd	▇	▇
Past	Indic.	Pl.	3rd	▇	▇
Past	Subj.	Sg.	1st	säiti	hetti
Past	Subj.	Sg.	2nd	säitisch	hettisch
Past	Subj.	Sg.	3rd	säiti	hetti
Past	Subj.	Pl.	1st	säitid, -ed	hettid, -ed
Past	Subj.	Pl.	2nd	säitid, -ed	hettid, -ed
Past	Subj.	Pl.	3rd	säitid, -ed	hettid, -ed

Jessen (NLS, 1933)

NOUNS

Nom.	Sg.	Preester 'priest'
Gen.	Sg.	■
Dat.	Sg.	Preester
Acc.	Sg.	Preester
Inst.	Sg.	■
Nom.	Pl.	Pressters
Gen.	Pl.	■
Dat.	Pl.	Preesters
Acc.	Pl.	Preesters

DEMONSTRATIVE SIMPLE/ARTICLE / **DEMONSTRATIVE COMPLEX**

			m.	f.	n.		m.	f.	n.
Nom.	Sg.		de	de	dat		düsse	düsse	düt
Gen.	Sg.		■	■	■		■	■	■
Dat.	Sg.		den	de	dat		düssen	düsse	düt
Acc.	Sg.		den	de	dat		düssen	düsse	düt
Inst.	Sg.		■	■	■		■	■	■
Nom.	Pl.		de	de	de		düsse	düsse	düsse
Gen.	Pl.		■	■	■		■	■	■
Dat.	Pl.		de	de	de		düsse	düsse	düsse
Acc.	Pl.		de	de	de		düsse	düsse	düsse

'I'/'YOU' / **'HE'/'SHE'/'IT'**

		Sg.	Dual	Pl.			m.	f.	n.
Nom.	1st	ick	■	wi		Sg.	he	se	dat
Gen.	1st	■	■	■		Sg.	■	■	■
Dat.	1st	mi	■	uns		Sg.	em	ehr	dat
Acc.	1st	mi	■	uns		Sg.	em	ehr	dat
Nom.	2nd	du	■	ji		Pl.	se	se	se
Gen.	2nd	■	■	■		Pl.	■	■	■
Dat.	2nd	di	■	ju		Pl.	ehr	ehr	ehr
Acc.	2nd	di	■	ju		Pl.	ehr	ehr	ehr

'TO SAY'/'TO HAVE'

Pres.	Indic.	Sg.	1st	segg	heff
Pres.	Indic.	Sg.	2nd	seggst	hest
Pres.	Indic.	Sg.	3rd	seggt	hett
Pres.	Indic.	Pl.	1st	seggt	hebbt
Pres.	Indic.	Pl.	2nd	seggt	hebbt
Pres.	Indic.	Pl.	3rd	seggt	hebbt
Pres.	Subj.	Sg.	1st	■	■
Pres.	Subj.	Sg.	2nd	■	■
Pres.	Subj.	Sg.	3rd	■	■
Pres.	Subj.	Pl.	1st	■	■
Pres.	Subj.	Pl.	2nd	■	■
Pres.	Subj.	Pl.	3rd	■	■
Past	Indic.	Sg.	1st	sä	harr
Past	Indic.	Sg.	2nd	säst	harrst
Past	Indic.	Sg.	3rd	sä	harr
Past	Indic.	Pl.	1st	sän	harrn
Past	Indic.	Pl.	2nd	sän	harrn
Past	Indic.	Pl.	3rd	sän	harrn
Past	Subj.	Sg.	1st	■	■
Past	Subj.	Sg.	2nd	■	■
Past	Subj.	Sg.	3rd	■	■
Past	Subj.	Pl.	1st	■	■
Past	Subj.	Pl.	2nd	■	■
Past	Subj.	Pl.	3rd	■	■

Example clause: Matthew 26, 10

❖ (New King James translation)
   'for she has done a good work for Me.'

❖ Old English
   witodlice god   weorc   heo   worhte   on me;
   truly   good work.NOM/ACC she.NOM work.1/3SG on me
   ➢ Morphology disambiguates

❖ Middle English
   for sche   hath   wrouyt   in me a   good   werk.
   for she.NOM have.3SG work.PTCP in me DET good work.NOM/DAT/ACC
   ➢ Element order disambiguates; Morphology disambiguates

❖ M. H. German
   wan ein gût werc   hât   si   geworcht an
   for   DET good work.NOM/ACC have.3SG/2PL she.NOM/ACC.SG/PL work.PTCP on
   mir.
   me
   ➢ Morphologically ambiguous; Structurally ambiguous

❖ Early New High German
   Sie   hat   ein   gut werck   an mir gethan/
   she.NOM/ACC.SG/PL have.3SG DET good work.NOM/ACC on me do.PTCP
   ➢ Morphologically ambiguous; Structurally ambiguous

❖ New High German
   Sie   hat   ein   gutes Werk an mir   getan.
   she.NOM/ACC.SG/PL have.3SG DET good work.NOM/ACC do.PTCP
   ➢ Morphologically ambiguous; Structurally ambiguous

❖ recent High Alemannic
   E   gueti Taat   hät   si ja a mer   taa!
   DET good deed.NOM/ACC have.3SG she.NOM/ACC.SG/PL do.PTCP
   ➢ Morphologically ambiguous; Structurally ambiguous

❖ recent Northern Low Saxon
   Se   hett   wat   Goodes an mi   dan.
   she.NOM have.3SG INDEF good.NOM/ACC do.PTCP
   ➢ Morphologically ambiguous; Structurally ambiguous

Methodological caveats

The bible translations are written in different dialects of English and German. Strictly speaking, translations from different historical stages can therefore not be considered as representing successive stages of "English" or "German". However, the general tendencies in grammatical development are similar in all dialects, so a historical interpretation of the data becomes plausible again. One should be cautious with respect to mechanisms of change and generalizations over the data when it comes to grammatical details.

For example, although the New High German and High Alemannic languages differ considerably, it seems possible that patterns of syncretism in New High German develop into something similar to the patterns of syncretism in High Alemannic.

A historical-comparative study like this one has to find a middle ground between what is methodologically desirable and what is feasible. It would be desirable to compare different stages of the same dialect, of course. But given the limited availability of sources this can only be done at the expense of the comparability of the contents of the texts. The present study therefore uses parallel texts with close to maximal comparability of the contents but at the expense of dialectological accuracy. At least, Old, Middle, Early New High, New High German and High Alemannic are Upper German varieties allowing comparison and historical interpretation to some degree. The same is true for Old and Middle English. Northern Low Saxon follows a Low German lineage and should not be interpreted historically in terms of English and (Upper) German.

Results

1. Corpus study: Change and variation in English and German	(1) How many morphologically ambiguous clauses are there (morphology fails)? (2) How many morphologically ambiguous clauses are also structurally ambiguous (element order fails)?

(1) How many morphologically ambiguous clauses are there (morphology fails)?

To put this question differently: How many clauses are there in which the forms of the words make it possible to identify "who does what to whom" in the clause, i.e. to distinguish S and O (A and P)? This means we look at the disambiguation potential of morphology among the grammatical devices.

- ❖ grammatical clues/devices
  - i) morphology
    - a) grammatical (case/agreement)
   - b) lexical (adpositions)

Morphologically ambiguous and unambiguous clauses

	Old English	Middle English	Old High German	Middle High German	Early New High German	New High German	High Alemannic	Northern Low Saxon
■ morph. ambiguous	3,75%	12,50%	3,37%	6,01%	5,56%	19,03%	26,35%	19,69%
■ morph. unambiguous	96,25%	87,50%	96,63%	93,99%	94,44%	80,97%	73,65%	80,31%
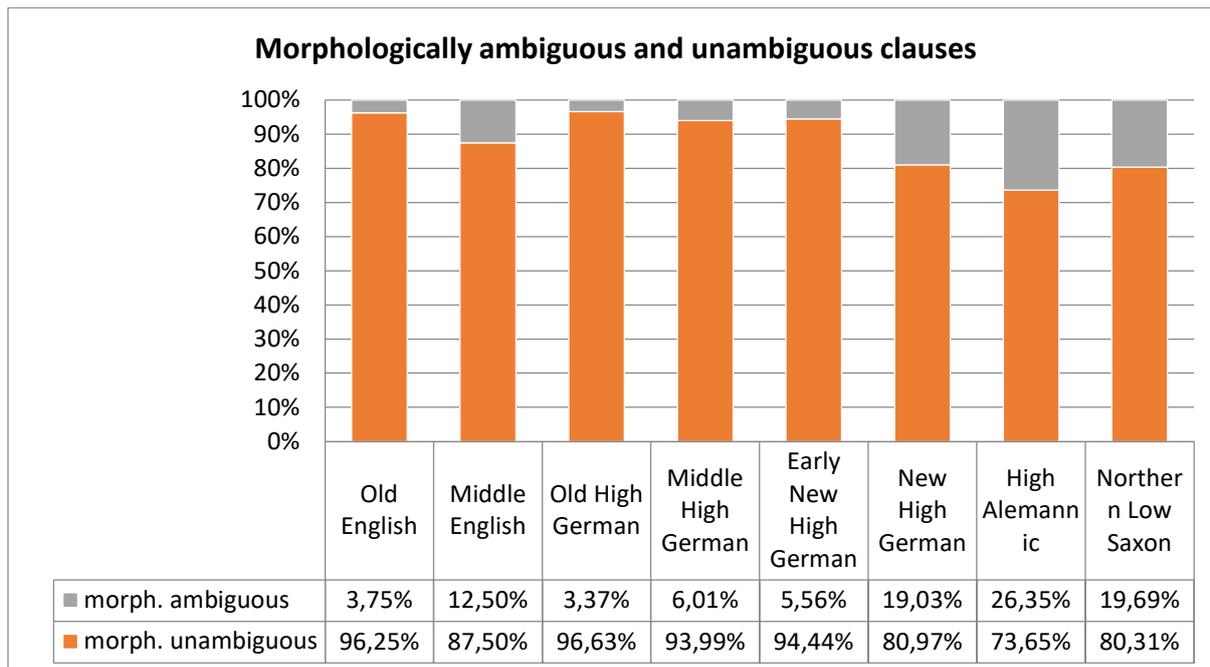
☞ The shares of morphologically ambiguous clauses range from 3.37% in Old High German (every 30th clause is morphologically ambiguous) to 26.35 % in High Alemannic (every 4th clause is morphologically ambiguous).

Note the increases of morphologically ambiguous clauses from Old English to Middle English and from Old High German to High Alemannic.

(2) How many morphologically ambiguous clauses are also structurally ambiguous?

According to the ambiguity classification above clauses which are morphologically ambiguous can nevertheless be structurally unambiguous. This is the case, if there are devices of element ordering in the "language system" that allow an interpreter to identify reliably who does what to whom, i.e. S and O (A and P).

❖ grammatical clues
   ii) element order

Morphologically unambiguous and structurally ambiguous clauses

	Old English	Middle English	Old High German	Middle High German	Early New High German	New High German	High Alemannic	Northern Low Saxon
■ morph. & struct. ambiguous	3,75%	0,00%	3,37%	6,01%	5,56%	19,03%	26,35%	19,69%
■ morph. unambiguous	96,25%	87,50%	96,63%	93,99%	94,44%	80,97%	73,65%	80,31%
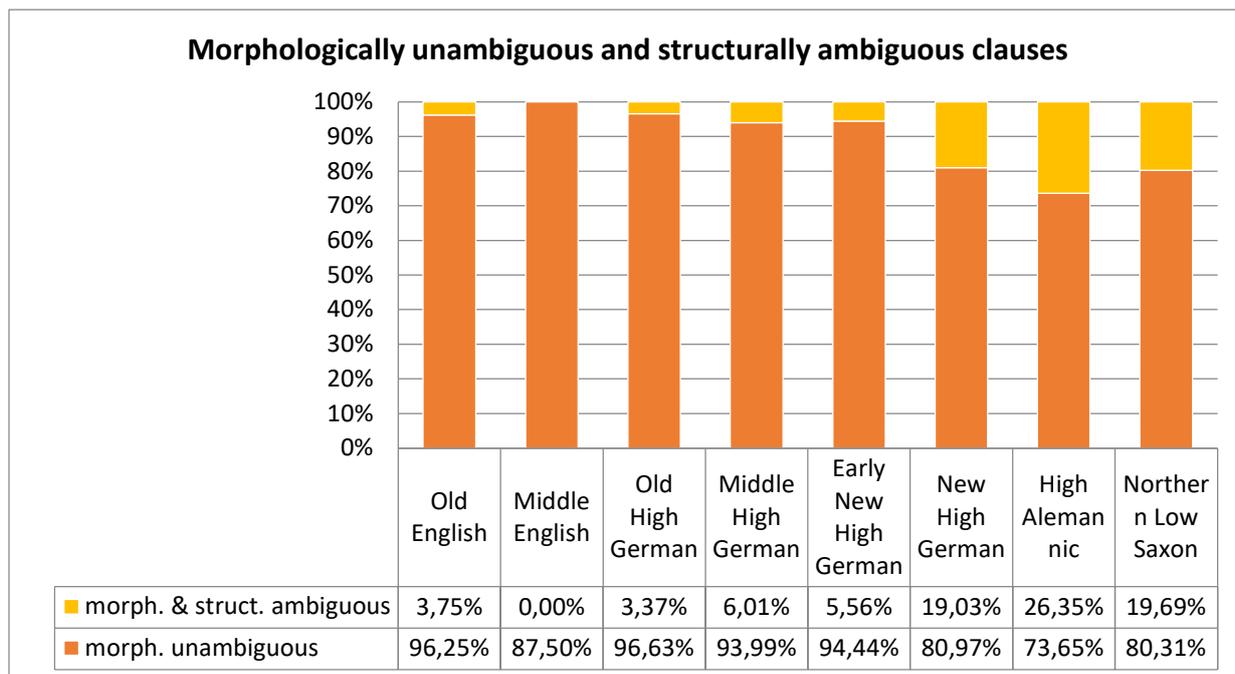
☞ Such (system-wide) ordering principles are absent in the languages under consideration except for Middle English.

In the former languages element order cannot be utilized to identify who does what to whom, if morphology isn't informative. In other words, clauses which are morphologically ambiguous in these languages are also structurally ambiguous. In Middle English, the constraint that S immediately precedes V can be utilized to interpret all clauses in the corpus reliably. The NP immediately preceding the verb is S, and not O, in Middle English. Therefore, clauses which are morphologically ambiguous here are structurally unambiguous.

2. Corpus study: The role of referential scales

2. Corpus study: The role of referential scales	(3) *Could* extra-grammatical devices aid the interpretation of structurally ambiguous clauses? (4) What about extra-grammatical devices in formally unambiguous clauses?

After making interpretive use of the grammatical devices (morphology and element order (systematic and local), there remains a considerable number of structurally ambiguous clauses in all languages except Middle English (see second chart above). For these clauses interpreters cannot say who does what to whom.

At this point we must ask whether interpreters could make use of the extra-grammatical devices to identify S and O (A and P) successfully.

❖ extra-grammatical clues

iv) referential scales

(3) *Could* extra-grammatical devices aid the interpretation of structurally ambiguous clauses?

(a) Animacy

The first of these scales is animacy or empathy (the semantic scale). The hypothesis said that

☞ for any given clause, if the interpreter cannot identify semantic relations by means of grammatical devices, he/she will assume

(a) that the referent higher on the following scale is the subject, or agent.

❖ Semantic scale (animacy or empathy)
self > kin > human > animate > inanimate > location > abstract > mass

We must check now, whether the animacy values of the nominal complements in the ambiguous clauses give some clue as their status with respect to S and O.

Relative animacy values of S and O in morphologically ambiguous clauses

	Old English	Middle English	Old High German	Middle High German	Early New High German	New High German	High Alemann ic	Northern Low Saxon
■ morph. ambiguous	12	38	12	20	19	63	88	77
■ anim. S < O (ambig.)	12	32	12	16	15	60	77	63
■ anim. O < S (ambig.)	0	0	0	0	0	0	0	0
■ anim. S = O (ambig.)	2	7	0	5	6	6	26	16
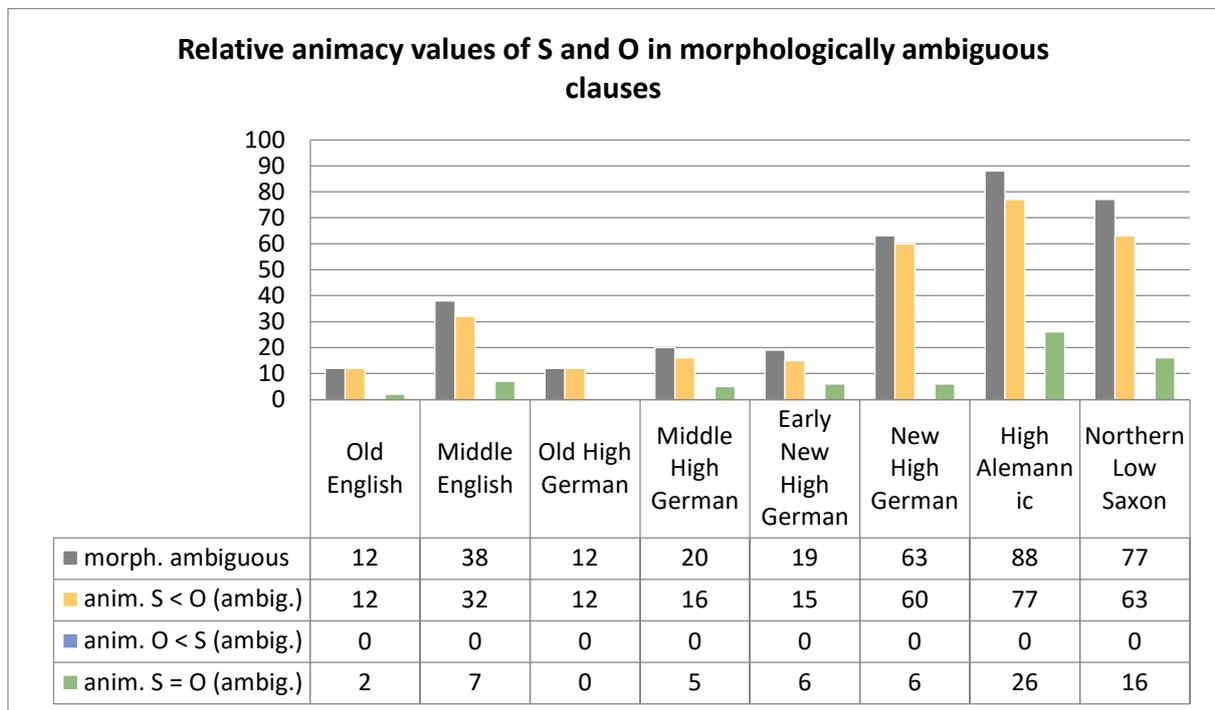
☞ We find that in morphologically ambiguous clauses (which are also structurally ambiguous in all languages except Middle English) the object is never higher in animacy than the subject. They are equal in animacy in a considerable number of clauses, especially in High Alemannic and Northern Low Saxon.

☞ This means higher animacy is quite a good indicator of S function (A role), but it does not suffice as a reliable cue. In clauses where S and O are equal in animacy the interpreter still cannot tell what is what.

(b) Accessibility

The hypothesis said that

☞ for any given clause, if the interpreter cannot identify semantic relations by means of grammatical devices, he/she will assume

(a) that the referent higher on the following scale is the subject, or agent.

❖ Accessibility scale
zero > verbal person > clitic pronoun > unstressed pron. > stressed pron. > prox. demonstrative > dist. dem. > prox. dem. + modifier > dist. dem. + mod. > first name > last name > short definite description > long definite description > full name > full name + modifier > indefinite description

So we must check whether the accessibility values of the nominal complements in the ambiguous clauses give some clue as to their status with respect to S and O.

