

The *cum-sine* Pattern in German Child Language: An Argument for Antonym Decomposition

Uli Sauerland, ZAS, orcid: 0000-0003-2175-535X
Marie-Christine Meyer, ZAS, orcid: 0000-0002-0898-7378
Kazuko Yatsushiro, ZAS, orcid: 0000-0002-8060-0385

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Abstract

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ohne ('without') with the adult meaning. But we show that children in
this age group produce the word *mit* ('with') immediately before *ohne*
about a third of the time. We explain this non-adult pattern based on
assumptions about the realization of primitive concepts in language
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least two units. Our evidence from child language is the first evidence
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15 1 Introduction

The study of antonyms has been a topic of great interest in the linguistic lit-
erature since at least the work of Bierwisch (1967). Bierwisch points out that
in antonymic adjective pairs such as *tall* and *short*, the antonyms exhibit
several asymmetries. For example, the question *How tall is John?* is per-
20 ceived to be more neutral than *How short is John?*, which suggests that John
is short. Similarly, *She is taller than Mary* is more neutral as to the individ-
uals' heights compared to *She is shorter than Mary* (Rett 2014, Ruytenbeek
et al. 2017, Gotzner et al. 2018, Moracchini 2019, and others).

The central question in the study of antonym pairs is whether their rela-
25 tion to each other is transparent in their linguistic representation. A number
of influential accounts propose that one member is always structurally de-
rived from the other (Heim 2006, 2008, Buring 2007, Bobaljik 2011). Such
decomposition is transparent in languages such as Hixkaryana, which ex-
hibits antonym pairs such as *kawo* – *kawo-hra* ('long' – 'short') and *tiyoke* –
30 *iyu-hra* ('sharp' – 'blunt') (Derbyshire 1985). Heim (2006), Buring (2007),
Bobaljik (2011), and Moracchini (2019) argue that this schema should be
generalized across languages, and propose an abstract negative morpheme
ANTI corresponding to Hixkaryana *-hra*. In any given antonym pair, one
member will then be derived from the other through application of ANTI.¹
35 To illustrate, *short* would be analyzed as ANTI-*long*, and *blunt* as ANTI-*sharp*.
This account entails that English antonymic adjectives should be analyzed
as portmanteau morphemes decomposed into ANTI and the corresponding
positive adjective.

¹Heim (2006) calls the morpheme LITTLE, but reduces its semantics to negation.
Bobaljik (2011) uses the symbol '↔'.

In this paper we look beyond the adjectival domain and instead focus
 40 on the German prepositions *mit* (‘with’) and its antonym *ohne* (‘without’).
 We present a compositional analysis within the Meaning First framework
 of Sauerland and Alexiadou (2020) and present novel acquisition data in
 support of our account.

Within the Meaning First approach, conceptual representations are pri-
 45 mary, whereas linguistic representations are derived from conceptual rep-
 resentations by a process called *compression*. During compression, con-
 cepts are mapped to morphemes through lexical realization and lineariza-
 tion. Crucially, not all parts of a *conceptual representation* (in the following
 abbreviated as CR) have to be mapped to lexical material; if a concept can
 50 be reconstructed from context, it may remain unrealized in the linguistic rep-
 resentation. Applied to antonyms in general, at the CR level an antonym
 pair would then be represented as $A - [\text{ANTI } A]$ (or equivalently $[A \text{ ANTI}]$
 because the CR is not linearly ordered).

Concepts can be either complex or primitive, and the primitive con-
 55 cepts are further divided into innate core concepts and experience-based
 concepts.² We follow Heim (2006) in assuming that ANTI is a type-shifted
 version of negation. This makes ANTI a likely candidate for being a primitive
 concept which is either innate, or acquired early on, with the first antonymic
 relationship. On the other hand, the concept A would in most cases not be
 60 an innate concept, and in many cases not even a primitive.

The concept A , therefore, will generally be present in a child’s mind only
 after the ANTI concept. We also follow Sauerland and Alexiadou (2020) in
 assuming that the ability to compose concepts into complex concepts is in-
 nate. It follows that children will be able to form the complex concept
 65 ANTI- A (or A -ANTI) as soon as they have learned the concept A . On the lin-
 guistic side, however, children will first have to acquire how adults compress
 these concepts into linguistic representations in the relevant language.

This compositional Meaning First account of antonyms makes testable
 predictions about the acquisition of antonym pairs. Namely, we expect
 70 there to be a stage during which children realize both concepts ANTI and
 A transparently, as represented at the CR level, even in languages in which
 this complex concept is compressed in adult language (see also Guasti et al.
 (2022)).

Recall our prepositional pair from German, *mit* (‘with’) and its antonym
 75 *ohne* (‘without’). We assume that the morpheme *mit* realizes a concept we
 represent as CUM.³ The morpheme *ohne* in the adult language expresses

²Sauerland and Alexiadou (2020) use the term *primitive* meaning *not complex* as in
 formal logic. They furthermore assume that the concept expressed by an open class
 word like *pencil* or *road* is generally complex consisting of at least a category concept
 (e.g. nominality or verballity) and a concept capturing the root’s idiosyncratic meaning
 following much work in morphology (Alexiadou et al. 2014 and others).

