Does position of negation mediate the difficulty of interpreting negatives? Evidence from child German

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Background. Following Jespersen's (1917) analysis, languages typically fall into one of three patterns: preverbal, postverbal, or pre- and postverbal negation. German sentential negation exhibits the postverbal pattern: the negator *nicht* ('not') is located in a fixed, low position below TP (Zeijlstra 2004), verb second movement in main clauses results in the negator appearing after the finite verb. The distance between finite verb and sentential negator varies, due to the syntactic operation of scrambling (e.g., Frey & Pittner 1998). Definite DP arguments, for example, must scramble in front of the sentential negator and are interpreted via reconstruction within the scope of the negator (Sudhoff 2008), cf. (1) *dem Jungen* 'the boy' and *den Ball* 'the ball'. PP arguments, in contrast, do not scramble across the negator, arguably because they form a verbal complex together with the verb (Frey 1993), cf. (2) *mit den Bausteinen* 'with the bricks'.

(1) Das Mädchen **gibt** dem Jungen den Ball **nicht**.   DISTANT NEGATION
The girl gives the$_{DAT}$ boy the$_{ACC}$ ball not
'The girl does not give the ball to the boy.'

(2) Der Junge **spielt nicht** mit den Bausteinen.   ADJACENT NEGATION
The boy plays not with the$_{DAT}$ bricks
'The boy does not play with the bricks.'

Importantly, negation in a 'distant' position as in (1) goes against the typological tendency to realize sentential negation adjacent to the finite verb (Meisel 1997). From a psycholinguistic perspective, this raises the crucial question of how the different surface positions of the negator affect the interpretation of negation in learners of languages like German. Previous acquisition research (e.g., Thornton 2020, Wason 1972, Wojtecka et al. 2011) suggests that children's comprehension is affected by truth-value, with 3- and 4-year-olds having more difficulty with true negatives than false negatives (e.g., (1) in the context of (3a) vs. (2) in the context of (3b)). But these studies, except for Wojtecka et al. (2011), do not consider whether syntactic cues, here: the surface position of negation, mediate how well children understand negated sentences. The current study addresses this research gap by systematically examining to what extent German-speaking children across development have more difficulty with 'distant' than with adjacent negation (*sensu* Meisel 1997), also controlling for the truth/falsity of negatives.

(3) a. *A girl is kicking the ball away from the boy.*   b. *A boy is playing with bricks.*

[In this context, (1) is a true negative]   [In this context, (2) is a false negative]

Method. Within a longitudinal design, 61 monolingual, typically-developing German-speaking children were tested three times (T1 age=3;9 years; T2 age=4;7 years, T3 age=5;8 years). Comprehension of sentence negation was assessed with a subtest of a standardized language test via Truth Value Judgment (Schulz & Tracy 2011). The child had to decide whether a puppet's negative utterance is correct with respect to the specific picture shown (see (3)). The factors Negation Position (adjacent/distant) and Truth (true/false) were crossed, resulting in four conditions. True negatives, matching the situation depicted in the picture, require an affirmative response; false negatives need to be rejected. The 12 test items were presented in pseudo-randomized order.

Results. The data was analyzed with a generalized mixed effects logistic regression (1=correct, 0=incorrect). For each age group, we fitted a model with Negation Position and Truth as fixed effects, with a random intercept for Participant (Fig.1, Table 1). For the 3-year-olds and the 4-year-olds, Negation Position and Truth were significant predictors, with lower accuracy for structures with distant negation and for true negatives. For the 5-year-olds, there was a Truth*Negation Position interaction; pairwise comparisons yielded a significantly lower accuracy for true vs. false negatives for distant negation (p=.0005), but not for adjacent negation (p=.9945).
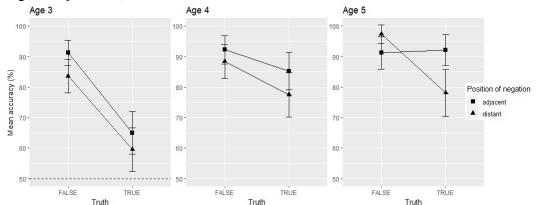

Figure 1. Mean accuracy and 95% confidence interval per condition across age.

Table 1. Model output for GLMM (fixed effects, contrast coding, reference levels: 'true', 'distant') by age group.

	Age 3		Age 4		Age 5	
	Estimate	Pr(<|z<)	Estimate	Pr(<|z<)	Estimate	Pr(<|z<)
Truth	-1.702	**<.001**	-0.897	**.002**	-1.220	**.003**
Negation position	-0.534	**.010**	-0.575	**.049**	0.002	.997
Truth*Negation position	0.514	.214	-0.126	.829	-2.691	**.001**

Discussion. At ages 3 and 4, children find negated sentences more difficult when the negator appears distant from the finite verb, following the scrambled objects, as opposed to adjacent to the verb. This holds for true and false negatives alike, with true negatives being more difficult than false negatives. By age 5, distant negation is still harder than adjacent negation for true negatives. While confirming previous findings that true negatives are challenging in out-of-the-blue contexts, our study is the first to demonstrate a systematic effect of syntactic position on children's interpretation. To pinpoint the source of the difficulty of 'distant' negation, further research is needed. We suggest that testing subordinate clauses will be informative in this regard:

(1')...*dass das Mädchen dem Jungen den Ball **nicht gibt*** (that the girl the boy the ball not gives)
(2')...*dass der Junge **nicht** mit den Bausteinen **spielt*** (that the boy not with the bricks plays)

(1'), like (1), involves scrambling, and the negator appears in a late surface position, but unlike (1), the negator is adjacent to the verb. (2'), like (2), does not involve scrambling and the negator appears in an early position, but different from (2) the negator is distant from the verb. Comparing subordinate and main clause negatives could help answer the question of whether the difficulty of 'distant' negatives is due to the reconstruction of the scrambled DPs, to the 'surface lateness' of the negator, or to the distance between verb and the negator.

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