

## Prominence relations and complex reference

**Introduction.** We investigate the relationship between the discourse prominence of larger units (e.g. clauses/propositions) and that of the smaller units contained within them (e.g. individual referents). In two pairs of parallel experiments on German, we manipulate prominence relations at the clause/propositional level on biclausal constructions and test for the effect on the prominence of a) individual subject referents and b) the propositions themselves. The two pairs of experiments differ in the type of discourse relation their connectives encode: *contrast* vs. *forward-looking causality*. Propositional anaphors can take complex antecedents, such as ones corresponding to a biclausal construction. We make the claim that the sentential structure of such complex reference is relevant for how clausal prominence is ‘inherited’ by the individual referents contained within them. Our results support our claims but also reveal interesting effects of the connectives.

**Methods.** We ran four forced-choice experiments in parallel, an individual anaphor one (Exp1) and a propositional anaphor one (Exp2) with *contrasting* connectives, and the same with connectives expressing *forward-looking causality* (Exps 3 and 4). We recruited 75 German native-speaking participants on Prolific per experiment, 300 in total. Participants were presented with biclausal discourses like (1) (*contrast*) or (2) (*forward-looking causality*) with separate subjects per clause. The clauses were combined either with a comma plus a subordinating connector (1/2a), a comma plus a coordinating connector (1/2b), or a full stop and either a sentence-internal connector marking contrast (1c) or no connector at all (2c). The biclausal construction was followed either by a nonce-verb sentence with an ambiguous personal pronoun (1d and 2d) for the individual anaphors or a sentence with a propositional anaphor (*das*, 1e and 2e) as subject. Participants were then either asked to resolve the ambiguous pronoun (1f and 2f) or to resolve the reference of the propositional anaphor (1g and 2g). In the individual anaphor experiments, participants chose between the two subjects of the clauses, while in the propositional anaphor experiments, participants chose between either the *first* clause, the *second* clause, or *both* together (presented by underlining).

	(1) Contrast		(2) Forward-looking causality	
<b>comma + subordination</b>	a) Alexander hat Fisch zubereitet, obwohl Dennis keinen Hunger hat. <i>Alexander prepared fish, even though Dennis isn't hungry</i>		a) Johanna hat um Hilfe gebeten, so dass Paula in die Küche gekommen ist. <i>Johanna asked for help so Paula came into the kitchen</i>	
<b>comma + coordination</b>	b) Alexander hat Fisch zubereitet, aber Dennis hat keinen Hunger.		b) Johanna hat um Hilfe gebeten, also ist Paula in die Küche gekommen.	
<b>full stop + coordination</b>	c) Alexander hat Fisch zubereitet. Dennis hat aber keinen Hunger.		c) Johanna hat um Hilfe gebeten. Paula ist in die Küche gekommen.	
	<b>individual</b>	<b>propositional</b>	<b>individual</b>	<b>propositional</b>
<b>Continuation</b>	d) Er <i>pauchte</i> . <i>He pauched</i>	e) Das finde ich überraschend. <i>I find that surprising</i>	d) Sie <i>kolpte</i> . <i>She kolped</i>	e) Das finde ich typisch. <i>I find that typical</i>
<b>Task question</b>	f) Wer pauchte? <i>Who pauched?</i>	g) Worauf bezieht sich <i>das</i> im letzten Satz?	f) Wer kolpte?	g) Worauf bezieht sich <i>das</i> im letzten Satz?

What does *das* refer  
to in the last  
sentence?

Each experiments had 24 items x 3 conditions, plus 16 fillers and 8 (Exps 1&3) or 16 (Exps 2 & 4) catch fillers that were used to eliminate data from inattentive participants.

*Predictions.* We hypothesize that individual referents inherit the prominence of their clauses. We should thus expect a similar decrease in resolution to the first referent in the individual anaphor experiments as to the first clause in the corresponding propositional anaphor experiments along the conditions: *comma+subord* > *comma+coord* > *full stop+coord*, because main clauses are more prominent than subordinate clauses and because of recency and the right frontier constraint <sup>[1]</sup> <sup>[2]</sup> <sup>[3]</sup> <sup>[4]</sup>. Specifically, we predict the resolution relationship between the two types of anaphors to be close when we group the complex *both* response in the propositional anaphor experiments, which does not exist in the individual anaphor experiments, in the following way: for the single-sentence conditions (separated by comma), we group *both* with *first* based on the reasoning that if a multiclausal sentence is prominent, then this will result in its highest subject (the first) being prominent. For the two-sentence conditions (separated by full stop), we group *both* with *second* based on the reasoning that if a complex proposition created from two independent sentences is prominent, this will result in its most recent subject (the second) being prominent. We predict that the overall relationship between conditions and types of anaphor should hold independent of the type of discourse relation.

*Results and Discussion.* We ran Bayesian binomial mixed-effects models on the data from each experiment, with our 3-level-condition as fixed effect and random effects for item and participant. For the propositional anaphor experiments, this was done after redistributing the *both*-responses (resolution to the whole biclausal construct) as described above.