Relative accessibility values of S and O in morphologically ambiguous clauses

	Old English	Middle English	Old High German	Middle High German	Early New High German	New High German	High Alemannic	Northern Low Saxon
■ morph. ambiguous	12	38	12	20	19	63	88	77
■ access. S < O (morph. ambig.)	7	9	6	17	11	17	21	19
■ access. O < S (morph. ambig.)	2	6	2	4	3	10	24	20
■ access. S = O (morph. ambig.)	3	4	1	2	5	3	11	3
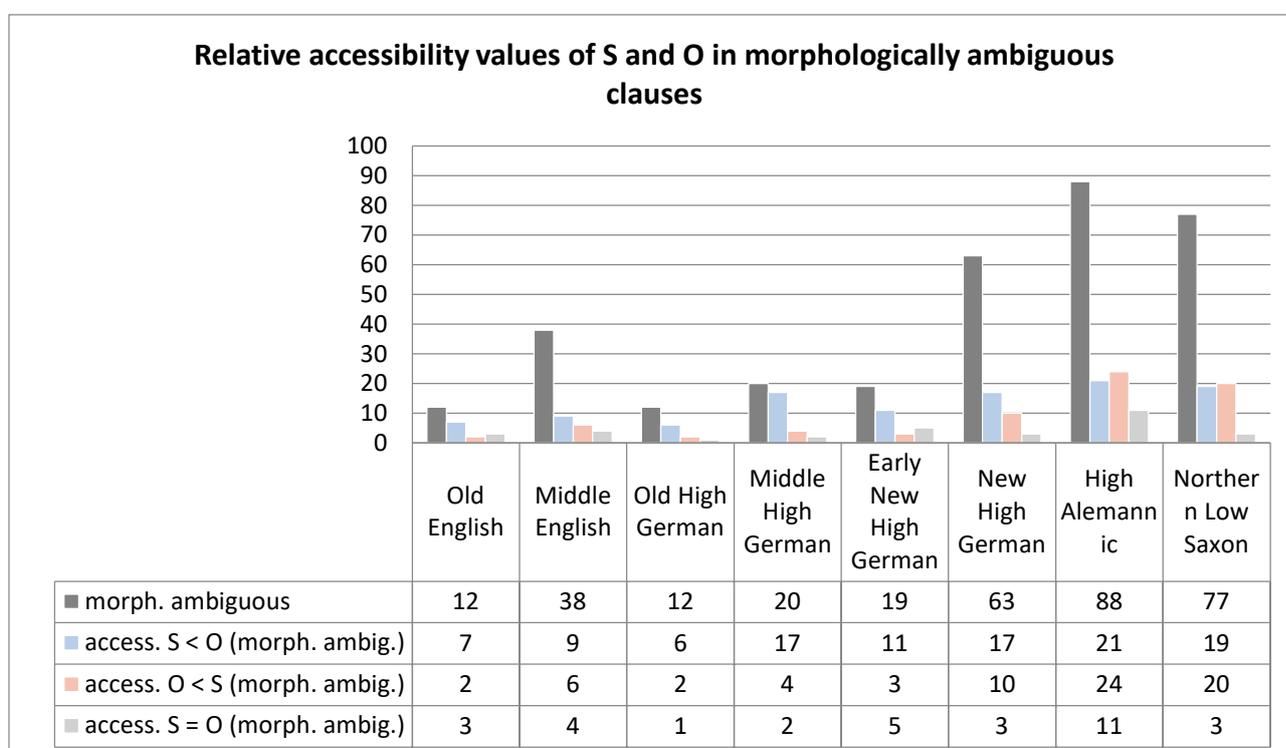
☞ We find that in morphologically ambiguous clauses higher accessibility is associated with S as well as with O functions. In other words, relative accessibility is no reliable cue as to the question of who does what to whom.

(c) Discourse pragmatics and specificity

With respect to the discourse-pragmatic and accessibility scales the hypothesis said that

☞ for any given clause, if the interpreter cannot identify semantic relations by means of grammatical devices, he/she will assume

(a) that the referent higher on the following scales is the subject, or agent.

❖ Discourse-pragmatic scale
Speech-act participant > Non-speech-act participant

❖ Specificity scale
individuated > non-individuated & countable > non-individuated & non-countable

To abbreviate the analysis, the results show that higher states on these scales do not correlate in any informative way with either S or O. The complement higher on each scale is more probably S but there is also a considerable share of clauses in which O is higher on the scales, so that neither the discourse-pragmatic nor the specificity status of a referent could be reliably utilized to identify who does what to whom in a morphologically and structurally ambiguous clause.

(d) S/A-1st

Obviously, referential scale information is not sufficiently informative to be exploitable for the interpretation of structurally ambiguous clauses. So we will check for the last extra-grammatical device for which we hypothesized that it may be utilized in interpretation, namely the assumptions that the first-mentioned complement in a (morphologically ambiguous) clause is S (A).

❖ extra-grammatical devices
v) S/A-1st

Even if there are no ordering principles on the level of the language system in all languages but English, it could be that element order becomes a distinctive means of interpretation only if morphology is not informative. Therefore, we would have to check whether O < S

orders occur to the same degree in morphologically ambiguous and morphologically un-ambiguous clauses. The S/A-1st principle would be active, if S (A) always preceded O (P) in morphologically ambiguous clauses. This would still allow a flexible order between S and O in morphologically unambiguous clauses.

S < O and O < S in ambiguous and unambiguous clauses

	Old English	Middle English	Old High German	Middle High German	Early New High German	New High German	High Aleman nic	Northern Low Saxon
relevant clauses (S & O overt)	320	304	356	333	342	331	334	391
S < O (morph. unambig.)	277	240	292	269	287	229	214	262
O < S (morph. unambig.)	37	27	103	57	47	45	45	68
S < O (morph. ambig.)	11	36	9	16	15	59	75	71
O < S (morph. ambig.)	2	2	3	4	4	6	16	8
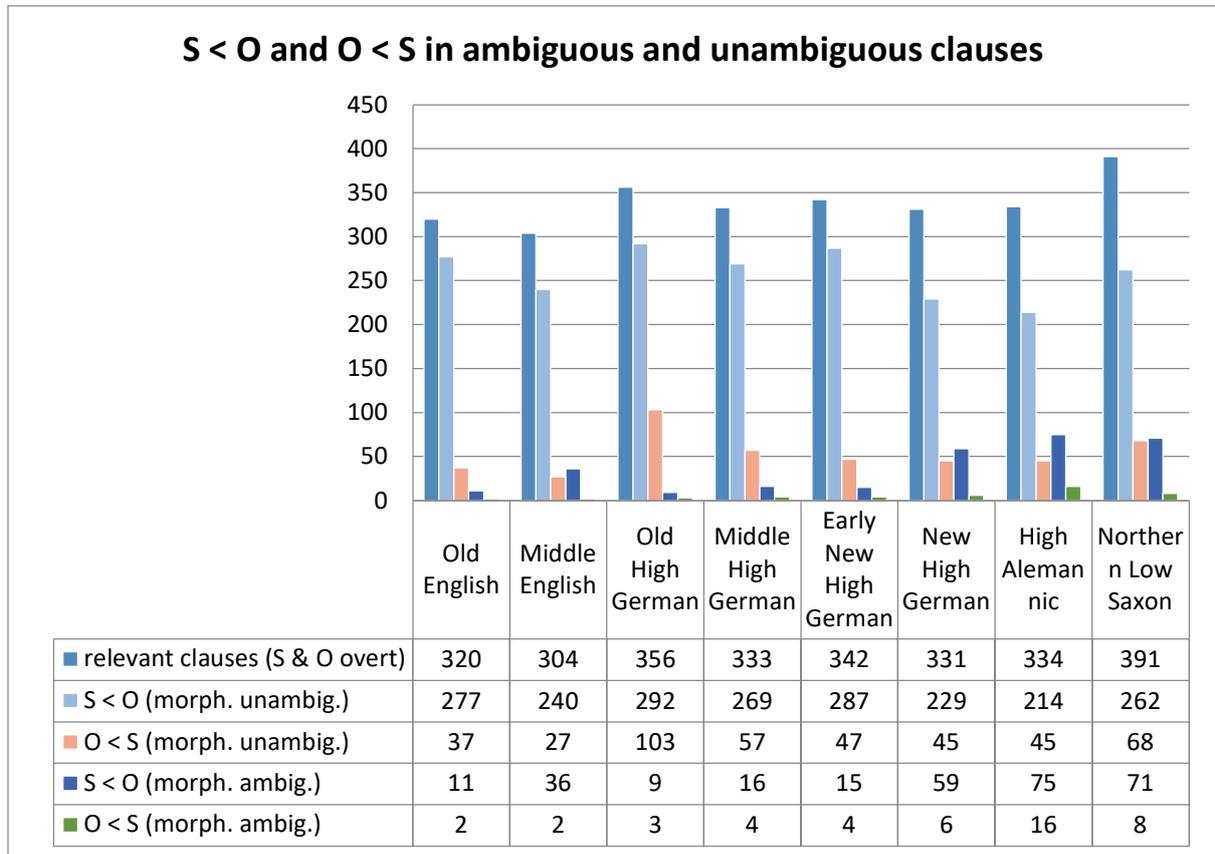
☞ We find that O < S orders actually occur in morphologically ambiguous clauses, even if they are few. A general assumption of S/A-1st in these clauses cannot be upheld, because it would be violated in a considerable number of cases.

But we can further ask, whether the S < O : O < S ratios differ between morphologically unambiguous and ambiguous clauses.

Shares of S < O and O < S in morphologically unambiguous and ambiguous clauses

Legend:
- S < O unambiguous (light blue)
- S < O ambiguous (teal)
- O < S unambiguous (orange)
- O < S ambiguous (green)

OE
- 12% / 88% (unambiguous)
- 15% / 85% (ambiguous)
- p = .06

ME
- 10% / 90% (unambiguous)
- 5% / 95% (ambiguous)
- p = 0.6

OHG
- 26% / 74% (unambiguous)
- 25% / 75% (ambiguous)
- p = 1

MHG
- 17% / 83% (unambiguous)
- 20% / 80% (ambiguous)
- p = 0.8

ENHG
- 14% / 86% (unambiguous)
- 21% / 79% (ambiguous)
- p = 0.5

NHG
- 16% / 84% (unambiguous)
- 9% / 91% (ambiguous)
- p = 0.18

HAlem
- 17% / 83% (unambiguous)
- 18% / 82% (ambiguous)
- p = 1

NLS
- 21% / 79% (unambiguous)
- 10% / 90% (ambiguous)
- p = 0.04*

☞ There is no consistent pattern that would indicate a "local" compensation of morphological underspecification by fixing the order between S and O in English and (Upper German) (Significance test: Fisher Exact Test run on the numbers in the table on the left, $p < .05$).

In Northern Low Saxon the distributions of S < O and O < S differ significantly between morphologically unambiguous and ambiguous clauses. (O < S is lower in the latter.) But this does not suffice as an information source for interpretation. If a Northern Low Saxon interpreter encounters a morphologically ambiguous clause, it may still exhibit an O < S order.

Interim summary

☞ Referential scale information is not sufficiently informative to be exploitable for the interpretation of structurally ambiguous clauses.

☞ The subject/actor-first assumption is not sufficiently informative to be exploitable for the interpretation of structurally ambiguous clauses.

☞ The clue validity of the extra-grammatical devices is as follows, based on the numbers above:

❖ S/A-1st >> animacy >> accessibility >> discourse-pragmatics >< specificity

In the interpretation of structurally ambiguous clauses the assumption that the first-mentioned participant is S (A) is the most reliable – but not sufficiently reliable – cue as to "who does what to whom", followed by animacy etc.

☞ Using the grammatical devices and the S/A-1st assumption for interpretation, 98,22% of all clauses in the corpus can be interpreted successfully.

From the "rest":

❖ *DA das   sahe Judas* /   (ENHG)
When DEM.NOM/ACC.SG see.3SG Judas.NOM/GEN/DAT/ACC
'When Judas saw this'

❖ *di   diese   wider dich gezcugen?*
REL.NOM/ACC.SG/PL DEM.NOM/ACC.SG/PL against you.ACC witness
'which they witness against you'

(ENHG)

❖ *was   sie   gethan hat*   (ENHG)
INTERROG she.NOM/ACC.SG/PL do.PTCP have.3SG
'what she did'

❖ *the min fæder   me   sealed*   (OE)
REL my father.NOM/ACC.SG me.DAT/ACC give.3SG

'that my father gave me'

❖ *dat   Jesus   seggt   harr:*   (NLS)
   REL.NOM/ACC.SG Jesus.NOM/DAT/ACC say.PTCP have.3SG
   'which Jesus said'

❖ *wo   die   gäge   dich   voorbringed*
   REL.NOM/ACC.SG/PL DEM.NOM/ACC.SG/PL against you.ACC produce
   'which they witness against you'

   (HAlem)

❖ *Da   hät   s   de Petrus   wider abgstritte*
   Then have.3SG it.NOM/ACC.SG/PL DET Petrus.NOM/ACC again deny.PTCP
   'Then Petrus denied it again'

   (HAlem)

☞ Using the grammatical devices and animacy information for interpretation, 97,52% of all clauses in the corpus can be interpreted successfully.

From the "rest":
❖ *Was   gaat öis   daas   aa?*
   INTERROG.NOM/ACC go.3SG us.DAT/ACC DEM.NOM/ACC.SG PART
   'What is that to us?'

   (Halem)

❖ *Wat   geit   uns   dat   an?*
   INTERROG.NOM/DAT/ACC go.3SG us.DAT/ACC DEM.NOM/DAT/ACC.SG
   PART
   'What is that to us?'

   (NLS)

❖ *Was   geht   uns   das   an?*
   INTERROG.NOM/DAT/ACC go.3SG us.DAT/ACC DEM.NOM/DAT/ACC.SG
   PART
   'What is that to us?'

   (NHG)

❖ *wat   de Biwel   seggt:*
   INTERROG.NOM/DAT/ACC DET bible.NOM/DAT/ACC.SG say.PTCP
   'what the bible says'

   (NLS)

❖ *das   ales   nüüt   bringt.*   (HAlem)
   COMP everything.NOM/ACC nothing.NOM/ACC bring.3SG
   'that nothing helps'

☞ Interpreters *are actually able to* interpret even structurally ambiguous clauses successfully, so how can they do this?

Combining animacy and S/A-1st

What is striking is that many of the clauses that cannot be successfully interpreted by the S/A-1st assumption could be successfully interpreted using animacy information, and that there are clauses for which the reverse relationship holds. It seems promising then to combine the two extra-grammatical devices, replacing the original hypothesis by a new one:

original:
❖ For any given clause, if the interpreter cannot identify semantic relations by means of grammatical devices, he/she will assume
  (a) that the referent higher on the referential scales is the subject, or agent.
  (b) that the first-mentioned participant is the subject, or agent.

revised:
☞ For any given clause, if the interpreter cannot identify semantic relations by means of grammatical devices, he/she will assume
        ❖ that the participant higher in animacy is the S (A), and
        ❖ that the first-mentioned is the S (A), if the animacy values of the participants are equal.

Equal animacy of S and O in relation to S < O and O < S in ambiguous clauses

	Old English	Middle English	Old High German	Middle High German	Early New High German	New High German	High Alemannic	Northern Low Saxon
■ morph. ambiguous	12	38	12	20	19	63	88	77
■ anim. S = O (S < O morph. ambig.)	2	7	0	5	4	5	22	12
■ anim. S = O (O < S morph. ambig.)	0	0	0	0	2	1	4	4
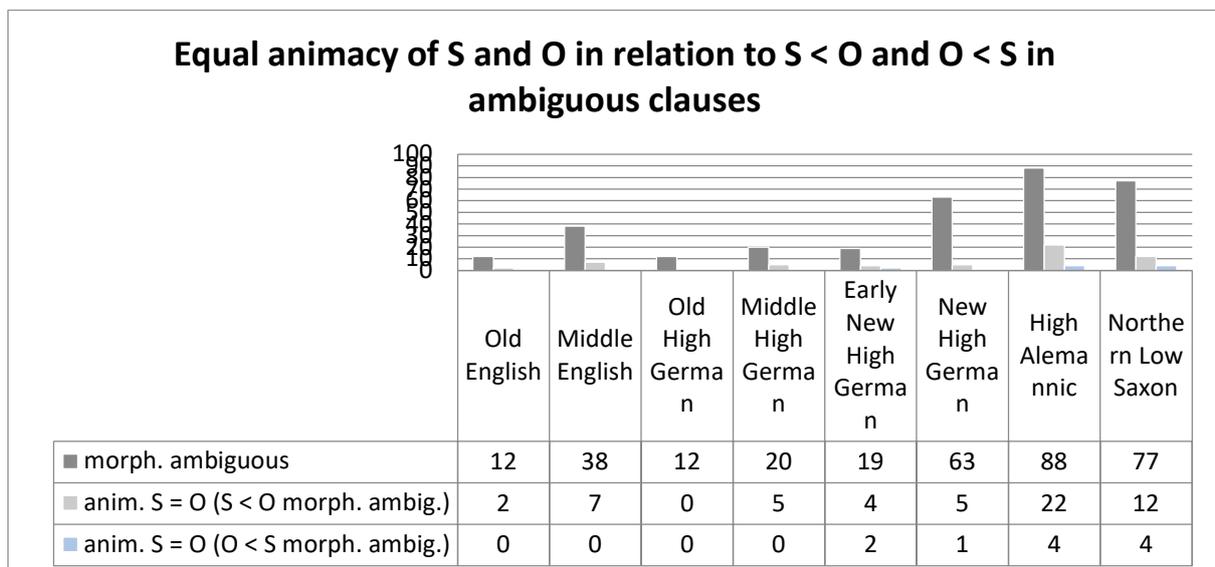
☞ Using the grammatical devices and the combined animacy and S/A-1st assumption for interpretation, 98,65% of all clauses in the corpus can be interpreted successfully.

☞ The residual 1.35% of clauses probably cannot be interpreted successfully by the proposed set of grammatical and extra-grammatical devices.

<u>(4) What about extra-grammatical devices in formally unambiguous clauses?</u>

It has been demonstrated that structurally ambiguous clauses can be quite accurately interpreted by a combination of extra-grammatical animacy and S/A-1st assumptions. We can ask now, whether the animacy and S/A-1st-related properties of structurally ambiguous clauses are exclusive to structurally ambiguous clauses or whether structurally unambiguous clauses also exhibit these properties. In other words, if first participants and participants higher in animacy tend to be Ss (As) in structurally ambiguous clauses, does this also hold for structurally unambiguous clauses?

Relative animacy values of S and O in unambiguous clauses

	Old English	Middle English	Old High German	Middle High German	Early New High German	New High German	High Alemannic	Northern Low Saxon
morph. unambiguous	308	266	344	313	323	268	246	314
anim. S < O (unamb.)	206	212	244	226	225	177	173	217
anim. O < S (unamb.)	20	13	40	26	29	25	21	32
anim. S = O (unamb.)	102	83	133	95	99	93	83	103
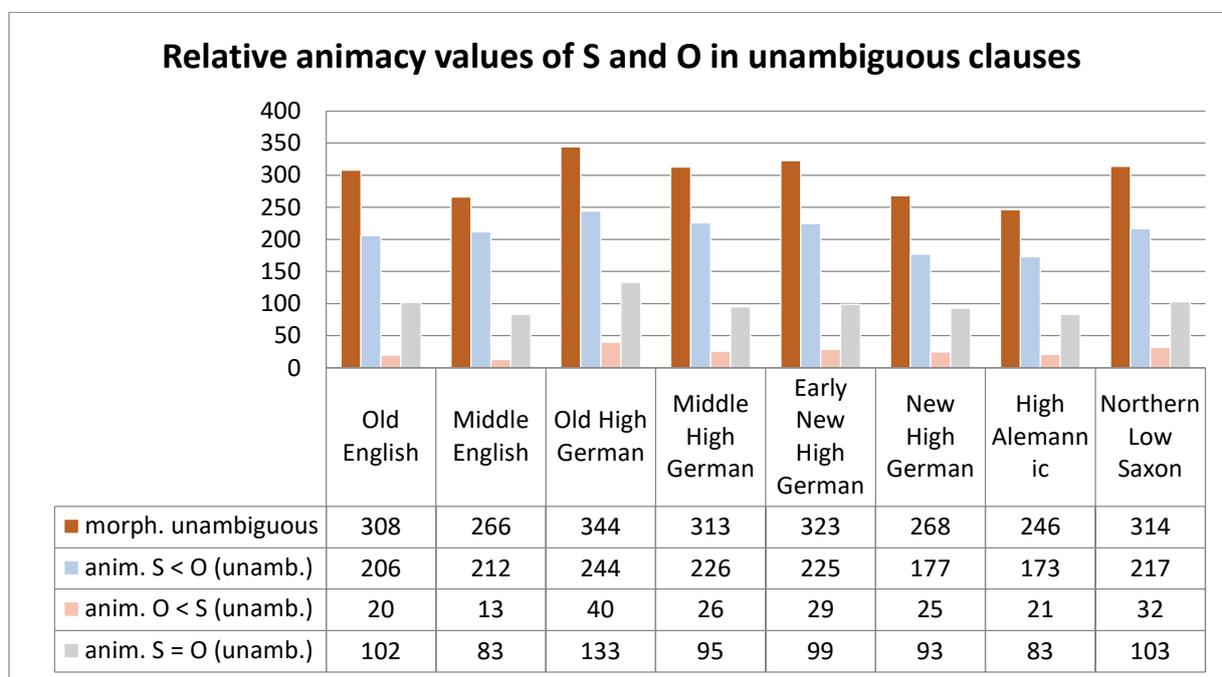
anim S>O vs. ¬anim S>O			*0.002			*0	*0.03	*0.003
anim S>O vs. anim S=O			*0.01			*1.9E-05		*0.04
anim S=O vs. anim O>S							*0.07	*0.02
anim S>O vs. anim O>S						*0.001	*0.0008	*0.0008