For each experiment individually, we found the differences between the conditions to be reliable and in the direction as we expected, with a posterior probability of 1, given the data and the model, except for the individual anaphor experiment with forward causality, for which the posterior probability that the two coordinating conditions differ in the predicted direction = 0.93. Results are given in Fig.1 (*Contrast*) and Fig.2 (*Forward causality*).

The results support the main hypothesis of prominence inheritance: differences between the conditions in the propositional anaphor experiments correspond broadly to those in the respective individual anaphor experiments, irrespective of the type of discourse relation. This also means that the way we treated the cases of complex reference (*both*) in approximately the right way, although differences between the results of the two types of experiments still exist. These differences, again, differ between the two kinds of connectives. In addition, we found strong differences between the two kinds of continuation sentence (*das finde ich überraschend / typisch* 'I find that surprising/typical') only in the propositional *forward-looking causality* experiment, but not in the *contrast* one. This provides insights into how complex anaphoric reference is constructed in interaction with the type of connective and the semantics of the sentence in which its anaphor is contained.

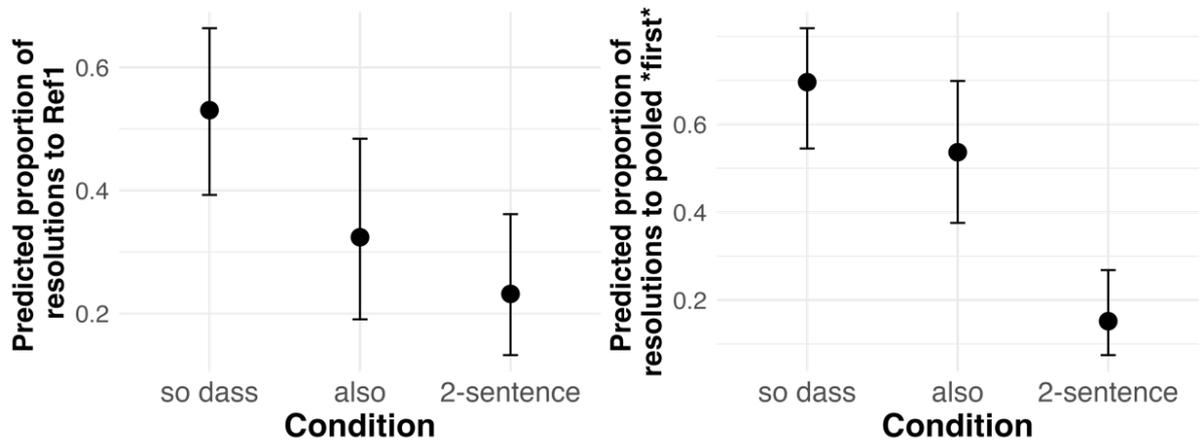


Figure 1. Model-predicted results for the individual (left) and propositional (right) anaphor experiments (Exp 1 and 2) with contrast as the discourse relation.

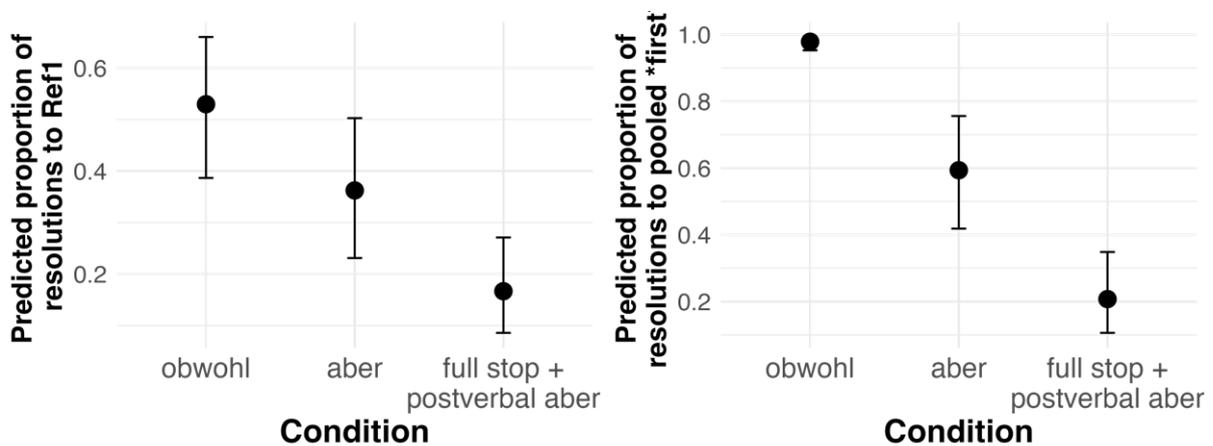


Figure 1. Model-predicted results for the individual (left) and propositional (right) anaphor experiments (Exp 1 and 2) with contrast as the discourse relation.

#### References:

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