42

Relative animacy values of S and O in unambiguous clauses

anim. S < O · anim. O < S · anim. S = O
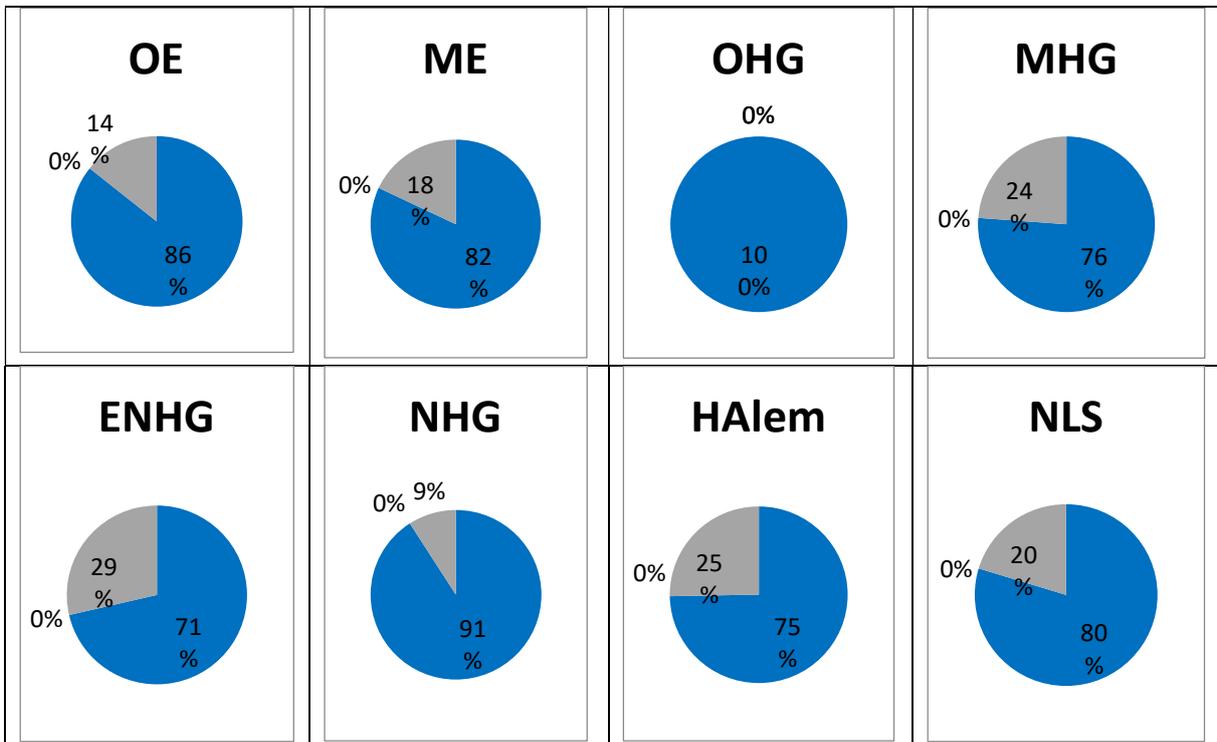
OE
63% · 6% · 31%

ME
69% · 4% · 27%

OHG
58% · 10% · 32%

MHG
65% · 8% · 27%

ENHG
64% · 8% · 28%

NHG
60% · 8% · 32%

HAlem
62% · 8% · 30%

NLS
62% · 9% · 29%

Relative animacy values of S and O in unambiguous clauses

OE
86% · 0% · 14%

ME
82% · 0% · 18%

OHG
100% · 0% · 0%

MHG
76% · 0% · 24%

ENHG
71% · 0% · 29%

NHG
91% · 0% · 9%

HAlem
75% · 0% · 25%

NLS
80% · 0% · 20%

Relative accessibility values of S and O in unambiguous clauses

	Old English	Middle English	Old High German	Middle High German	Early New High German	New High German	High Alemannic	Northern Low Saxon
morph. unambiguous	308	266	344	313	323	268	246	314
access. S < O (morph. unamb.)	113	109	102	110	100	93	87	122
access. O < S (morph. unamb.)	41	23	77	42	46	41	32	33
access S = O (morph. unamb.)	98	76	138	104	108	102	105	134

Relative accessibility values of S and O in unambiguous clauses

access. S < O   access. O < S   access. S = O

OE	ME	OHG	MHG
45% / 16% / 39%	52% / 11% / 37%	32% / 24% / 44%	43% / 16% / 41%

ENHG	NHG	HAlem	NLS
39% / 18% / 43%	40% / 17% / 43%	39% / 14% / 47%	42% / 12% / 46%
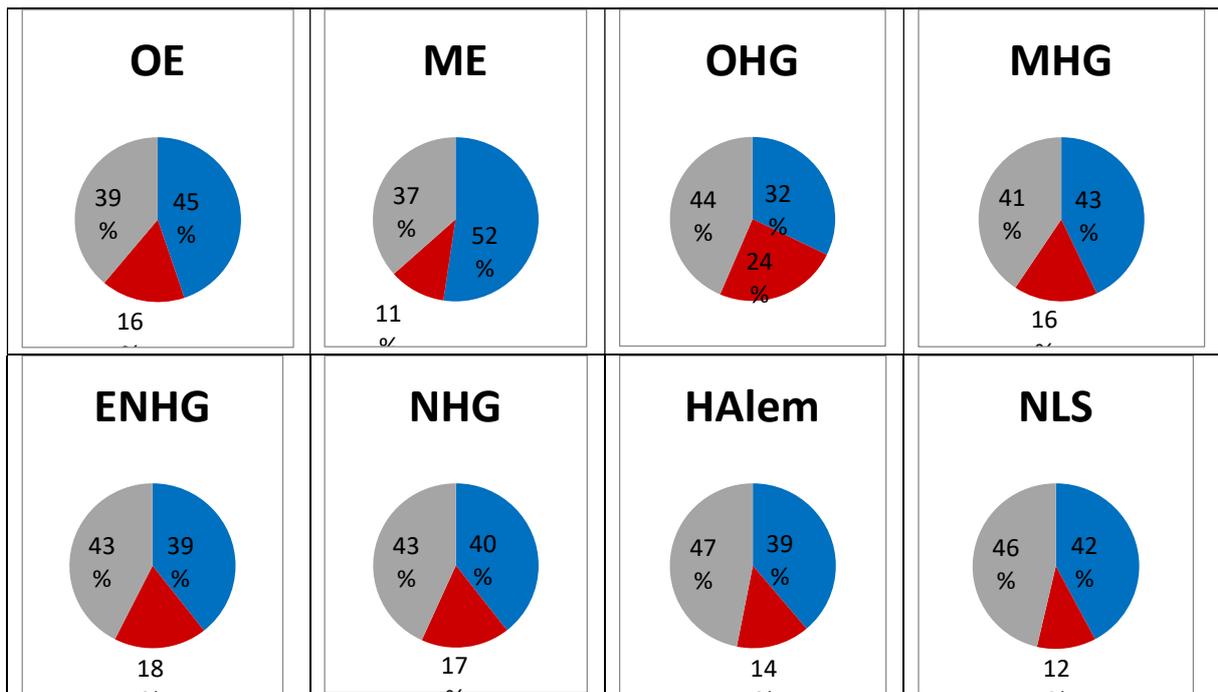
Relative accessibility values of S and O in ambiguous clauses

OE	ME	OHG	MHG
25% / 17% / 58%	21% / 32% / 47%	11% / 22% / 67%	9% / 17% / 74%

ENHG	NHG	HAlem	NLS
26% / 16% / 58%	10% / 33% / 57%	20% / 43% / 37%	7% / 48% / 45%
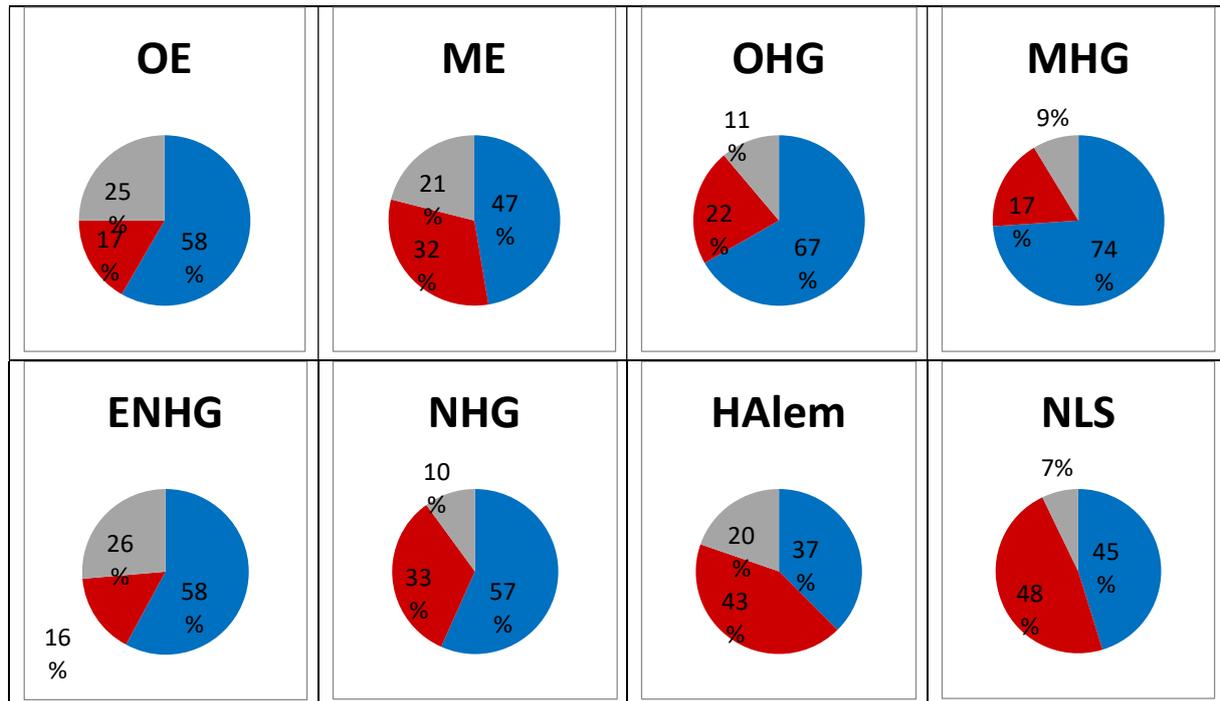
3. Neurolinguistic study: Interpretation of case and word order information

3. Neurolinguistic study: Interpretation of case and word order information	(5) How do morphology and element order interact in incremental interpretation? (6) *Do* extra-grammatical devices aid the interpretation of structurally ambiguous clauses? (7) Are there (neuro-)cognitive effects of extra-grammatical devices in formally unambiguous clauses?

With respect to cognitive processes of language users, the corpus study provides only „atemporal" information about the relationship between case, word order and referential scales.

☞ It demonstrates what interpreters *could do* with the grammatical and extra-grammatical information at hand.

In order to evaluate the cognitive significance of the corpus study results, they must be complemented by a method giving insight into real-time comprehension strategies.

45

☞ We must ask how the hearer *actually* utilizes different information types in order to identify who does what to whom in a clause.

Method

We conducted three neurolingusitic experiments with event-related brain potentials (ERPs) with Standard German (NHG), High Alemannic (HAlem), and Frisian (FR) speakers (n between 20 and 30 for each).

> "Event-related brain potentials (ERPs): ERPs are potential changes in the E[lectro]E[ncephalo]G[ram] that are time-locked to sensory or cognitive events and which may therefore be used to examine the brain's response to critical stimuli (e.g. words or sentences). [...] ERP effects [are classified] into so-called 'components'. Components are associated with functional interpretations, such that different components may be interpreted as reflecting distinct cognitive processes." (Bornkessel-Schlesewsky & Schlesewsky (2009), Processing syntax and morphology, Oxford University Press, p. 5)

In our studies, participants were confronted with auditorily presented material, while their brain activity was being recorded during comprehension, followed by an acceptability rating. The speakers of the stimuli were native speakers of the respective language, as were the participants.

The stimuli in all languages were of the following kind: a passive question followed by one of two possible answers. An S < O answer or an O < S answer. Both answers were always correct answers to the question.

❖ New High German:

Wird der Eintopf vom Chefkoch gewürzt?
     a. *[S < O] Ja, natürlich würzt <u>der</u> (NOM) Chefkoch <u>den</u> (ACC) Eintopf.*
     b. *[O < S] Ja, natürlich würzt <u>den</u> (ACC) Eintopf <u>der</u> (NOM) Chefkoch.*

  lit. 'Is the stew being seasoned by the chef?
    a. Yes, of course the chef (S) is seasoning the stew (O).
    b. Yes, of course the stew (O) is seasoning the chef (S).'

❖ <u>Zurich German (High Alemannic)</u>

Wiirt de Braate vom Scheffchoch gwüürzt?
     a. *[S < O] Ja, natürlich wüürzt <u>d</u> (nom/acc) Scheffchoch <u>d</u> (nom/acc) Braate.*
     b. *[O < S] Ja, natürlich wüürzt <u>d</u> (nom/acc) Braate <u>d</u> (nom/acc) Chefchoch.*

lit. 'Is the roast being seasoned by the chef?
    a. Yes, of course the chef (S/O) is seasoning the roast (S/O).
    b. Yes, of course the roast (S/O) is seasoning the chef (S/O).'

The questions are structurally unambiguous. The *yes*ses in the answers affirm the semantic relations established in the question.

As can be seen in the inflectional paradigms, the singular masculine definite article shows distinct case forms for nominative and accusative (*der* and *den*, respectively) in New High German. So who does what to whom is in any case indicated by case morphology, both in S < O and O < S sentences. The nominative–accusative distinction is absent in the feminine definite article system, so there is a nominative/accusative syncretism.

In High Alemannic the definite article shows a nominative/accusative syncretism in all genders. So who does what to whom is not indicated by case morphology, so the sentence is structurally ambiguous. The same is true for Frisian, except that Frisian shows a systematic syncretism between nominative, dative, and accusative for the definite article in all genders (similar to Northern Low Saxon feminine and neuter declensions)

We manipulated not only case ambiguity and element order but also the animacy of the O, either human or inanimate.

The critical region on which we measured the brain potentials was the onset of the first NP (underlined).

After the participants heard a question-answer pair they were asked how well the answer fitted the question, to be rated on a scale from zero to three.

Results

Here is an extract of the results.

New High German   High Alemannic

—— S < O unambiguous/O [- anim.]   —— S < O ambiguous/O [- anim.]

······ O < S unambiguous/O [- anim.]   ······ O < S ambiguous/O [- anim.]
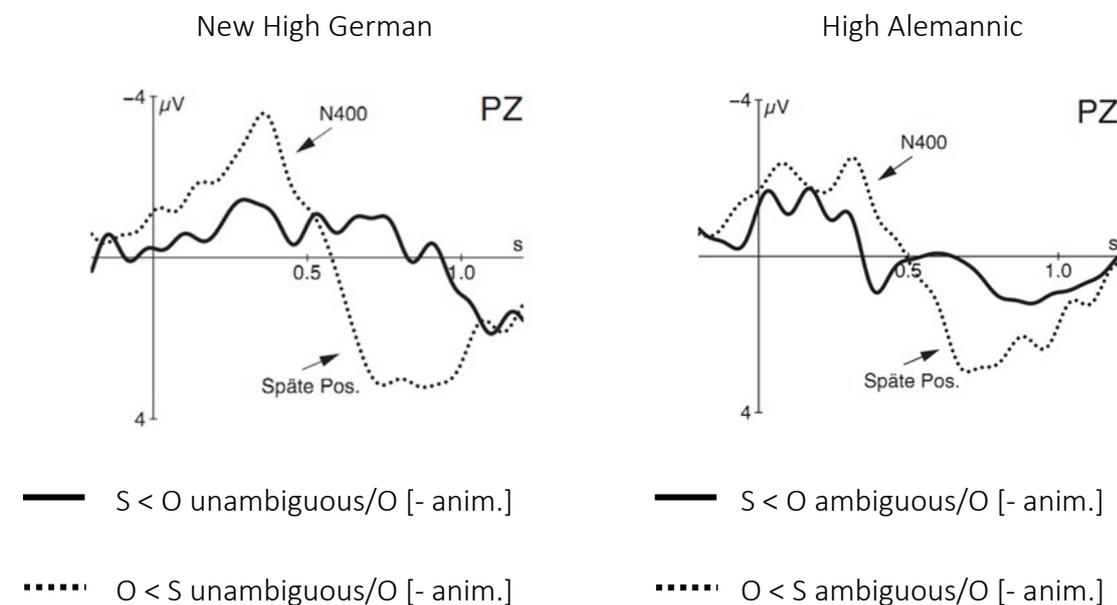
We found that O < S structures (the dotted lines) elicited a negativity effect after about 400ms and a late positivity effect after about 600ms in relation to the respective S < O structures (the solid lines) in New High German, High Alemannic, and Frisian. These effects are interpreted as violations.

☞ What is remarkable is that these violation effects occur independently of whether case is unambiguous or ambiguous! Even O < S structures in which the NPs are unambiguously case-marked show these violations.

These neurophysiological results demonstrate the well-known subject, or actor, preference in language comprehension. This preference has been found in diverse languages including German, Turkish, Tamil, Chinese and Hindi; cf. Bornkessel-Schlesewsky & Schlesewsky 2009).

☞ The brain „anticipates" an S < O order in the absence of any information to the contrary. An O < S order is a violation of this anticipation.

☞ If an S < O order is the general expectation, unambiguous case information in S < O orders is redundant information, strictly speaking, in that it provides no additional information for the clause as a whole and for the question of who does what to whom. But it confirms the initial expectation early in incremental clause comprehension. In contrast, unambiguous case information in O < S orders is highly relevant information in that it reliably cancels the initial expectation and triggers a reanalysis.

☞ There were no animacy effects.

☞ The amplitude of the late positivity effect was higher in (New High German) unambiguous O < S clauses than in ambiguous O < S clauses. This points to a higher "decision certainty", if morphological cues (grammatical devices) are utilizable.

The acceptability ratings diverge from this. If case was unambiguous (which is possible only in the New High German masculine), O < S is judged acceptable. O < S is judged unacceptable only if case is ambiguous (that is, always in High Alemannic, Frisian, and in the New High German feminine).

☞ Thus, O < S is acceptable, if case disambiguates the sentence.

New High German

−belebt +belebt

3.0
2.5
2.0
1.5
1.0

feminin +ambig maskulin −ambig feminin +ambig maskulin −ambig

Abfolge
● O<S
▲ S<O

High Alemannic

−belebt +belebt

3
2
1

feminin +ambig maskulin +ambig feminin +ambig maskulin +ambig

Abfolge
● O<S
▲ S<O
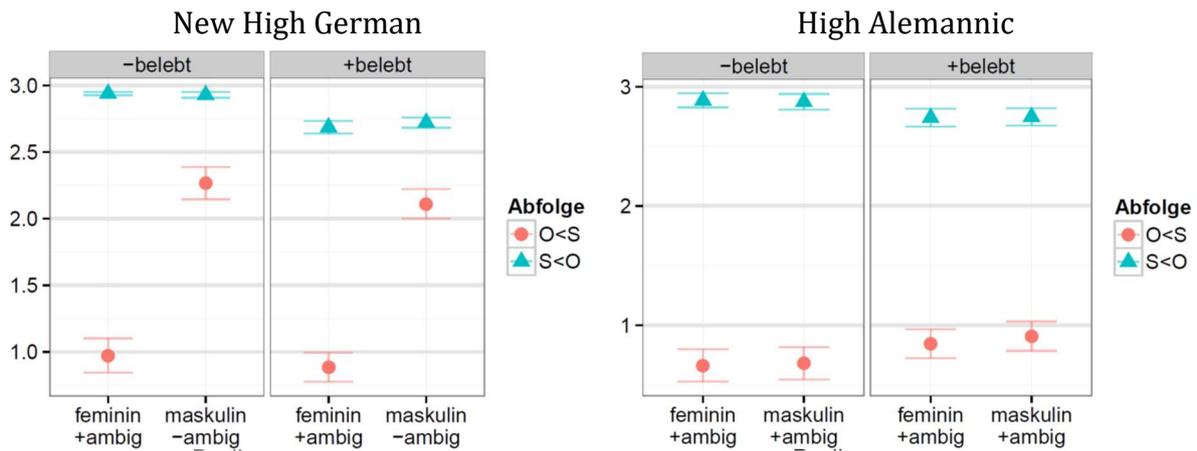
Animacy effects have also been reported in a number of studies pointing to their actual utilization for the identification of who does what to whom. In incremental interpretation the first participant encountered is readily associated with the S function (A role), if it is high in animacy, and there are (violation) effects, if the first participant is low in animacy.

Summary

(1) How many morphologically ambiguous clauses are there (morphology fails)?

❖ Across languages there are morphologically ambiguous clauses, ranging from 3% to 26% (corpus study).

❖ The number increases from Old English to Middle English and from Old High German over the other stages of Upper German to High Alemannic (corpus study).

(2) How many morphologically ambiguous clauses are also structurally ambiguous (element order fails)? (5) How do morphology and element order interact in incremental interpretation?

❖ Except for Middle English, morphologically ambiguous clauses are also structurally ambiguous. In Middle English element order disambiguates all clauses (corpus study).

❖ In the other languages the absence of morphological distinctions is not compensated for by more fixed element order (corpus study). However, there is an initial expectation for the first participant in a clause to be the S/A, irrespective of a grammaticalized element order (neurolinguistic study)!

(3) *Could* extra-grammatical devices aid the interpretation of structurally ambiguous clauses? (6) *Do* extra-grammatical devices aid the interpretation of structurally ambiguous clauses?

❖ Animacy and subject/actor-first assumptions could be utilized as non-grammatical devices in order to arrive at a successful interpretation of structurally ambiguous clauses (corpus study).

❖ The "functional charge" on these extra-grammatical devices increases in the history of (Upper) German. It ceases in the history of English (corpus study).

❖ There is independent evidence for the role of animacy and an S/A-1st assumption in language comprehension.

(4) What about extra-grammatical devices in formally unambiguous clauses? (7) Are there (neuro-)cognitive effects of extra-grammatical devices in formally unambiguous clauses?

❖ S < O orders are preferred over O < S orders in formally ambiguous *and* in formally unambiguous clauses. However, in English S < O has become nearly exclusive and in the history of German the number of S < O clauses increases, while the number of O < S clauses decreases. Similarly, higher animacy values tend to be associated with the S function (A role) in both kinds of clauses (corpus study).

❖ It seems that interpreters can resort to extra-grammatical devices, if grammatical devices fail. If grammatical devices are functional, animacy and S/A-1st information is "overwritten". If morphology is present and distinctive, it is obligatory. So is a grammaticalized element order (Middle English) (corpus study).

 However, the neurolinguistic results show no differences between morphologically ambiguous and unambiguous S < O clauses and they show no differences between morphologically ambiguous and unambiguous O < S clauses. Instead, O < S elicits effects in relation to S < O irrespective of morphology (neurolinguistic study).

☞ Can this tell us anything about the role of morphology in language competence?

❖ We saw that there is an initial expectation for the first participant in a clause to be the S/A.

 If case morphology is uninformative due to syncretism, the initial expectation is "carried through" the clause. But there is no grammatical device which would make the resulting interpretation reliable. The interpretation is somewhat uncertain.

If, in contrast, case is present and informative, it either confirms the initial expectation or it cancels the expectation. In the former case it is redundant information, it is relevant information in the latter case. The clues (grammatical devices) are highly reliable. The resulting interpretation is certain. The effect of certainty is reflected in the amplitudes of the late positivity in ambiguous and unambiguous clauses (neurolinguistic study).

All this demonstrates that most of the assumptions about the relationship between element order and morphology cited in the Introduction are too simplistic.

☞ Martinet was wrong with respect to German: O < S is possible even in morphologically ambiguous clauses.

☞ Jespersen was wrong with respect to German: The intervening period between lack of morphological distinctions and rigid element order is possible! (Actually, there are languages where users have to rely heavily on extra-grammatical devices.)

☞ Meillet was wrong with respect to German: There is no distinctive element order in German, although every fourth clause is morphologically ambiguous in High Alemannic.

☞ Herder (as cited by Harris & Campbell) was wrong in overgeneralizing morphological underspecification as the cause of rigidification of element order, as English shows: Middle English could actually afford a flexible element order. It had less morphological ambiguity than Northern Low Saxon and High Alemannic.

☞ Sapir was wrong in implying a direct relationship between rigidification and loss of morphological distinctions.

☞ So is Dixon.

☞ Kiparsky is at least problematic in one respect, for the same reason as Herder: Few morphological distinctions (as in High Alemannic) do not necessarily imply rigid element order (HAlem has none). One could argue that this implication holds by tendency. But then one has to outline how this can be quantified: How much syncretism necessitates a rigid element order? And how can we quantify syncretism in a way that does justice to the "natural" distribution of forms across texts, sentences, and clauses? Kiparsky is wrong in another respect, since the claim that "loss of inflections automatically brings about a shift to positional licensing" is clearly falsified by German.

Part II: Synthesis – Understanding grammar by understanding interpretation

1. Basic assumptions and theoretical apparatus of Instruction Grammar	
2. Interpreting the corpus and neurolinguistic results	(8) What does it mean for the theory of language (competence)?
3. A re-evaluation of morphology, word order and animacy	

1. Basic assumptions and theoretical apparatus of Instruction Grammar

- ❖ Question of form: Why do we structure our utterances the way we do?
- ❖ Question of use: What are the conditions that govern our use of particular structures instead of others?
- ❖ Question of understanding: Why do we interpret utterances the way we do and not differently?

Instruction Grammar is an attempt to answer these questions by recourse to non-linguistic human competences and the nature of sign-use.

- ❖ Non-linguistic competences: perceive (primarily visually), conceptualize, identify (categorize), attribute, memorize, attend to; physical action and behavior
- ❖ Sign-use: what it means to use signs

What happens in the following photo story?
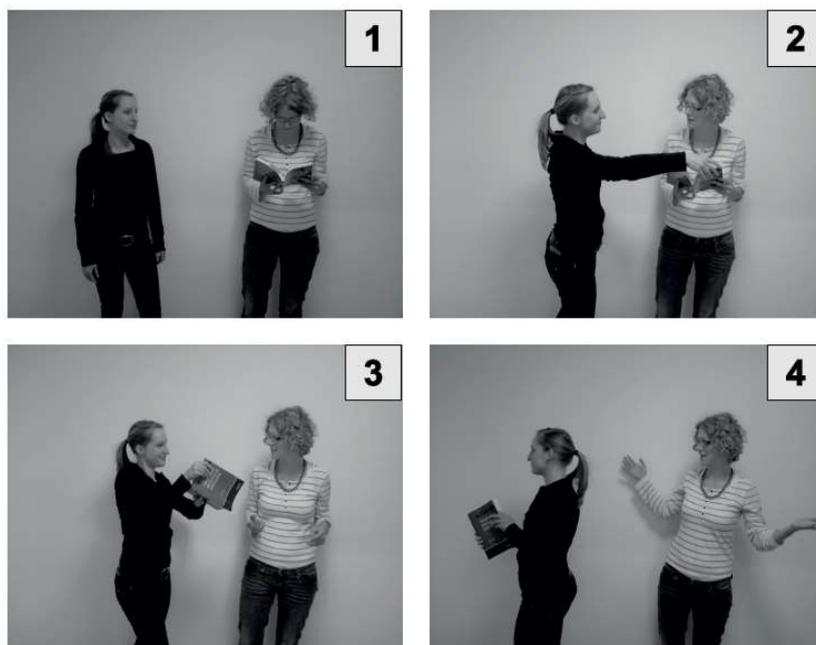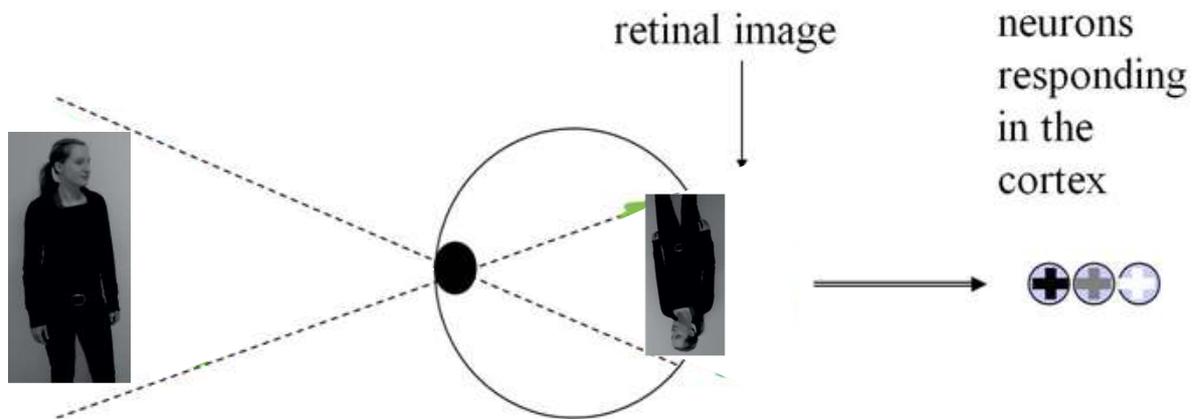
Light waves reflected from objects cause „images" on the retina. The topological structure of the light points on the retina are mapped to further processing stages in the cortex, e.g. the primary visual cortex. That means the relative spatial relations between visual features are preserved in the topological structure of neurons firing in the cortex. This is called retinotopic mapping. The output of the processing in the primary visual cortex can be described as a bundle of disintegrated visual features.

The so-called Gestalt Laws are instrumental in grouping disintegrated visual features into parts and wholes. Those features are grouped into a Figure in relation to a (back-)Ground, which

- are close to each other,
- are similar to each other,
- constitute good continuations,
- constitute closed forms, and
- move together.

Figure–Ground segregation is facilitated by a small figure relative to a big ground and the movement of a figure relative to a (stationary) background. We can now describe our percepts as Figure–Ground configurations.
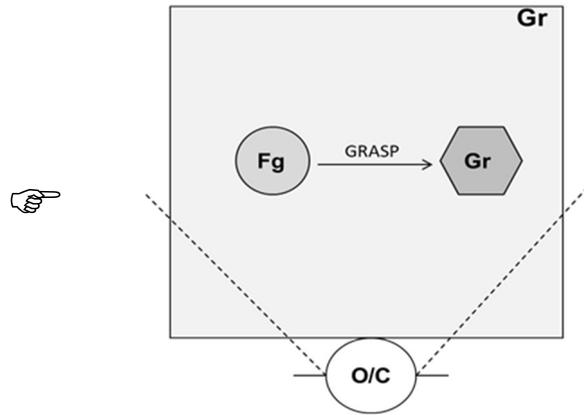
☞ Perceptions are structured by means of Figure and Ground.
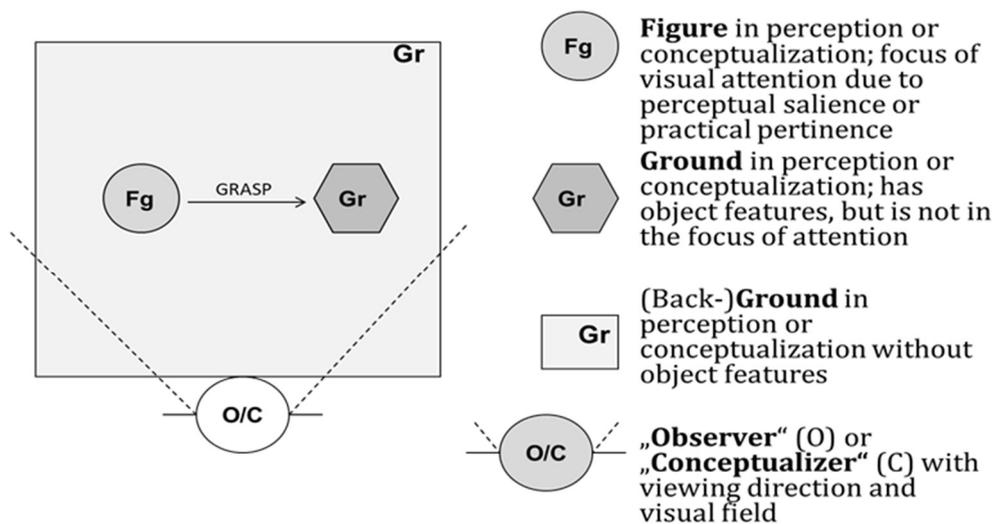
What functions as Figure and Ground in a perceptual scene is not objectively fixed, but, as the characterizations of the perceptual constituents indicate, depends on

- the features of the stimuli,
- their perceptual salience in dependence of the perceiver's perceptual system, and
- their pertinence to the perceivers practical purposes.

If nothing happens in the scene, Figure–Ground segregation is relatively flexible.

The following Figure–Ground segregation are possible, among others. It is also possible that they represent three different stages we are successively going through when inspecting the picture.

'the woman in black'
'die Frau in Schwarz'

'the woman in black besides the other woman'
'die Frau in Schwarz neben der anderen Frau'

‚The woman has a book.'
'Die Frau hat ein Buch.'
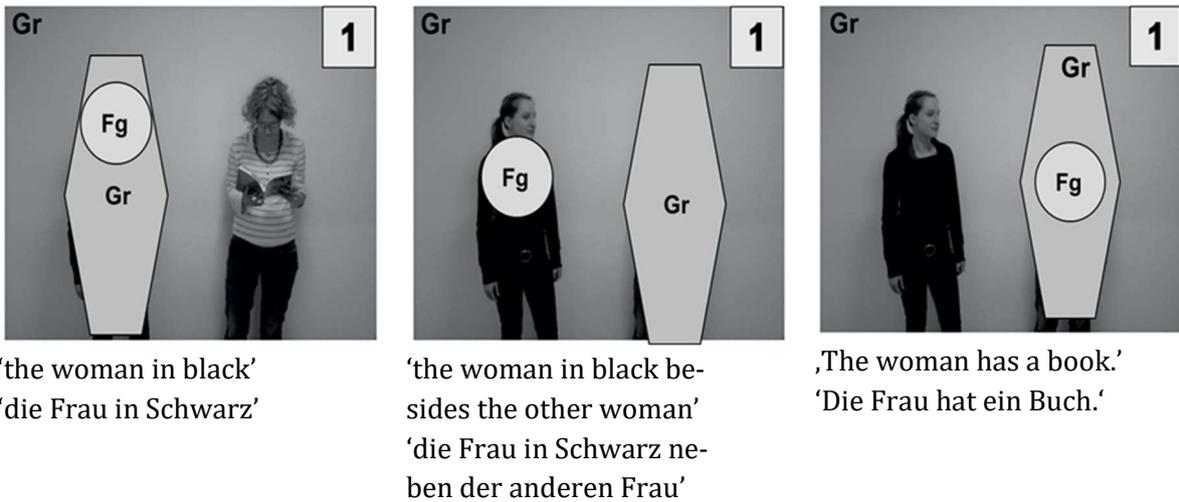
If something happens (which is actually the case in the photo story), Figure–Ground configurations change continuously, and this means, objects of perception may change their perceptual "roles" from sub-event to sub-event.

'The woman grasps the book'
'Die Frau greift das Buch'

'The woman takes the book'
'Die Frau nimmt das Buch'
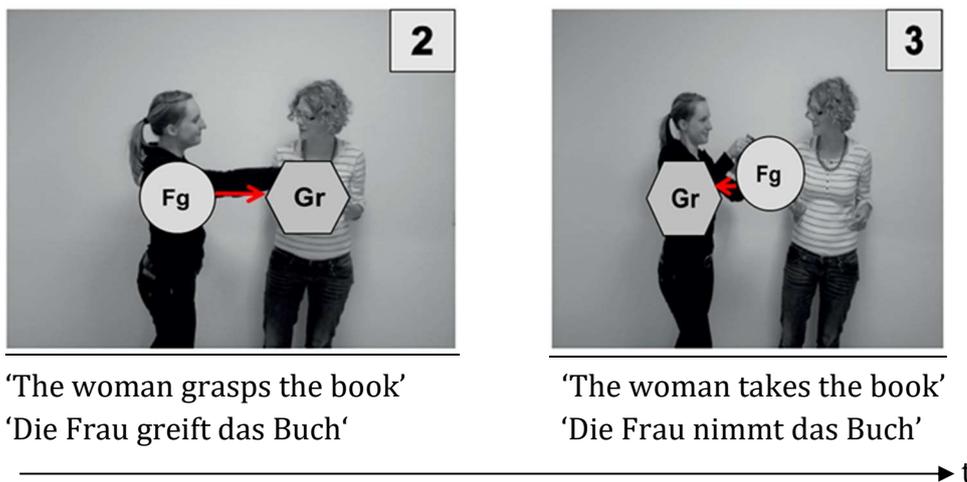
Conceptualization

Apart from what we know about perception, we all also know that even in the absence of visual stimuli we are able to evoke visual images (or conceptualizations) in a top-down manner and to manipulate them. Imagine the woman in black on a platform, rotating clockwise. The time you require to rotate the woman in your mind can be shown to be a linear function of the degree of rotation. In addition, it can be shown that the neurons firing in such a conceptualization task overlap with those that would also be active in the actual perception of that event. They too are retinotopically organized.

This points to the following conclusion:

☞ (Top-down) conceptualization is simulated (bottom-up) perception and concepts are simulated percepts. Categorizing, or identifying a percept, would then be matching a bottom-up percept with a concept from memory.
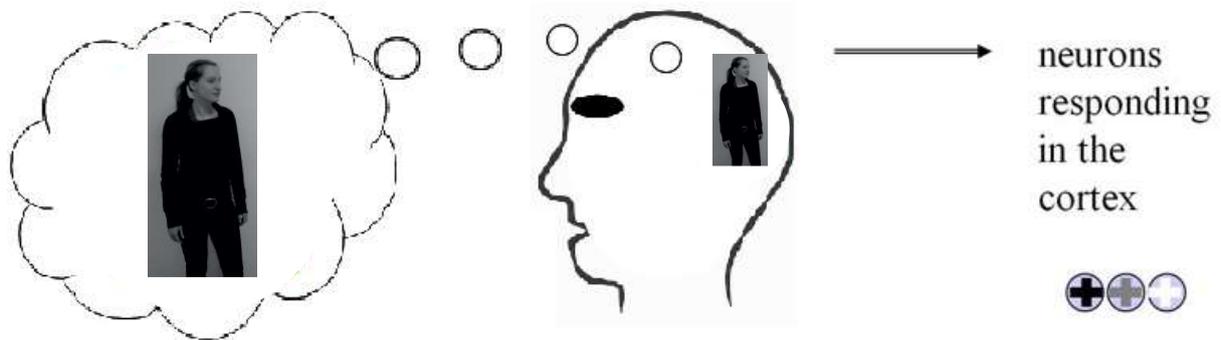
In other words, the structuring principles of perception are the same for conceptualizations: Figure–Ground configurations. To distinguish them, I usually use "Figure" and "Ground" for percepts and "Trajector" and "Landmark" as their counterparts in conceptualization. For the sake of simplicity, I will use here only "Figure" and "Ground".

The perception and conceptualization of the whole event looks like this, then (the observer/conceptualizer is left out here):
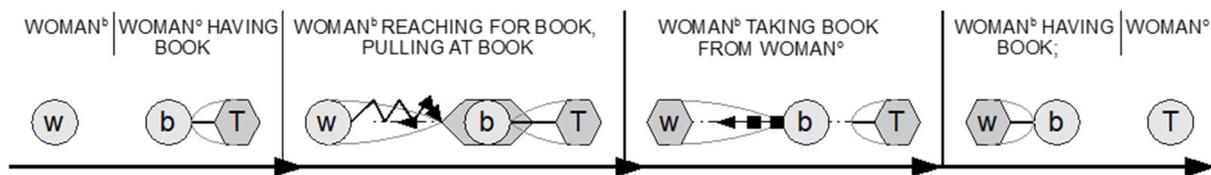
Compressed into one schematic, it looks like this. This conceptual structure is part of what replaces predicate–argument structures in Instruction Grammar:
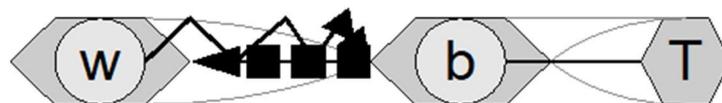
The corresponding utterance would be:

❖ *Die   Frau   in Schwarz nimmt   der   anderen Frau das Buch ab.*
DET.NOM/ACC woman in black   take.3SG DET.DAT other   wmn
DET.NOM/ACC book PRT
'The woman in black takes the book from the other woman.'

We will see later on why the conceptual structure is expressed this way grammatically.

56

Social attribution

Trivially, our percepts consist of what is perceivable for our sense organs. However, there are things we do not perceive, but which are of crucial importance for our living together. Consider the following context:

❖ The three-year-old twins Jessica and Nicole are at dinner with their parents Sarah and Marc. Nicole reaches for the milk carton. She grabs it only with her fingertips, causing it to fall down. It falls off the table and runs all over the floor. Jessica and her mother have kept track of what happened.

(a) Jessica: *Nicole   hat   die Milch   runtergeworfen.*
              Nicole.NOM/ACC have.3SG DET milk.NOM/ACC down-throw.PTCP
              ʻNicole knocked over the milk.ʼ

(b) Sarah: (hesitating, looking at the surprised causer)
              Nein, sie   ist   ihr   runtergefallen.
              No   it.3NOM/ACC be.3SG her.DAT down-fall.PTCP
              ʻNo, (it happened to her that) it fell down.ʼ

(c) Jessica: ⋯ (not signalling misunderstanding)

In this type of event which anyone is certainly familiar with there is a single event (Nicole knocking over the milk) with two different verbalizations (Jessica's and Sarah's). However, these verbalizations are not paraphrases of each other, because they differ in "meaning". Using classical terminology, while the (a) sentence makes Nicole the "agent" or "causer" of the event, the (b) sentence makes her an "experiencer" or even "patient". The milk is a "theme" in both sentences. The classical thematic role theories fail to explain on what grounds Nicole can be made an agent/causer or an experiencer/patient here, and why the milk remains the theme in both cases. What they also miss is that Nicole may be conceived of as a causer and an experiencer/patient at the same time – she causes the milk to fall down, but cannot help it – she may have experienced it "passively".

Both speakers probably pursue different purposes with their respective utterances which, if realized, may have different social consequences for Nicole. In other words, what is under discussion here is whether Nicole can be made responsible for what she did or not, and on what grounds.

What the speakers perceive here is – apart from their perspectives on the scene – identical in all relevant respects. They also categorize the scene identically in all relevant respects (if categorization is matching percepts and concepts). The percept/concept of the event looks like this.

[Nicole] [hat] [die Milch] [runtergeworfen]
NP   Aux NP   V
nom   nom
dat   acc
acc
[Nicole] [has] [the milk] [down-thrown]

[Sie] [ist] [ihr] [runtergefallen]
NP   Aux NP   V
nom   dat
acc
[It] [is] [(to) her] [down-fallen]
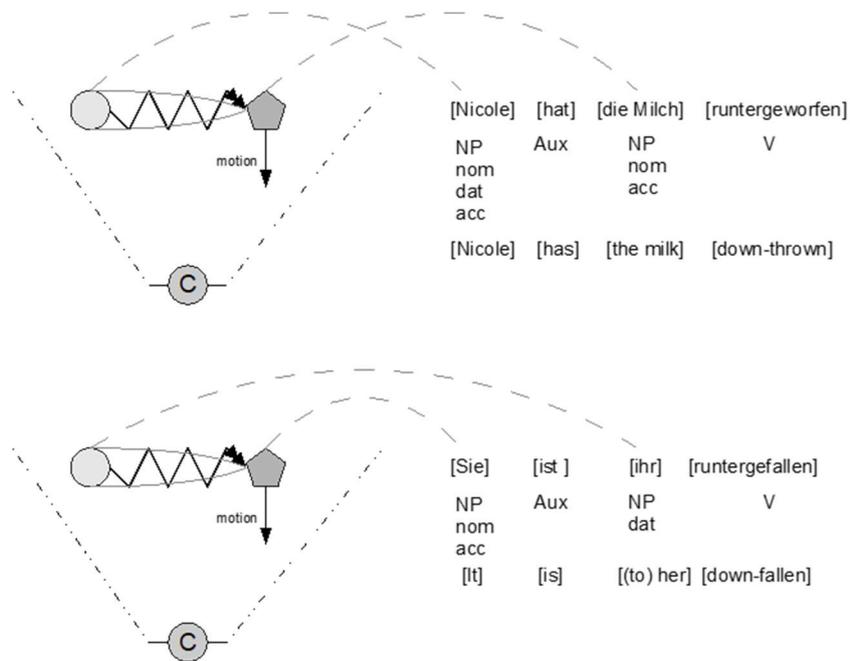
This means

☞   the criteria which decide over Nicoles agentive or patientive involvement are no perceptual criteria.

For example, Jessica and Sarah cannot perceive whether

❖   the objects move by self-propellation or not,
❖   there has been causation and what was the cause (who was the causer),
❖   Nicole's deed was deliberate or accidental,
❖   Nicole's is deed considered an accomplishment or a misaccomplishment,
❖   the observer has particular personal attitudes towards Nicole,
❖   …

The first two of these may be fixed in the categorization/identification of the event. Whereas the percept contains no information as to the capacity of self-propellation and the presence of a causal relation (it only "shows" the conjunction of two events), top-down categorization allows the identification of the perceptual stimuli and activates so-called affordances (Gibson 1979, James & Gauthier 2002). Affordances are perceptual features which suggest ("afford") action possibilities to the perceiver. 'round' affords rolling, 'sharp' affords cutting, 'high with basis' affords erecting, 'solid' affords exertion of force etc. Because objects are primary in perception and conceptualization, their features restrict the eventualities in which these objects may occur. It's not: "It's rolling, therefore it must be round", which is the concept behind classical selectional restrictions, but rather "It's round, therefore you can roll it".

```
feature: OPEN
affordance: POUR
           FILL
           COVER
           ...

feature: ROUND
affordance: ROLL
           ...

feature: THIN
affordance: GRASP
           LIFT
           BREAK
           ...
```
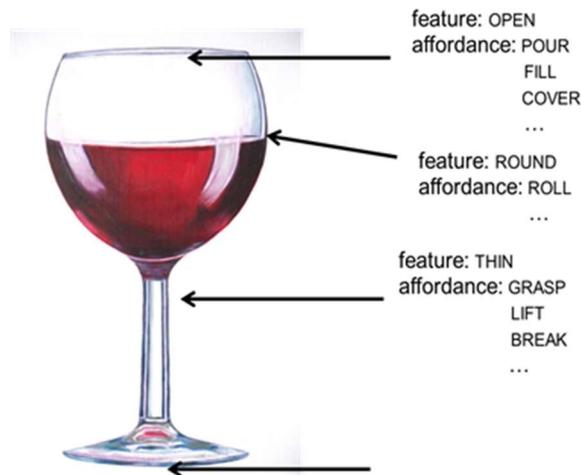
With respect to our scenario the perceivers, Jessica and Sara, identify their perceptual objects as Nicole, a physically solid human being, and the milk, a solid inanimate object. Being human affords self-propelled movement and exertion of physical force. Being an inanimate object does not afford self-propellation but exertion of force. So the perceivers know that the milk's motion had to be caused externally and Nicole's movement is a candidate cause for the milk's motion. Inferring a causal relation between Nicole and the milk is relatively easy. It rests on the identification of

❖ spatial contiguity between earlier (N's movement) and later (milk's falling) events,
❖ temporal contiguity between earlier and later events,
❖ contact (mechanism) between objects in earlier and later events,
❖ similarity of motion patterns in both events (force and gravity).

☞ The other factors mentioned above, deliberate vs. accidental, accomplishment vs. misaccomplishment, personal attitudes etc., are neither perceptual nor conceptual in nature.

It is these factors which are involved in the attribution of responsibility. Of course, there are perceptual and conceptual factors in any event and they serve as a basis for the attribution of responsibility, but they do not suffice. This is what the scenario demonstrates.

☞ Instead, there are attribution habits which are heavily dependent on cultural practices.

For example, Social Psychology has identified factors co-determining the attribution of responsibility in especially ambiguous events like the one above. These attribution performances are acquired via the participation in everyday interaction and are habitualized/routinized within sociocultural praxes.

❖ Is the attributor the actor himself/herself or an observer?

- ❖ Does the attributor consider the actor's activity an accomplishment or a misaccomplishment?
- ❖ Does the attributor feel sympathy (empathy) or antipathy (no empathy) toward the actor?
- ❖ (...)

These factors are determinative of the second set of differences:

- ❖ Attribution of purposeful action vs. accidental behavior
- ❖ Ascription to stable dispositions vs. factors of the situation
- ❖ Attribution of whether credit or blame is deserved vs. not deserved
- ❖ (...)

The attribution of purposeful action mostly correlates with the attribution of stable dispositions and the possibility to praise or blame the person in question. The attribution of accidental behavior mostly correlates with the attribution of factors of the situation and the inappropriateness of praising or blaming the person in question.

There are eight possible scenarios resulting from the determining factors above (2x2x2). Jessica and Sara are both observers and they certainly consider Nicole's deed a misaccomplishment. Where they differ is in empathy toward the actor. And this leads to different outcomes with respect to the second set of differences. These are the relevant two (of the eight) attribution scenarios applying here:

a) J: *Nicole   hat   die   Milch runtergeworfen.*
    Nicole.3NOM/DAT/ACC have.3AUX the.NOM/ACC milk down-throw.PTCP
    'Nicole knocked over the milk.'

Jessica = observer	attribution of intentional action
outcome = misaccomplishment	ascription to stable dispositions
attitude = antipathy	ascription of blame possible

b) S: *Nein, sie   ist   ihr   runtergefallen.*
    No   it.3NOM/ACC be.3AUX her.DAT down-fall.PTCP
    'No, (it happened to her that) it fell down.'

Sarah = observer	attribution of accidental behavior
outcome = misaccomplishment	ascription to situational forces
attitude = high empathy	ascription of praise or blame inappropriate

The outcome of Jessica's attribution is the attribution of responsibility to Nicole, whereas the outcome of Sarah's attribution is the exoneration from responsibility, and together with the perceptual/conceptual structure of the event, this is what their respective utterances express.
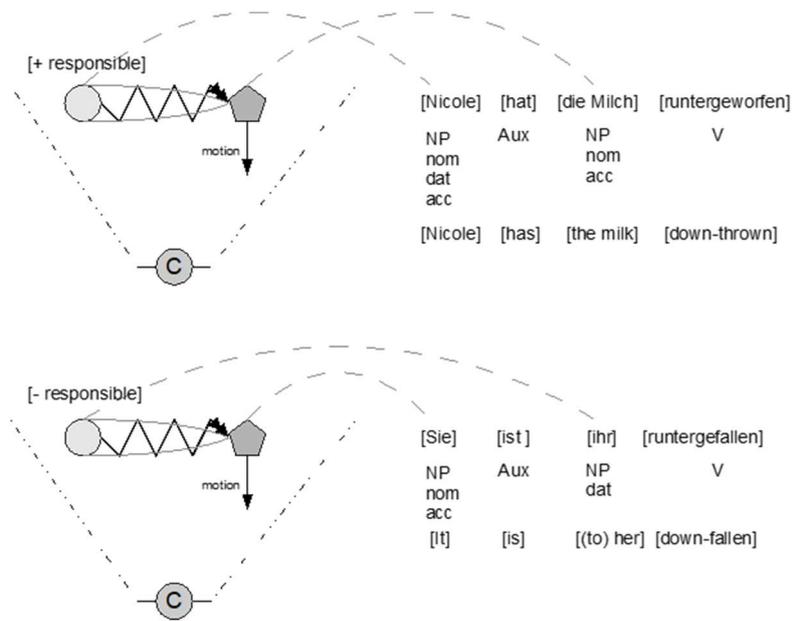
The attributions imposed on (simulated perceptions) are the other part of what replaces predicate–argument structures in Instruction Grammar.

Attributional ambiguity

Events as they are perceived are underspecified with respect to sociocultural categories like responsibility, as we have seen.

☞ Social attributions are imposed on percepts and concepts, as soon as living entities are involved in an event.

But this underspecification is not only a property of percepts and concepts. Let us say that it is responsibility that distinguishes "real" agents from "mere" physical causers. Then Jessica's utterance is actually ambiguous as to the agentivity of Nicole. But most speakers of German and of other languages readily infer that the causer did what he/she did intentionally, i.e. responsibly. Generalizing, this means that

☞ many, if not most utterances are actually ambiguous with respect to responsibility just like many events are ambiguous with respect to responsibility.

David Holisky has formulated an immensely important pragmatic implicature in this context. It says that

☞ (mere) causers (or movers) are interpreted as (real) agents, if they are animate.

61

This powerful implicature must be cancelled to convey mere causation or movement, as in *Nicole hat die Milch aus Versehen* ('accidentally') *runtergeworfen*. We will see later that this interpretive principle does not only hold for language interpretation but also for the interpretation of non-linguistic events. We will also see, why the two utterances have the syntactic structures they have in dependence on the conceptual and attributional structures of the event.

The division of labor between perception, conceptualization, and attribution

We have seen that bottom-up perception provides information like 'there are objects configured in Figure-Ground relations including movement between them or change of a Figure'. Identification and conceptualization add to this sparse information that the objects and movements belong to particular categories and may be linked via causal relations. In other words, causation is a conceptual matter. Attribution in turn adds to this that the presence of human objects opens up the possibility, or even necessity to attribute them responsibility or exonerate them from responsibility.

☞   We can conclude from this that objects and movements are already perceptual matters, that causation is a conceptual matter, and that responsibility is an attributional matter. From this perspective on event cognition, an agent comprises aspects of all of these, as a perceptual or conceptual object that is attributed responsibility and that is perhaps also, but not necessarily so, a causer.

Is there evidence for the neat division of labor I propose between bottom-up perception, top-down identification/conceptualization, and attribution: yes, there is. As an example: The role of attribution distinguishing real agents from mere moving objects and causers is perhaps the most controversial among my claims. However, it can be shown that the attribution of purposeful action, or what I called responsibility, can be selectively impaired, namely in schizophrenic patients. They have no or few problems in perception and conceptualization, even in the identification of causation, but they have severe problems in distinguishing responsible causers from non-responsible causers.

The instruction rationale

The structures of utterances do not stand in an arbitrary relationship with the perceptual, conceptual and attributional relations between objects. Utterances are produced and comprehended in an incremental, i.e. a step-by-step, manner. In comprehension the "incoming" sounds, gestures or graphs are immediately and automatically associated with their respective concepts. The interpreter immediately construes relations between the stimuli already perceived and makes predictions as to what will come next. So when he or

she is perceiving an utterance, he or she construes a corresponding concept incrementally, and this means, as we have seen, he or she will incrementally simulate a perception.

❖ *Die   Frau   in Schwarz   nimmt   der   anderen Frau   das Buch*
   ab.
   DET.NOM/ACC woman in black   take.3SG DET.DAT other   wmn.DAT DET
   book.NOM/ACC PRT
   'The woman in black takes the book from the other woman.'

☞ An utterance is an ordered instruction to simulate a perception.

In Instruction Grammar there are no predicate–argument relations. Rather, the semantic relations are present in Figure–Ground configurations which are constitutive of (simulated) perceptions and they are present in the social attributions imposed on these configurations.

Goldberg (1995: 39) claimed in her important Scene Encoding Hypothesis that "[c]onstructions which correspond to basic sentence types encode as their central senses event types that are basic to human experience.", and this serves as the experiential basis of the notion of construction. All the constructions Goldberg proposed are considered to encode what is "basic to human experience". However, she left unspecified what makes something basic in this sense. Part of the motivation behind Instruction Grammar is to explicate what makes eventualities basic to human experience. The whole perceptual, conceptual and attributional "grounding" of Instruction Grammar serves this purpose. Utterances are instructions for conceptualizations and conceptualizations are simulated perceptions. The working of perception and conceptualization relies on our perceptual and conceptual apparatus, on the perceptual salience and on the practical pertinence of stimuli. The salience and pertinence of stimuli determine what we attend to, i.e. what we focus visually and what we single out as Figures against Grounds. In other words, the many but finite ways in which we perceive eventualities in terms of Figure and Ground stand in the service of our capability of reacting to what happens around us and in the service of our capability of acting purposefully towards what is around us. Even the attribution of (or exoneration from) responsibility to objects of (simulated) perception stands in the service of our capabilities of reacting and acting. And this is what makes "event types" – described in terms of Figure and Ground and social attribution – basic to human experience.

☞ The utterances by which we express similar eventualities share similar grammatical features. This makes them constructions. In Instruction Grammar these constructions take the form of instructions.

The basic sentence patterns in the world's languages can be described as constructions.

Diagrammatic iconicity: double and single

If an utterance with its underlying construction is an instruction for simulated perception, and if interpretation is incremental, the interpreter will construe a simulated perception "along" the utterance, as he perceives it. That means, his or her conceptualization will reflect the earlier–later structure of the utterance. This is an instance of diagrammatic iconicity, then. Whereas in the case of iconicity a sign resembles its referent in specific aspects, in diagrammatic iconicity none of the signs in isolation resembles its respective referent, but the arrangement of the symbols resembles the arrangement of what they stand for. In terms of Instruction Grammar,

☞ none of the isolated expressions in an utterance resembles its simulated percept, but the earlier–later structure of the utterance resembles the earlier–later structure of the Figure–Ground configuration perceived or conceptualized. Diagrammatic iconicity comes in two variants, double and single.

❖ Double iconicity (event as perceived = simulated perception = utterance):

	Der Junge	schießt	den Ball	in	den Busch
syntax	The boy	shoots	the ball	into	the bush
	Il ragazzo	tira	la palla	nella	boscaglia
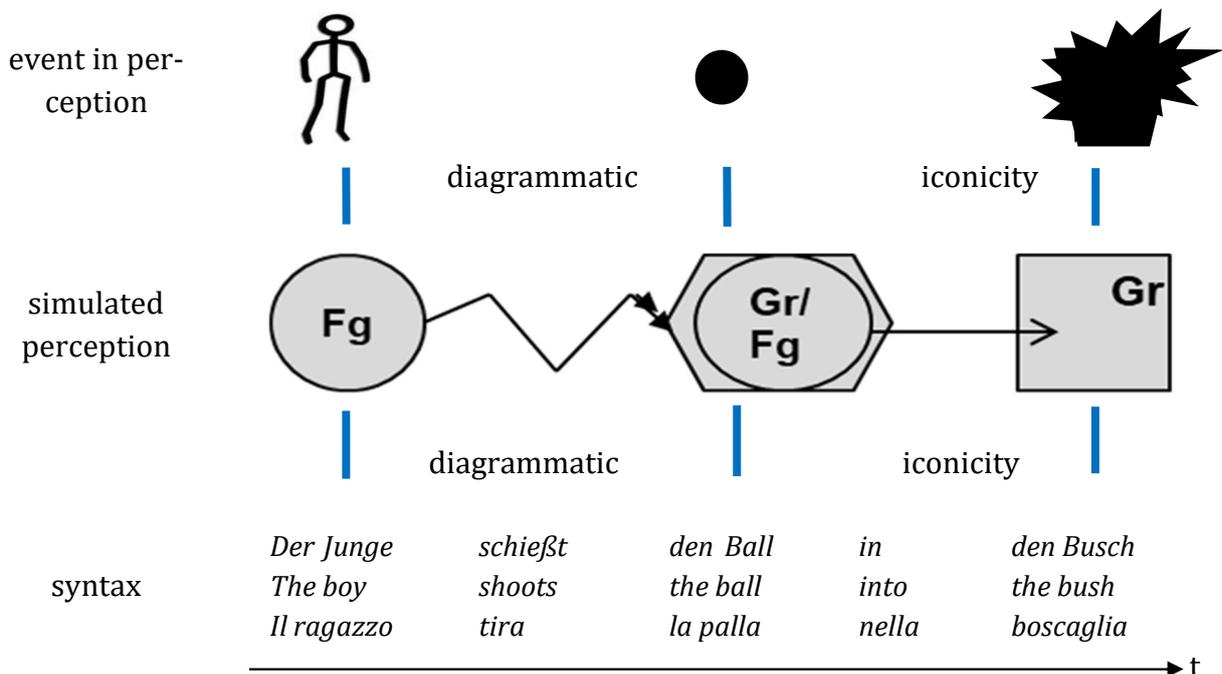
The speaker attends to the salient first mover, perceives the event in its time-course, categorizes what he/she perceives along the time-course (simulated perception) and produces an utterance (syntax) that is motivated by the earlier–later structure of the event, as he/she perceived it (perception).

Der Junge/The boy/Il ragazzo...   (Fg)   expectation

  schießt/shoots/tira...

64

den Ball/the ball/la palla...

in den Busch/into the
bush/nella boscaglia

confirmed &
expectation

confirmed &
expectation

confirmed
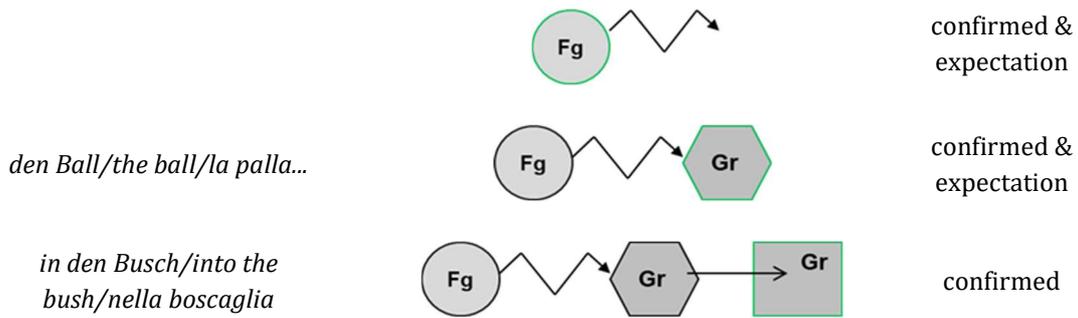
❖ Single iconicity (event as perceived ≠ simulated perception = utterance):
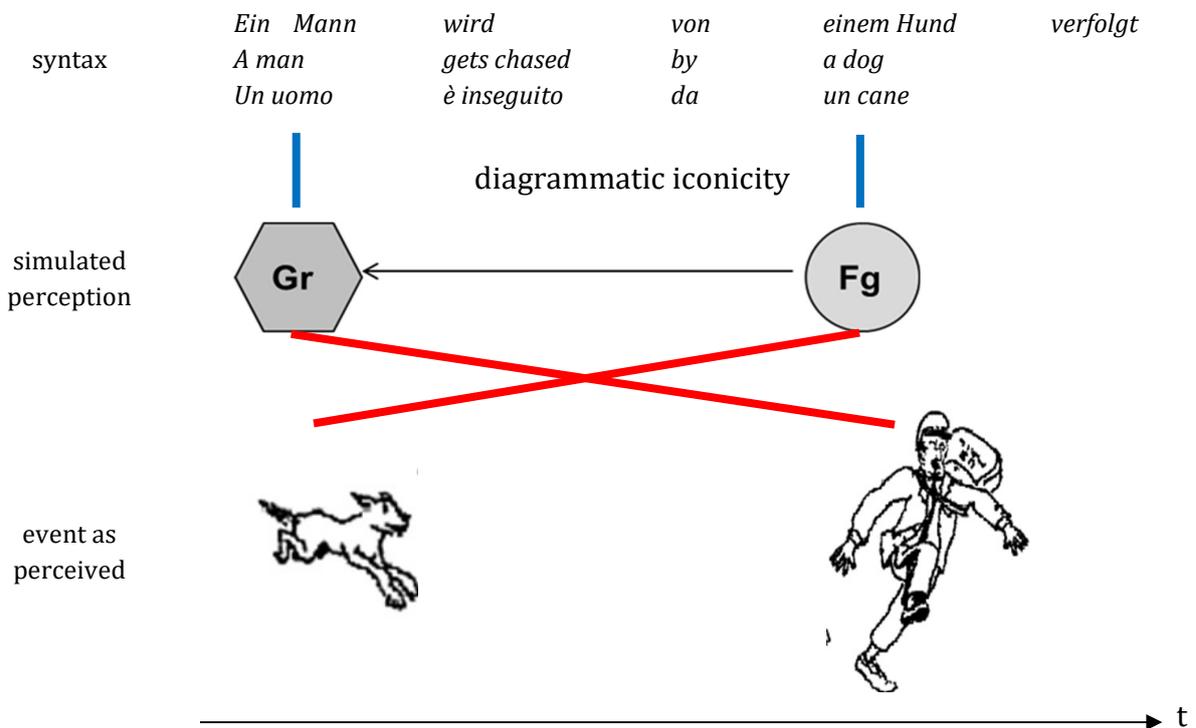
The interpreter perceives an utterance in its time-course (syntax), simulates the corresponding perception "along" the utterance and notices at a certain point that the earlier–later structure of his simulated percept cannot be the same as that of the event, if he/she actually perceived it.

☞ In order to fully comprehend event to the simulated perception of which the utterance instructs the interpreter, he/she has to bring his/her simulated perception in to the "natural" earlier–later structure. This may require a reconceptualization, if the initial expectation turns out to be false.

Ein Mann   Fg   expectation

65

| *wird...* | Fg | uncertainty |
| *von einem Hund verfolgt* | Gr ← Fg | expectation violated, reconceptualization, expectation and confirmed |
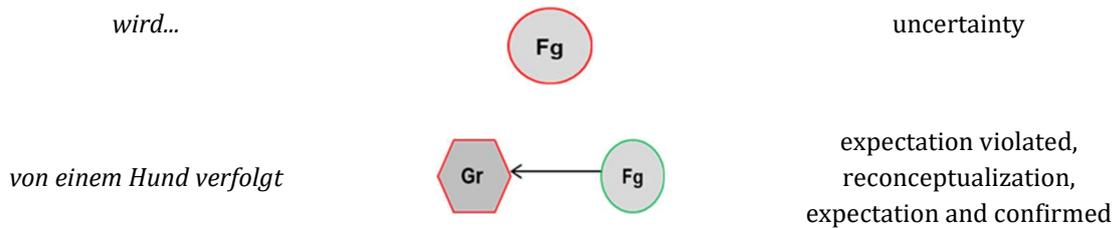
Evidence for the cognitive preference of double iconicity over single iconicity

1) The well-known actor first-preference in psycho- and neurolinguistics, according to which interpreters interpret the first participant of an event as the actor, if there is no evidence to the contrary.
2) The basic element order in the world's languages.

APV	AVP	VAP	VPA	PVA	PAV
565	488	95	25	11	4
1148 (83.4%)			40 (2.9%)		

no dominant order: 189 (13,7%)

3) The fact that utterances without double iconicity are more costly in comprehension and understood less accurately than their doubly iconic counterparts.
4) The convergence between eye movements in the perception of scenes and syntactic constructions chosen in language production.

Interim summary: Basic assumptions of Instruction Grammar

☞ An utterance is an ordered instruction for conceptualization and (the re-enaction of) social attribution.
☞ (Top-down) conceptualization is simulated (bottom-up) perception and concepts are simulated percepts. Categorizing, or identifying, a percept would then be matching a bottom-up percept with a concept from memory.
☞ Perceptions and conceptualizations are structured by means of Figure and Ground (Trajector and Landmark, respectively).
☞ Utterances can be described as diagrammatically iconic to conceptualization (single) and/or perception (double).
☞ Social attribution concerns the socioculturally acquired ascription of responsibility to the objects of perception and conceptualization.

The instructive layers

Perception and conceptualization are crucially dependent on objects, i.e. on those stimuli or features of stimuli that affect our sense organs. In the case of visual perception this would be light waves hitting our retina and causing retinal images that become integrated to object Figures against (back-)Grounds. As has become clear, perception and conceptualization is all about objects and their relations to each other. Now, what components of utterances correspond to perceptual or conceptual objects? The answer is almost trivial and can only be: thing expressions. The diagrammatic part of instructions is constituted (only) by thing expressions, i.e., by the correspondence in earlier–later structures between objects in (simulated) perceptions and thing expressions in utterances. For instance, in *Er sah die Männer* 'he saw the men' there are (arguably) two perceptual objects. They correspond to two nominal constituents in the clause and the clause instructs to a doubly iconic conceptualization of the event.

☞ The first layer of the instruction is thus the construction layer made of the thing expressions and their relative order. With respect to thing expressions an instruction instructs to a diagrammatic conceptualization (single or double) (and to the (re-)enaction of a social attribution).

However, utterances do not only consist of thing expressions. There are also adjectives, adverbs, verbs, prepositions etc. I will call them eventuality expressions because they express eventualities in which objects are involved. The difference between these and thing expressions is that in contrast to thing expressions there is nothing in perception or conceptualization which corresponds to them. Therefore, they cannot be of a diagrammatically iconic kind. Imagine a man standing. The traditional predicate–argument structure would be STAND (man) and the linguistic expression would be such that the verb corresponds to the predicate 'STAND' and the complement corresponds to the argument 'man'. But from a perceptual perspective, what corresponds to the verb *stand*? The answer is: nothing.

http://www.diycalculator.com/imgs/cvision-upside-down.gif
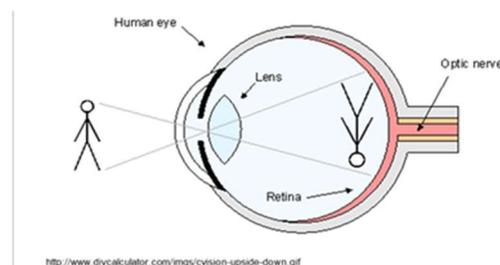
☞ The simulated perception of a man standing is fully specified for the possessor of this concept. The object (man) and eventuality (standing) are *united* in the concept of the object. You "see" the eventuality "at" the object. But the nature of language as a symbol system makes it necessary that a class of symbols be introduced that *separates the*

eventuality from the object in order to make the concept communicable in an informative manner, although *object and eventuality are conceptually inseparable*. The word *man* – in contrast to the corresponding concept – does not contain any information about the kind of eventuality it occurs in. This class of symbols into which aspects of objects are *outsourced*, contains expressions for states, processes, and activities. The introduction of such a class of symbols, e.g. verbs, prepositions, adjectives, and adverbs, means the introduction of a conceptual asymmetry into the symbol system. This is dependency.

☞ What is more, the man, as soon as he is categorized by a perceiver as a man, *affords* many activities, among them standing. Similarly, if an interpreter hears *man,* he or she simulates the corresponding perception which activates the affordances of the object. The affordances can be said to prime the eventualites in which the man is potentially involved. If the interpreter hears *standing*, this predication simply *actualizes the affordance* suggested by the concept of man.

☞ Eventuality expressions actualize affordances of thing expressions.

There are also morphological markers for agreement, concord, case, number, gender, tense etc. What in (simulated) perception corresponds to these? The answer is again: nothing. These grammatical elements do not alter the *content* of the (simulated) perception, but they alter *the way* in which these contents are conceptualized. To illustrate this, compare the following utterances. :

❖ *Er* ⬭ *sah* *die* *Männer* ⬡
    he.NOM see.3SG.PRET DET.NOM/ACC.PL man.PL
    'He saw the men.'

❖ *Ihn* ⬡ *sahen* *die* *Männer* ⬭.
    him.ACC see.3PL.PRET DET.NOM/ACC.PL man.PL
    'The men saw him.'

What case and agreement do here is instruct to different Figure–Ground segregations between the same set of objects in the scene.

☞ The second layer of the instruction is thus the layer made of grammatical morphology, prosody, and eventuality expressions. Grammatical morphology and prosody instruct indexically, affecting (a) the way in which a perception is simulated, and (b) what to do with the utterance as a whole (illocution). Eventuality expressions instruct indexically in that they symbolically source out aspects of conceptual objects that are inherent to them conceptually.

Finally, the utterance as a whole instructs practically, since it is a request for some kind of action on the side of the interpreter.

☞ The third layer of the instruction is the layer of the utterance as a whole. It instructs practically in that it is a request for action on the side of the addressee.

unit of utterance	instruction type	instruction to...
units constituting construction	diagrammatic	simulate perception (re-enact) attribution
grammatical morphemes/ eventuality expressions/ (intonation)	indexical	
utterance as a whole	practical	act (verbally/non-verbally)

Summarized:
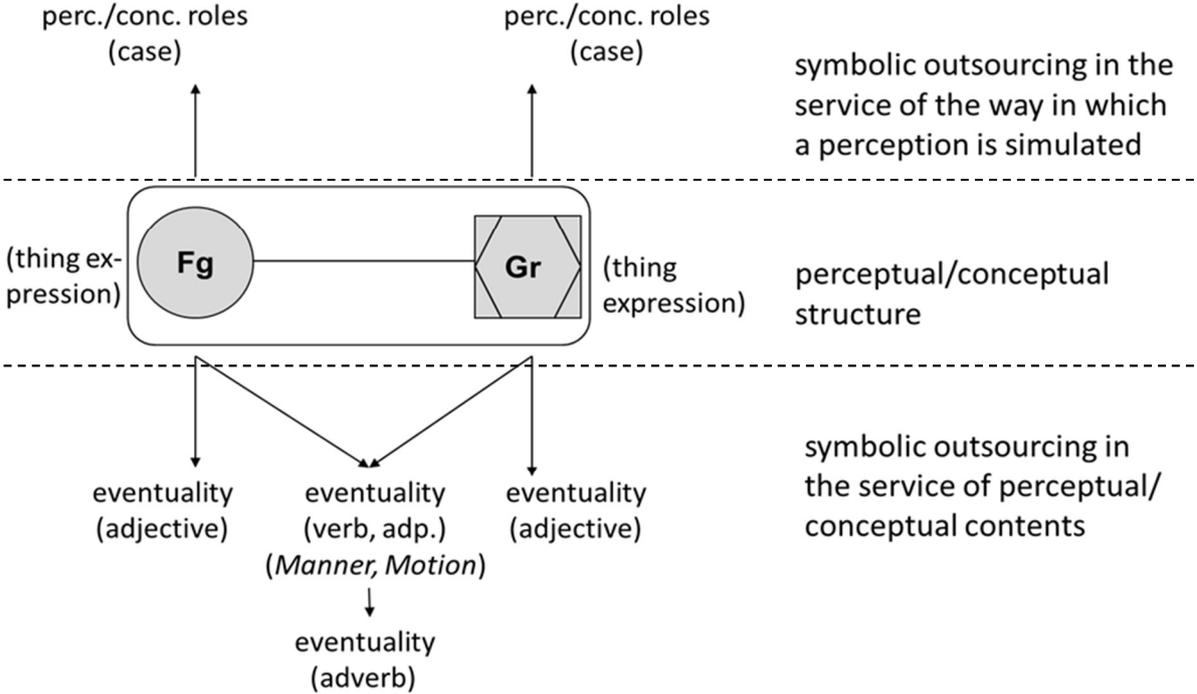
Flagging (case and adpositions)

Due to the mutual dependence of Figures and Grounds, the basic unit in which (simulated) perceptions of objects are embedded is the (simulated) percept of a whole eventuality (state, process, activity, situation, event).
Similarly, the basic unit in which thing expressions (and their outsourcings) are embedded is the utterance.

69

Therefore, we must search for the function of flagging on the level of an abstract instruction.

☞ An abstract instruction (construction) is the conventional association of abstract syntactic types and abstract eventuality types.

NP_{NOM}-V-PP-instruction
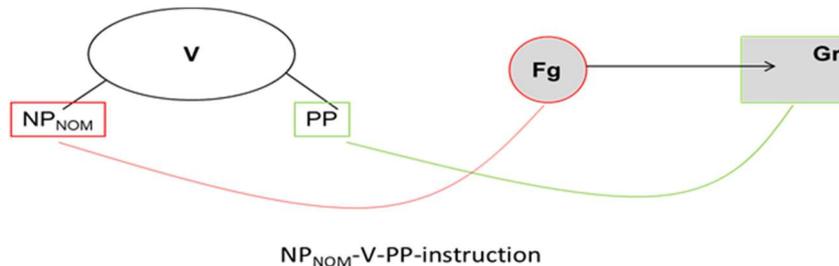
Here are some of the most important syntactic types in the languages under consideration.

NP_{NOM}-V	NP_{DAT}-V	NP_{NOM}-V-NP_{ACC}	NP_{NOM}-V-NP_{DAT}-PP	NP_{NOM}-V-NP_{DAT}-NP_{ACC}
NP_{ACC}-V	NP_{NOM}-V-NP_{DAT}	NP_{NOM}-V-PP	NP_{NOM}-V-NP_{ACC}-PP	NP_{NOM}-V-NP_{ACC}-NP_{ACC}

Each of these syntactic types is associated with at least one abstract type of eventuality. Each association represents an abstract instruction. What do cases do within abstract constructions?

❖ Case hierarchy of increasing neutralization of functions

broad function <---> narrow function

| nominative | >> | accusative | >> | dative |

The reason for this is that the nominative occurs in syntactic types with one, two, three, or more perceptual/conceptual objects, the accusative occurs primarily in syntactic types with two or more perceptual/conceptual objects, and the dative occurs primarily in syntactic types with three or more perceptual/conceptual objects. These abstract syntactic types vary in their degree of homonymy and polysemy.

❖ Hierarchy of syntactic types with respect to homonymy and polysemy

homonymous <--> polysemous

---

one object   >>   two objects   >>   three objects   >>   four objects

To illustrate what this means: What can we say about the associated (simulated) perceptions of the following syntactic types?

❖ NP_{NOM}-V
❖ NP_{NOM}-V-NP_{DAT}-NP_{ACC}

We can say next to nothing about the eventuality (type) expressed by the former: There is one object (Figure or Ground?) in some type of eventuality. We can say a lot more about the latter: There is most probably some (concrete, abstract, metaphorical) transfer relation between the three objects.

Examples for the association of syntactic types with eventuality types and the conceptual import of flagging:

❖ NP_{NOM}-V-NP_{ACC}-PP (active voice, double iconicity) instructs towards the simulated perception of

     ❖ unidirectional (real or fictive) motion between $Figure_{t1}$ and $Ground_{t1}$ and between $Figure_{t2}$ and $Ground_{t2}$.

     Examples for V: *schießen* 'shoot', *werfen* 'throw', *schieben* 'push', *niesen* 'sneeze'

❖ NP_{NOM}-V-NP_{ACC}-PP (active voice, single iconicity) instructs towards the simulated perception of

     ❖ unidirectional (real or fictive) motion between $Figure_{t1}$ and $Ground_{t1}$ and between $Figure_{t2}$ and $Ground_{t2}$.

Examples for V: *bekommen, erhalten* ‚obtain, get'

❖ NP$_{NOM}$-V-NP$_{DAT}$-NP$_{ACC}$ (active voice, double iconicity) instructs towards the simulated perception of

    ❖ (i) unidirectional (real or fictive) motion between Figure$_{t1}$ and Ground$_{t2}$ and bi-directional (real or fictive) motion between Figure$_{t2}$ and Ground$_{t2}$.


    Examples for V: *geben* 'give', *zeigen* 'show', *vorstellen* ‚introduce', *reichen* ‚hand'

    (This type of dative is also present in the instruction following the photo story from the beginning: *Die Frau in Schwarz nimmt der anderen Frau* (DAT) *das Buch ab.* 'The woman in black takes the book from the other woman.')

    (The bidirectional motion between Figure and Ground does also license the use of dative in the NP$_{NOM}$-V-NP$_{DAT}$ instruction. Examples for verbs are *begegnen* 'meet with', *danken* 'thank', *gratulieren* 'congratulate', *öffnen* 'open (sth.) to so.')

    ❖ (ii) unidirectional (real or fictive) motion between Figure$_{t1}$ and Ground$_{t1}$ and non-physical, pertinence-based involvement in the relation between Figure$_{t1}$ and Ground$_{t1}$.
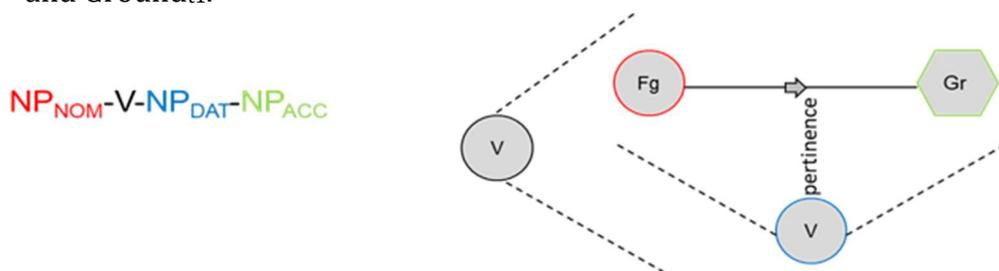
    Examples for V: *waschen* 'wash', *schneiden* 'cut', *föhnen* 'blow-dry' ("free" datives (in)commodi and ethicus)

    (Non-physical, pertinence-based involvement in the relation between Figure and Ground does also license the use of dative in the NP$_{NOM}$-V-NP$_{DAT}$ instruction. One example is *Sie ist ihr* (DAT) *runtergefallen*, lit. 'It (the milk) fell down to-her' from the breakfast scenario. Here, the referent of *she* is physically involved and even a physical causer, but this is not entailed by the dative, as *Dass das Raumschiff explodiert ist, hat ihm* (DAT) *gestunken* 'That the spaceship exploded, bothered to-him' illustrates.)

❖ (iii) There is also a third type of dative involving unidirectional motion of both the nominative and the dative referents into the same direction (not depicted here). At the same time there is also unidirectional movement of the nominative referent towards the dative referent. Examples for V in this abstract instruction are *folgen* 'follow' and *helfen* 'help'.

❖ NP$_{NOM}$-V-NP$_{ACC}$ (active voice, double iconicity) instructs towards the simulated perception of

    ❖ uni-directional (real or fictive) motion between Figure and Ground.

Examples for V: *schlagen* 'hit', *lesen* 'read', *anschauen* 'view', *mögen* 'like', *öffnen* ,open' etc.

❖ NP$_{NOM}$-V-PP (active voice, double iconicity) instructs towards the simulated perception of

    ❖ unidirectional (real or fictive) motion between Figure and Ground.

Examples for V: *fahren* 'drive', *laufen* 'run', *schauen* 'look', *fliegen* 'fly', *liegen* 'lie', *sitzen* 'sit', *stehen* 'stand' etc.

❖ NP$_{NOM}$-V (active voice) instructs towards the simulated perception of

    ❖ an object and an eventuality.

Examples for V: *stinken* 'stink', *schweigen* 'keep silent', *lachen* 'laugh', *weinen* 'cry', *auslaufen* 'leak', *schön sein* 'be beautiful', *schweben* 'hover', *brechen* 'break'

Trivially, these abstract instructions are abstractions of concrete instructions. They "draw" particular aspects from concrete instructions. This means, concrete instructions are more specific in particular aspects relating to

- ❖ features of objects,
- ❖ manner and motion,
- ❖ causation, and
- ❖ the attribution of responsibility.

abstract instruction: NP_{NOM}-V-NP_{ACC}-PP
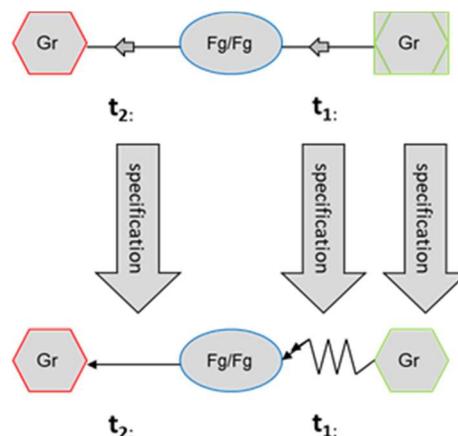
concrete instruction: The woman gets a package from the man.

The responsible causer preference (RCP) and the ecological dimension

We have seen that there is a cognitive bias towards

- ☞ doubly iconic utterances,
- ☞ crosslinguistic S/A-before-O/P structures
- ☞ the assumption that the first participant in a clause is the actor (and, we can add, the more agentive it is, the better),
- ☞ a pragmatic implicature from movers/causers to agents.

Where these biases are not adhered to, there are more production and processing costs and less accuracy in comprehension. What is the common denominator of these biases? With respect to linguistics at least, it seems that they converge in the actor-first preference. Interpreters "want" to identify the actor in an utterance as soon as possible. The other biases are more or less derivative of this more central bias. Is this merely a frequency effect? Do we want actors first because we are used to get actors first in language? I don't think so. There is evidence that this bias is *not restricted to language* but also shows up in the interpretation of non-linguistic events. As the social psychologists Jones and Davis (1965: 220) put it,

> [t]he person perceiver's fundamental task is […] to find sufficient reason why the person acted […]. Instead of a potentially infinite regress of cause and effect […] the perceiver's explanation comes to a stop when an intention or motive is assigned that has the quality of being reason enough […].

Why this need for intentional explanations? The most effective way for us to predict what will happen next around us is looking for the cause of what is presently happening. Knowing the cause of, for instance, a saliently moving object, means identifying the "front end" of the event, allowing a prediction of its probable outcome and the probability of its repetition. Such information safeguards our well-being and makes our own capacity to act possible. However, as experienced actors in the world we know that inanimate objects do not move by themselves but depend on their setting in motion by persons most of the time (e.g. flying stones). In other words, there remains some uncertainty as to whether the causal chain is sufficiently "closed" at the front end. If, in contrast, we identify a person as the cause of an event, we must evaluate whether this person's activity was externally caused itself or whether he/she acted purposefully. This has been introduced above as social attribution. Purposeful action is not caused in the way behavior and (other) "natural" events are. Both research in cognitive psychology for "inanimate" events and research in social psychology for events caused by persons show that our categorization performance is geared towards the identification of the front end of any event we perceive (cf. Kunda 2003, Moskowitz 2005, Kahneman 2012). The ideal front end is a person acting purposefully. That means when we, moving actively in the world pursuing purposes ourselves, encounter something salient, our attention goes to identifying its cause, and, if a person is the candidate cause, to attribute this person a purpose.

☞ Inferring this purpose is instrumental in predicting others' actions and therefore the most reliable and most effective way of planning (or re-planning) our own further course of action.

Based on this I formulated the responsible causer preference:

☞ Responsible causer preference (RCP):
Standing in the service of our capability to act, our automatic and routinized categorization performances are geared to the respective salient or pertinent features of objects that most probably close an event at its front end by indicating its causer, or even more effectively, the responsible causer acting purposefully.

☞ The automatic and routinized nature of the RCP accounts for the fact that it works fast but not always accurately. It is easier to attribute responsible causation to someone, if the perceptual, conceptual and attributional criteria are met, than to exonerate this person from responsibility. This is costly and requires awareness and reflection one one's RCP bias.

This is reflected in our scenario from above:

	[Nicole]	[hat]	[die Milch]	[runtergeworfen]
	NP	Aux	NP	V
	nom		nom	
	dat		acc	
	acc			
	[Nicole]	[has]	[the milk]	[down-thrown]

	[Sie]	[ist]	[ihr]	[runtergefallen]
	NP	Aux	NP	V
	nom		dat	
	acc			
	[It]	[is]	[(to) her]	[down-fallen]
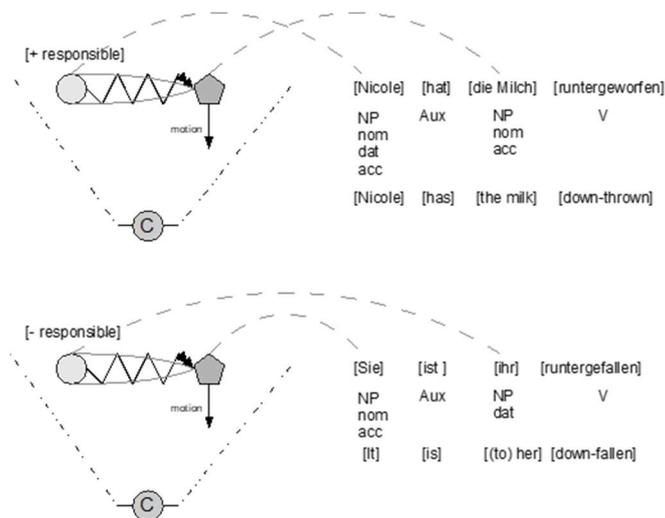
There is an impulse here to identify Nicole as the responsible causer due to the RCP. Jessica has given in to this impulse. Sarah has not.

☞ If we could make plausible that RCP is not only active in the interpretation of non-linguistic events like the knocking-over-the-milk-event, but also in the interpretation of linguistic utterances, this would provide an explanation for the biases towards doubly iconic utterances, crosslinguistic S/A-before-O/P structures, the actor preference, and Holisky's pragmatic implicature from movers/causers to agents.

☞ In fact, it would demonstrate that the actor preference, which seems to lie at the heart of the other linguistic biases, is only the language-specific instantiation of the more general RCP.

With the instruction rationale everything is in place to make the efficacy of the RCP plausible for language. But first we have to take another brief look at perception and action without language.

We move in our environment pursuing purposes most of the time. In doing so we have to transduce what we perceive with our senses into (motor) action. Our physical and cognitive makeup is predisposed to do so. For instance, the car driver, let's call her Scully, acts purpose-rationally and on the basis of what she perceives. If in some distance a deer enters the road, she perceives this and transduces what she perceives into an action plan and afterwards into an action, e.g. that of breaking. This perception–action link is highly effective: seeing–acting.
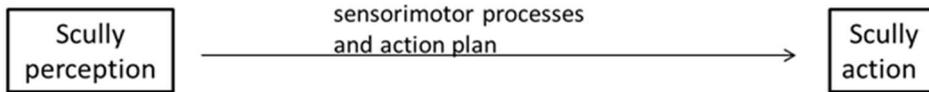
We can now assign language, or grammar, its role between perception and action.

☞ From the perspective of Instruction Grammar it is the most central function of language and grammar to transduce *someone's* perception into *somebody else's* action as efficiently as possible.

If Scully has a front passenger, Mulder, then Mulder could perceive that in some distance a deer runs onto the road, while Scully is operating the car radio. He could utter calmly: *Scully, a deer is entering the road*. According to the instruction rationale, Scully will simulate the corresponding perception in order to transduce it immediately into the action of breaking – *just as if she had had the perception herself*.
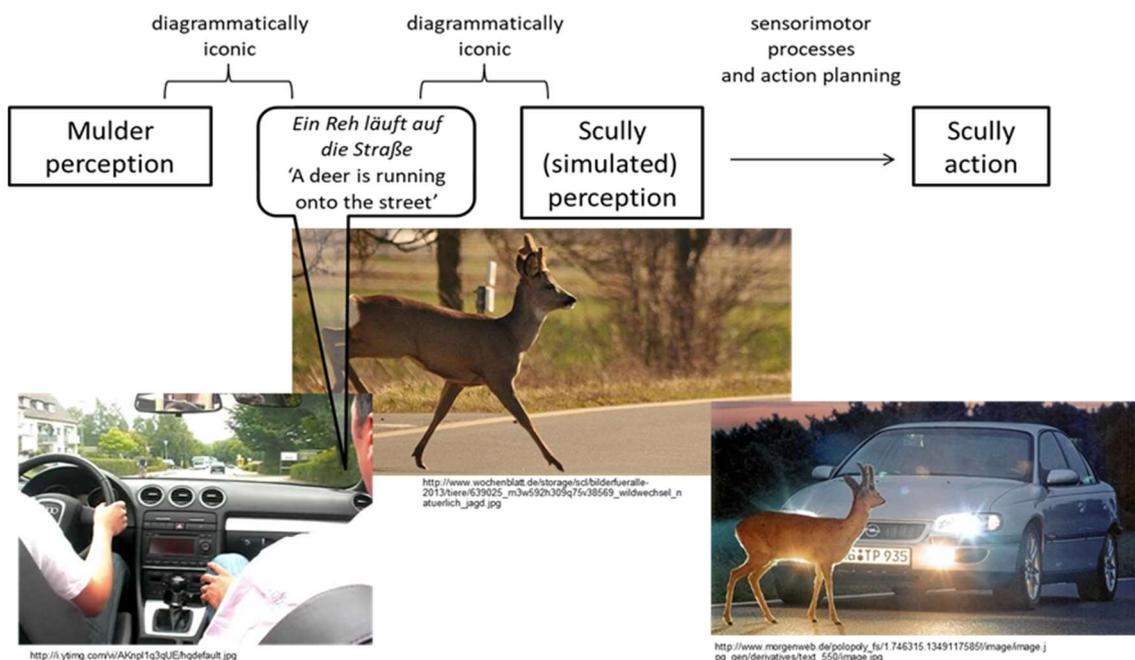
How must an utterance be structured then, if a simulated perception on the basis of an utterance must be efficiently transformed into action? The answer would be:

☞ in conformance with the RCP, and this means as an iconic diagram of the event as it would be perceived, if language was not mediating.

    The other biases fall into place, then: The utterance is doubly iconic, it is S < O (A < P), the first participant is the actor, and the Figure (deer) is a good (though not perfect) "closer" of the front end of the eventuality.

What is the relationship between the RCP and animacy?

☞ Animacy is indexical with respect to responsible causers because the higher an object of (simulated) perception or a participant in a clause is in animacy, the more capable it is of responsible causation, and the more probable it closes an event at its front end. But animacy comes only second to (responsible) cause(r)s: It indicates the front end of an event, but neither is everything high in animacy the front end of an event nor is every front end of an event high in animacy.

The only difference between the perception–action link unmediated by language and mediated by language is this: When we have utterances as perceptual input we are geared to identify the (responsible) cause(r) in an event on the basis of the symbolically mediated perceptual simulations of these events instead of in the "real" events as perceived.

☞ But here, as there, an event can be most efficiently closed at its front end, if the (responsible) cause(r) is identified as soon as possible. In the case of an utterance, this would be the first argument NP encountered.

## 2. Interpreting the corpus and neurolinguistic results

The "standard" interpretation

The results of the corpus and neurolinguistic studies seem to validate the hypothesis from the beginning:

☞ For any given clause, if the interpreter cannot identify semantic relations by means of grammatical devices, he/she will assume
(a) that the referent higher on the referential scales is the subject, or agent.
(b) that the first-mentioned participant is the subject, or agent.

☞ What is more, the interpreter will interpret the utterance correctly by doing so.

The relevant scale turned out to be the animacy hierarchy (semantic scale) and it must be combined with the S/A-1st assumption to result in correct interpretations of structurally ambiguous clauses. The efficacy of the extra-grammatical devices is explained by the Instruction Grammar perspective on grammar and cognition.

The (validated) hypothesis can be put into a handy filter metaphor of interpretation:
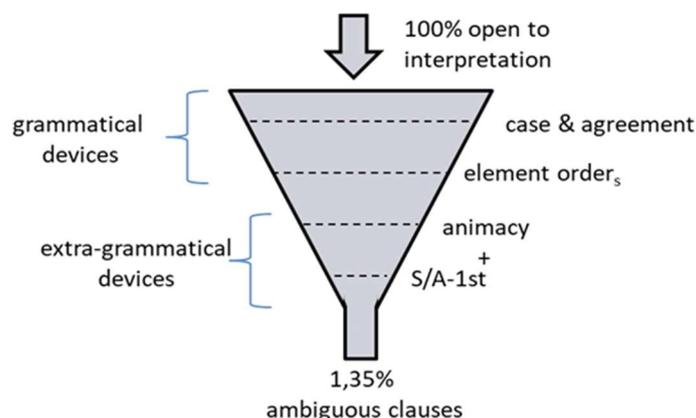
We assume that all clauses are initially open to interpretation with respect to "who does what to whom". Once the clauses are filled into the interpretation funnel one after another, the interpreter will use the grammatical devices to find out what is S and what is O (A and P) in these clauses. For the clauses that pass these filters because they are not informative, the interpreter uses the extra-grammatical devices.

☞ On its own, this is in fact a useful and insightful linguistic generalization.

Even though, I will argue on the basis of Instruction Grammar that the architecture of this filter model is not viable from the perspective of human ecology. My alternative approach leaves the relative accomplishments of grammatical and extra-grammatical devices for linguistic interpretation untouched, but alters their relative role to each other in cognition.

## 3. A re-evaluation of morphology, element order and animacy

An alternative interpretation

I argue that the premises of the hypothesis of the project were wrong in that they presupposed the primacy of the grammatical devices over the extra-grammatical devices (see the formulation again). An alternative perspective is possible, namely:

☞ **When confronted with a clause, the interpreter**

a) **brings prior expectations based on general cognitive principles (biased) to interpretation (surfacing in extra-grammatical devices) and**
b) **utilizes the (obligatory) grammatical devices he encounters (only) to confirm or cancel these expectations on-line.**

This turns the relationship between grammatical and extra-grammatical devices upside down and results in a quite different architecture of the filter architecture.
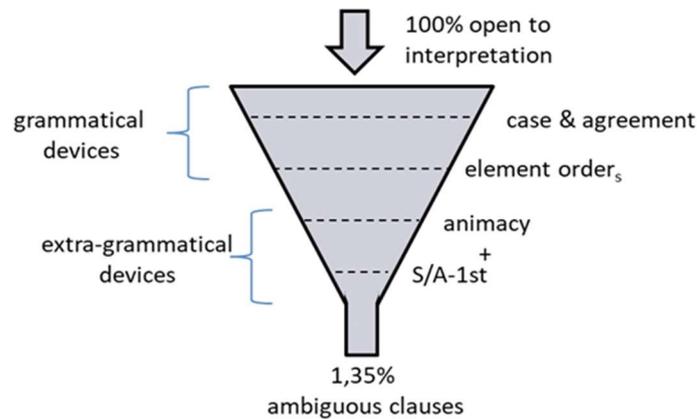
What are the consequences? Firstly, it is not ambiguous clauses any more that enter the funnel at the top and leave it at the bottom but expected S/A-1st clauses with human Ss (As). In the other perspective the actor-first and animacy strategies ranged *below* the grammatical devices. They are now positioned *above* the grammatical devices and take the role of prior expectations for all clauses. The linguistic instructions are, in fact, expected to conform to the RCP: the instruction is expected to be diagrammatically iconic to how the eventuality is perceived and the first-mentioned participant (Figure most of the time) is expected to be human and a responsible causer.

Second, against this background interpreters may now encounter distinctive morphological markers during comprehension which either *confirm* their expectation, which makes the morphological information *redundant*, or they *cancel* the expectation which makes the information *relevant*. (The same is true for a grammaticalized element order (Middle English)).

Confirmation is given in this example:

❖ *for sche   hath   wrouyt   in me a   good werk.*   (Middle English)
    for she.NOM have.3SG work.PTCP   DET good work.NOM/DAT/ACC
    'for she has done a good work for Me.'

This clause is "perfect" from the perspective of simulated perception, since it is doubly iconic and allows a responsible causer attribution.

    Cancellation is given in this example:

❖ *witodlice god weorc   heo   worhte   on me;*   (Old English)

80

truly　　good work.NOM/ACC she.NOM work.1/3SG

This clause requires a (costly) reconceptualization, when *heo* is encountered (*god weorc* is predictively treated as Figure, but must be reconceptualized as Ground). The clause is not doubly iconic but it allows a responsible causer attribution to the referent of *heo*.

 If clauses lack distinctive morphological markers or a grammaticalized element order altogether, interpreters retain the animacy and S/A-1st-based interpretation. This is given here:

❖ *Sie　　　　　　　hat　　ein　gut　werck an mir　　gethan /* (E. N. H. German)
 she.NOM/ACC.SG/PL have.3SG DET good work.NOM/ACC do.PTCP

This instruction can straightforwardly be conceptualized as doubly iconic and as satisfying the RCP.

 But crucially – and here an new factor enters –, the interpreter cannot be *certain* about his or her interpretation because it is neither confirmed nor cancelled *reliably* by any grammatical device, in contrast to the English examples above which are highly reliable due to case (and element order in ME). And if there's one principle that holds for cognition, it is:

☞ certainty first; uncertainty: total disaster.

The degree of uncertainty rises considerably, if higher animacy and first participant information are contradictory, do not align or pattern together in an unexpected way. These are the some of the most problematic cases for the interpretation of structurally ambiguous clauses. This might be the reason why they are so few in the corpus. Communication by means of such clauses might fail too often.

❖ *E　gueti Taat　　　　hät　　si ja a mer　　　　taa!*
 DET good deed.NOM/ACC have.3SG she.NOM/ACC.SG/PL do.PTCP
 'for she has done a good work for Me.'

❖ *Und von　säbere Stund aa hät　　si　　　　de　　　　　Jünger　zu sich gnaa.*
 And from same　　hour　on have.3SG she.NOM/ACC DET.NOM/ACC disciple to him take.PTCP
 'And from that hour that disciple took her unto his own home.'

                (recent High Alemannic)

In the first clause the interpreter could reconceptualize the instruction as O < S (P < A) when encountering *si*, based on the referent's high animacy. In the second clause, the participants are equal in animacy. With respect to the general cognitive motivation both clauses are as "bad" as the Old English one above. With respect to certainty, they are even

worse, since the Old English clause is highly reliable due to case morphology, while the animacy clue in the High Alemannic clauses is far less reliable or not even there, respectively. We could say that from this perspective

☞ the primary function of all devices is to remove uncertainty from interpretations which have been constructed on the basis of general cognitive principles. They do so by either confirming the expectation or cancelling the expectation, then leading to a reanalysis (producing costs).

With respect to their reliability, i.e. to certainty, there is a clear hierarchy:

grammatical devices			extra-grammatical devices		
morphology	>/=	grammaticalized element order	>	animacy and S/A- 1st assumption	>	other

The alternative architecture of interpretation is more plausible from the perspective of human ecology than the "standard" architecture,

☞ because the extra-grammatical devices are only the language-specific instantiations of the general cognitive responsible causer preference (RCP).

☞ The extra-grammatical devices *do not operate on, or after,* the grammatical devices but vice versa: the grammatical devices work on the basis of the extra-grammatical devices which are biases from general cognition.

☞ Double iconicity and the RCP are the *cognitive ecological infrastructure* on which the grammatical devices draw in order to make language work. The extra-grammatical devices are not mere addenda to an encapsulated grammatical competence but grammatical competence relies heavily on these devices.

Some attempts at explanations

❖ Except for Middle English, morphologically ambiguous clauses are also structurally ambiguous. In Middle English element order disambiguates all clauses. In the other languages the absence of morphological distinctions is not compensated for by more fixed element order.

From the Instruction Grammar perspective on interpretation, no language in the corpus *requires* a grammaticalized element order from a functional perspective. Although there are considerable shares of structurally ambiguous clauses in the corpus, the conceptualizations and attributions on the basis of diagrammatic iconicity and the RCP lead to successful interpretations in almost all cases.

❖ Animacy and subject/actor-first assumptions can be utilized as non-grammatical devices in order to arrive at a successful interpretation of structurally ambiguous clauses.

This is because what stands behind them are central parts of our cognitive outfit which do not only surface in language interpretation but are crucial for our active engagement in the world.

❖ The "functional charge" on these extra-grammatical devices increases in the history of (Upper) German. It ceases in the history of English.

I cannot say anything about the question *why* English and German lose morphological distinctions. But as these distinctions get lost, the general cognitive infrastructure "takes over" in the interpretation of linguistic utterances. This infrastructure was there all the time, but with rich and varied morphological distinctions, it gets "overwritten" by the obligatory grammatical devices.

❖ S < O orders are preferred over O < S orders in formally ambiguous clauses *and* they tend to be preferred in formally unambiguous clauses. However, in English S < O has become nearly exclusive and in the history of German the number of S < O clauses increases, while the number of O < S clauses decreases.

This preference is completely expectable, if we assume that S < O (A < P) reflects the doubly iconic structuring of eventualities and that this type of diagrammatic iconicity is ecologically motivated. I cannot say, why O < S decreases.

❖ Similarly, higher animacy values tend to be associated with the S function (A role) *in both kinds* of clauses.

Again, this is expectable, if we assume the language-external motivation of diagrammatically iconic structures: What is first in perception comes first in the utterance. First in perception is what moves first. First movers tend to be animate.

❖ There is an initial expectation for the first participant in a clause to be the S/A.

Again, this is expected, if we assume that a doubly iconic structuring of eventualities in linguistic instructions can be transduced into one's own action most efficiently.

❖ If case or agreement are uninformative, the initial expectation is "carried through" the interpretation of the clause. The clues (extra-grammatical devices) have limited reliability. The resulting interpretation is somewhat uncertain.

Humans need to be capable of acting all of the time. We do (and often should) not stop acting when confronted with ambiguity (as in the breakfast scene above). On the long run tentative but uncertain interpretations may have proven more successful with respect to safeguarding our well-being and the realization of our purposes than no interpretation. This may have led to the hard-wiring of the RCP in the first place.

❖ If case or agreement is present and informative, they either confirm the expectation – then they provide redundant information – or they cancel the expectation – then they provide (highly) relevant information. The clues (grammatical devices) are highly reliable. The resulting interpretation is certain.

The primary function of morphology is to remove uncertainty from the tentative interpretations based on general cognitive principles. Distinctive morphology (alongside a grammaticalized element order) is the most reliable information. If it confirms an initial expectation, it does not add anything to, or alter, the simulated perception plus attribution, and in this sense it is redundant. But it also makes the interpretation certain and here lies its function. If distinctive morphology (alongside a grammaticalized element order) cancels the initial expectation, it does alter the simulated perception plus attribution in a reliable way, and this is why it is relevant.

In contrast, if an initial expectation is cancelled based on less reliable extra-grammatical cues (as in the High Alemannic examples above), the resulting simulated perception plus attribution is uncertain.

Reliability

Why are morphological and (grammaticalized) element order stimuli more reliable in the interpretation of linguistic instructions than animacy and first participant stimuli?

We could also ask which sources of information are more mandatory, and why? Paying heed to the grammatical sources is more mandatory. Why? They are *symbol-system inherent* information sources which are in an absolute sense *perceptually salient in vision or hearing* because they are symbolically manifested. This applies to morphological forms but not to the animacy of a referent or to the status of being the first participant in a clause.

Animacy and the assumption that the first participant encountered is a responsible causer are principles of general event cognition. They are based on perception (Figure and Ground, movement), categorization/conceptualization (animacy & causation) and attribution (responsibility), and they play a role in the interpretation of any non-linguistic event. Thus, they have a much broader scope of application than morphology and a grammaticalized element order. In fact, the latter cannot be motivated by perception, conceptualization or attribution, as I argued. They have not perceptual correlate. The grammatical devices are *dedicated symbolic devices*, and *as* symbolic devices they allow (or require?) a much higher degree of rigid organization in terms of oppositions and of conven-

tionalization. Symbolic devices allow the development of nearly perfect statistical correlations between particular linguistic forms and their particular functions (e.g. nominative and subject) in contrast to correlations between particular features of non-linguistic stimuli and their functions (e.g. Figure in perception and responsible causer). Whereas these statistical correlations are based on their "natural occurrence", the statistical correlations between linguistic forms and their functions are arbitrary, and may therefore develop into perfect correlations. These matters are resolved in my monograph "Der Mensch und seine Grammatik (Tübingen 2020).

Selected references

Part I: Analysis

a) The languages in the corpus
i. Sources
Beheim, Evangelienbuch: Des Matthias von Beheim Evangelienbuch in mitteldeutscher Sprache. 1343. Herausgegeben von Reinhold Bechstein. Leipzig 1867: Weigel.

Luther, Biblia: Biblia: Das ist Die gantze Heilige Schrifft/ Deudsch/ Auffs new zugericht. D. Mart. Luth. Begnadet mit Kurfürstlicher zu Sachsen Freiheit. Gedruckt zu Wittenberg/ Durch Hans Lufft. MDXLV. [Faksimile Dt. Bibelstiftung Stuttgart. 2. Auflage 1980]

Luther, Bibel: Die Bibel. Nach der Übersetzung Martin Luthers. Mit Apokryphen. [Bibeltext in der revidierten Fassung von 1984.] Durchges. Ausg. in neuer Rechtschreibung. Hrsg. von der Evangelischen Kirche in Deutschland. Stuttgart 2001: Dt. Bibelgesellschaft.

Jessen, Testament: Johannes Jessen: Dat Ole un dat Nie Testament in unse Moderspraak herausgegeben von Heinrich Kröger, Heiko Frese und Peter Voigt. 9./11. Auflage. Göttingen 2006: Vandenhoeck & Ruprecht. [1937 (altes Testament), 1933 (neues Testament)]

Liuzza, Gospels: The Old English version of the Gospels. Edited by R. M. Liuzza. Volume one: text and introduction. Oxford 1994: Oxford University Press.

Tatian (Sievers): Tatian. Lateinisch und altdeutsch mit ausführlichem Glossar herausgegeben von Eduard Sievers. Zweite neubearbeitete Ausgabe. (Bibliothek der ältesten deutschen Litteratur-Denkmäler 5.) Paderborn 1892: Schöningh. [1872]

Weber, Nöi Teschtamänt: s Nöi Teschtamänt Züritüütsch us em Griechische übersetzt vom Emil Weber. Zürich 1997: Jordanverlag.

Wycliffe, Testament: The New Testament in English according to the version by John Wycliffe about A. D. 1380 and revised by John Purvey about A. D. 1388 formerly edited by the Rev. Josiah Forshall, F. R. S., Etc. and Sir Frederic Madden, F. R. S., Etc. [Reprint]. Oxford 1879: Clarendon.

ii. Grammars & research topics

Braune, Wilhelm/Reiffenstein, Ingo (2004): Althochdeutsche Grammatik I. Laut- und Formenlehre. 15. Auflage bearbeitet von Ingo Reiffenstein. Tübingen: Niemeyer.

Brooke, Kenneth (1955): An introduction to Early New High German. Oxford: Blackwell.

Ebert, Robert Peter/Reichmann, Oskar/Solms, Hans-Joachim/Wegera, Klaus-Peter (1993): Frühneuhochdeutsche Grammatik. Tübingen: Niemeyer.

Ellis, Jeffrey (1966): An elementary Old High German grammar: descriptive and comparative. Oxford: Clarendon.

Fischer, Olga/van Kemenade, Ans/Koopman, Willem/van der Wurff, Wim (2000): The syntax of Early English. Cambridge: Cambridge University Press.

Durrell, Martin (2011): Hammer's German grammar and usage. Fifth edition. Oxford: Routledge.

Hogg, Richard (2002): An introduction to Old English. Edinburgh: Edinburgh University Press.

Kellner, Leon (1905): Historical outlines of English syntax. London/New York: Macmillan & Co.

Lass, Roger (1994): Old English: a historical linguistic companion. Cambridge: Cambridge University Press.

Lindow, Wolfgang (1998): Niederdeutsche Grammatik. Leer: Schuster.

Lockwood, W. B. (1968): Historical German Syntax. Oxford: Clarendon.

Paul, Hermann (2007): Mittelhochdeutsche Grammatik. 25. Auflage neu bearbeitet von Thomas Klein, Hans-Joachim Solms und Klaus-Peter Wegera. Mit einer Syntax von Ingeborg Schöbler, neubearbeitet und erweitert von Heinz-Peter Prell. Tübingen: Niemeyer.

Ringe, Don/Taylor, Ann (2014): A Linguistic history of English: Volume II: The development of Old English. Oxford: Oxford University Press.

Russ, V. J. (ed.) (1990): The dialects of Modern German. A linguistic survey. London: Routledge.

Shrier, Martha (1965): Case systems in German dialects. Language 41, 420–438.

Speyer, Augustin (2010): Topicalization and stress clash avoidance in the history of English. Berlin/New York: de Gruyter (Topics in English Linguistics 69).

Taylor, Ann/Warner, Anthony/Pintzuk, Susan/Beths, Frnak (2003): The York-Toronto-Helsinki Parsed Corpus of Old English Prose (YCOE). University of York. http://www-users.york.ac.uk/~lang22/YCOE/YcoeHome.htm

Visser, F. Th. (1963): An historical syntax of the English language. Part one: Syntactical units with one verb. Leiden: Brill.

Weber, Albert (1948): Zürichdeutsche Grammatik. Ein Wegweiser zur guten Mundart. Zürich: Schweizer Spiegel Verlag.

Wright, Joseph/Wright, Elizabeth Mary (1908): Old English Grammar. London u.a.: Henry Frowde/Oxford University Press.

Wright, Joseph/Wright, Elizabeth Mary (1908): An Elementary Middle English Grammar. London u.a.: Humphrey Milford/Oxford University Press.

Wright, Joseph (1906): An Old High German primer, with grammar, notes, and glossary. Second edition. Oxford: Clarendon.

Wright, Joseph (1917): A Middle High German primer, with grammar, notes, and glossary. Third edition. Oxford: Clarendon.

b) Morphological and word order changes

Allen, Cynthia (2009): Case syncretism and word order change. In: van Kemenade, A./Los, B. (eds.): The handbook of the history of English. Chichester: Wiley-Blackwell, 201–223.

Allen, Cynthia (1995): Case marking and reanalysis. Oxford: Clarendon.

Bech, Kristin (2001): Word order patterns in Old and Middle English. A syntactic and pragmatic study. Dissertation, University of Bergen. Bergen.

Campbell, Lyle/Harris, Alice C. (1995): Historical syntax in cross-linguistic perspective. Cambridge: Cambridge University Press.

Hawkins, John A. (1986): A comparative typology of English and German. Unifying the contrasts. London/Sydney: Croom Helm.

Kiparsky, Paul (1997): The rise of positional licensing. In: van Kemenade, A./Vincent, N. (eds.): Parameters of morphosyntactic change. Cambridge: Cambridge University Press, 460–494.

Lightfood, David W. (ed.) (2002): Syntactic effects of morphological change. Oxford: Oxford University Press.

Meillet, Antoine (1949): Caractères généraux des langues germaniques. Septième édition revue. Paris: Hachette.

+ Stefan Rabanus' references on syncretism

c) Referential scales

Ariel, Mira (1988): Referring and accessibility. Journal of Linguistics 24, 65–87.

Ariel, Mira (1991): The function of accessibility in a theory of grammar. Journal of Pragmatics 16, 443–463.

Comrie, Bernard (1989): Language universals and linguistic typology. Second edition. Chicago: University of Chicago Press.

DeLancey, Scott (1981): An interpretation of split ergativity and related patterns. Language 57(3), 626–657.

Kasper, Simon (2012–2015): ReffMech. Die Relation von formalen und funktionalen Mechanismen der Form/Inhalts-Zuordnung. Leitfaden zur Datenbank der LOEWE Syntax/Semantik-Schnittstelle. Konzeption unter Mitarbeit von Magnus Breder Birkenes, Felix Esser, Giulia Grassi, Sara Hayden, Axel Harlos, Julia Schüler, Paul Widmer. Technisch implementiert durch Frank Nagel unter Mitarbeit von Slawomir Messner und Raphael Stroh. Marburg: Philipps-Universität. http://www.unimarburg.de/fb09/dsa/mitarbeiter/kasper/reffmechleitfaden.pdf

Kasper, Simon (2015): Adnominale Possessivität in den hessischen Dialekten. In: Elementaler, Michael/Hundt, Markus/Schmidt, Jürgen Erich (Hrsg.): *Deutsche Dialekte. Konzepte, Probleme, Handlungsfelder. Akten des 4. Kongresses der Internationalen Gesellschaft für Dialektologie des Deutschen (IGDD).* Stuttgart: Steiner (ZDL Beihefte 158), 211–226, 505–506.

Kasper, Simon (2015): Linking syntax and semantics of adnominal possession in the history of German. In: Gianollo, Chiara/Jäger, Agnes/Penka, Doris (Hrsg.): *Language change at the syntax-semantics interface.* Berlin/New York: de Gruyter (Trends in Linguistics: Studies and Monographs 278), 57–99.

Kasper, Simon (2016): Passiv, Possession und Belebtheit. In: SyHD-atlas. URL: http://www.syhd.info/apps/atlas/#grammatikalisierungspfade-grade

Kasper, Simon (2016): Adnominale Possession. In: *SyHD-atlas.* URL: http://www.syhd.info/apps/atlas/#adnominale-possession

Kuno, Susumu/Kaburaki, Etsuko (1977): Empathy and syntax. Linguistic inquiry 8(4), 627–672.

Silverstein, M. (1976): Hierarchy of features and ergativity. In: Dixon, R. M. W. (ed.): Grammatical relations in Australian languages. Canberra: Australian Institute of Aboriginal Studies, 112–171.

Yamamoto, Mutsumi (1999): Animacy and reference: a cognitive approach to corpus linguistics. Amsterdam/Philadelphia: John Benjamins.

+ Stefan Rabanus' references on animacy

Part II: Synthesis

a) Instruction Grammar and its major inspirations from the field of Linguistics

Bornkessel-Schlesewsky, Ina/Schlesewsky, Matthias (2009): Processing syntax and morphology. A neurocognitive perspective. Oxford: Oxford University Press.

Bornkessel-Schlesewsky, Ina/Schlesewsky, Matthias (2009): The role of prominence information in real-time comprehension of transitive constructions. A cross-linguistic approach. Language and Linguistics Compass 3(1), 19–58.

Croft, William (1991): Syntactic categories and grammatical relations. The cognitive organization of information. Chicago: University of Chicago Press.

Croft, William (2001): Radical Construction Grammar. Oxford: Oxford University Press.

Dixon, R. M. W. (2010– 2012): Basic Linguistic Theory. Vol. 1: Methodology (2010). Vol. 2: Grammatical topics (2010). Vol. 3: Further grammatical topics (2012). Oxford: Oxford University Press.

Ferreira, Fernanda (2003): The misinterpretation of noncanonical sentences. Cognitive Psychology 47, 164–203.

Goldberg, Adele (1995): Constructions. A Construction Grammar approach to argument structure. Chicago/London: University of Chicago Press.

Haiman, John (1980): The iconicity of grammar. Isomorphism and motivation. Language 56(3), 515–540.

Hawkins, John A. (2004): Efficiency and complexity in grammars. Oxford: Oxford University Press.

Kaschak, Michael P./Glenberg, Arthur M. (2000): Constructing meaning: the role of affordances and grammatical constructions in sentence comprehension. Journal of Memory and Language 43, 508–529.

Kasper, Simon (2013): Attributional praxis and linguistic stability. In: Barysevich, Alena/D'Arcy, Alexandra/Heap, David (eds.): Proceedings of Methods XIV. Papers from the Fourteenth International Conference on Methods in Dialectology, 2011. Frankfurt a. M. u.a.: Peter, 80–89.

Kasper, Simon (2014): Herleitung einer Instruktionsgrammatik. Zeitschrift für Germanistische Linguistik 42(2), 253–306.

Kasper, Simon (2014): Comparing languages by degrees of motivation and exploitation of motivation? Handout prepared for the "36. Jahrestagung der Deutschen Gesellschaft für Sprachwissenschaft (DGfS): 'Gottesteilchen der Sprache? Theorie, Empirie und die Zukunft sprachlicher Kategorien'", Philipps-Universität Marburg, 5.–7. März 2014.

Kasper, Simon (2014): "Who does what to whom?" in German diasystems. Evidence from Corpus Linguistics and Neurolinguistics. Handout prepared for the conference "Dialect Syntax – The State of the Art", Goethe-Universität Frankfurt, 5./6. Dez. 2014.

Kasper, Simon (2015): Instruction Grammar. From Perception via Grammar to Action. Berlin/Boston: de Gruyter.

Kasper, Simon (2016): Agens/Patiens-Shift. In: SyHD-atlas. URL: http://www.syhd.info/apps/atlas/#agenspatiens-shift

Kasper, Simon (subm. f. publ.): Frequency and iconicity revisited. Towards an integrative ecological perspective. In: Herbeck, Peter/Tschugmell, Nicola/Wolf, Johanna (eds.): Living Economies. Berlin/Boston: de Gruyter.

Jackendoff, Ray (1990): Semantic structures. Cambridge: MIT Press.

Langacker, Ronald (2008): Cognitive Grammar. A first course. Oxford: Oxford University Press.

MacWhinney, Brian/Bates, Elizabeth/Kliegl, Reinhold (1984): Cue validity and sentence interpretation in English, German, and Italian. Journal of Verbal Learning and Verbal Behavior 23, 127–150.

Matthews, Peter H. (2007): Syntactic relations. A critical survey. Cambridge: Cambridge University Press.

Peirce, Charles Sanders (1960): Collected papers of Charles Sanders Peirce. Vols. 1 & 2. Ed. C. Hartshorne. Second edition. Cambridge: Belknap Press of Harvard University Press.

Pintadosi, Steven T./Tily, Harry/Gibson, Edward (2012): The communicative function of ambiguity in language. In: Cognition 122(3), 280–291.

Primus, Beatrice (1999): Cases and Thematic Roles. Tübingen: Niemeyer.

Pulvermüller, Friedemann/Hauk, Olaf/Nikulin, Vadim V./Ilmoniemi, Risto J. (2005): Functional links between motor and language systems. European Journal of Neuroscience 21, 793–797.

Pustejovsky, James (1995): The generative lexicon. Cambridge: MIT Press.

Rabanus, Stefan (2008): Morphologisches Minimum. Distinktionen und Synkretismen im Minimalsatz hochdeutscher Dialekte. Stuttgart: Steiner.

Schlesewsky, Matthias/Fanselow, Gisbert/Kliegl, Reinhold/Krems, Josef (2000): The subject preference in the processing of locally ambiguous wh-questions in German. In:

Hemforth, B./Konieczny, L. (eds.): German sentence processing. Dordrecht: Kluwer, 65–95.

Talmy, Leonard (2000): Toward a Cognitive Semantics. 2 Vols. Cambridge: MIT Press.

Tomasello, Michael (2003): Constructing a language. A usage-based theory of language acquisition. Cambridge: Harvard University Press.

Tomasello, Michael (2008): Origins of human communication. Cambridge: MIT Press.

Van Valin, Robert D. jr. (2005): Exploring the syntax-semantics interface. Cambridge: MIT Press.

Van Valin, Robert D. jr./LaPolla, Randy J. (1997): Syntax. Structure, meaning, and function. Cambridge: Cambridge University Press.

b) Major inspirations from other fields

Barsalou, Lawrence (1999): Perceptual symbol systems. In: Behavorial and Brain Sciences 22, 577–660.

Bruce, Vicki/Green, Patrick R./Georgeson, Mark A. (2003): Visual perception. Physiology, psychology and ecology. Fourth edition. Hove/New York: Psychology Press.

Evans, Vyvyan/Chilton, Paul (2010): Language, cognition and space. The state of the art and new directions. London/Oakville: Equinox.

Gibson, J. J. (1979): The ecological approach to visual perception. Boston: Houghton Mifflin.

Hartmann, Dirk (1998): Philosophische Grundlagen der Psychologie. Darmstadt: Wissenschaftliche Buchgesellschaft.

Janich, Peter (2014): Sprache und Methode. Tübingen: Francke.

Jones, Edward E./Kanouse, David E./Kelley, Harold H./Nisbett, Richard E./Valins, Stuart/Weiner, Bernard (1971–1972): Attribution: perceiving the causes of behavior. Morristown: General Learning Press.

Mandler, Jean M. (2004): The foundations of mind. Origins of conceptual thought. Oxford: Oxford University Press.

Moskowitz, Gordon B. (2005): Social cognition. Understanding self and others. London/New York: Guilford Press.

Palmer, Stephen E. (2002): Organizing objects and scenes. In: Levitin, D. J. (ed.): Foundations of Cognitive Psychology. Core readings. Cambridge: MIT Press, 189–212.

Pecher, Diane/Zwaan, Rolf A. (eds.) (2005): Grounding cognition. The role of perception and action in memory, langauge and thinking. Cambridge: Cambridge University Press.

Schutz, Alfred/Luckmann, Thomas (1973): The structures of the life-world. Evanston: Northwestern University Press.

Shepard, Roger N./Metzler, Jaqueline (1971): Mental rotation of three-dimensional objects. Science 171(3972), 701–703.