³While this nomenclature might suggest that CUM is a primitive concept, we can remain

the complex concept [ANTI CUM] or [CUM ANTI] (recall that we assume CR's are not linearly ordered). Thus German doesn't transparently express the two concepts CUM and ANTI as two separate morphemes. In English, on the other hand, CUM and ANTI are transparently expressed by *with-out*. Our assumptions for English and German adult language are summarized below:

- (1) German: *ohne einen Hut*
 English: with- out a hat
 CR: [[CUM ANTI] [a hat]]
 'without a hat'

The difference between German and English has a functional justification, as it minimizes the number of morphemes while accomplishing a similar granularity of disambiguation in the two languages. In English, *out* expresses not only ANTI in the context of *with*, but is also the antonym of *in*.⁴ As a consequence, there are minimal pairs like (2) where *out* and *without* in English differentiate two different meanings relying on the bimorphemic expression. In German, however, the antonym of *in* is *aus*, and therefore the two monomorphemic expressions *aus* and *ohne* suffice to distinguish the two interpretations in (2).

- | | English | German |
|--------|-----------------------|----------------|
| (2) a. | She is going out. | Sie geht aus. |
| b. | She is going without. | Sie geht ohne. |

In German, the transparent (and redundant) way to realize the complex concept [CUM ANTI]/[ANTI CUM] would be *mit ohne*, which is marked. It can be used only in a special 'baby talk' register in imitation of child speech for rhetoric effect, as in the translated book title *Schutzensel mit ohne Flügel* ('guardian angel with without wings', by Arto Paasilinna). Another humorous use of *mit ohne* is possible in response to alternative questions that contrast *with* and *without* as illustrated in (3):

- (3) *Möchtest Du den Kaffee mit oder ohne Zucker? – Mit ohne*
 want you the coffee with or without sugar? – with without
Zucker, bitte.
 sugar please

Do you want your coffee with or without sugar? – (With) Without sugar, please.

agnostic as our account would not be affected if CUM was internally complex.

⁴Note that *without* in English can also express a meaning similar to *outside* (in Scottish English, the order *outwith* is used in this case), while in German *ohne* does not exhibit this ambiguity and only the word *außerhalb* expresses this meaning of *without*.

How do children acquire *ohne* (‘without’), the antonym of *mit* (‘with’)?
 95 As far as we are aware, the Meaning First framework is the only approach
 which makes specific predictions for this case. To see what these are, note
 first that within a Meaning First account, the question amounts to how
 children acquire the compression of the complex concept [CUM ANTI]/[ANTI
 CUM] into the corresponding linguistic structure. Secondly, children have to
 100 acquire that the compression of [CUM ANTI] into *ohne* is *obligatory*; before
 they do, they are expected to at least sometimes articulate both of the two
 concepts [CUM ANTI]/[ANTI CUM] – if they have the morphological resources
 to do so. Guasti et al. (2022) discuss other examples from production il-
 105 lustrating that children produce less compressed structures that are absent
 or marked in the adult language. Furthermore, the Meaning First approach
 predicts a corresponding difference in comprehension: invoking only one
 concept should be faster than invoking two. However, the prediction con-
 cerning comprehension is shared with some other proposals, in particular
 that of van Hout (1998).

110 In the example at hand, this leads us to expect that German-speaking
 children will undergo a developmental stage at which they express the com-
 plex concept [CUM ANTI]/[ANTI CUM] using two morphemes that they un-
 derstand to express CUM and ANTI, respectively. The specific prediction
 depends on the child’s morphological understanding of *ohne*. Following dis-
 115 tributed morphology (Halle and Marantz 1993, and others), we assume that
 lexical insertion targets terminals of the conceptual structure, i.e. primitive
 concepts. Then *ohne* (‘without’) can be understood either as expounding CUM
 whenever it appears in the context of *anti* at CR. Alternatively, *ohne* could
 expone ANTI whenever it appears in the context of *cum* at CR. Under both
 120 analyses, the remaining concept (either [anti] or [cum]) would not be overtly
 expounded.

But CUM in other environments in German is expounded by *mit* (‘with’)
 and ANTI can be expounded by negation *nicht* (‘not’) and other expression
 of antonym (see below). Because German children furthermore may have
 125 no evidence for the linear order of ANTI and CUM, at least the four non-
 adult patterns *mit ohne* (‘with without’), *ohne mit* (‘without with’), *nicht
 ohne* (‘not without’), and *ohne nicht* (‘without not’) may be produced by
 children.

	exponent of ... allomorphy	CUM	ANTI	CUM-ANTI	ANTI-CUM
(4)	yes	<i>ohne</i>	<i>nicht</i>	<i>ohne nicht</i>	<i>nicht ohne</i>
	yes	<i>mit</i>	<i>ohne</i>	<i>mit ohne</i>	<i>ohne mit</i>
	no	<i>mit</i>	<i>nicht</i>	<i>mit nicht</i>	<i>nicht mit</i>

130 Above we assumed that children use *ohne* as a contextual allomorph
to either express ANTI or CUM whenever they want to expone the complex
concept [cum anti]/[anti cum]. The third row of table (4) shows the articu-
lations children are predicted to produce if no allomorphy is assumed. Both
of the predicted patterns, however, are also possible in the adult language
135 with constituent negation, which receive the same interpretation as is pre-
dicted for child language except for the contrast requirement of constituent
negation. Hence it would be difficult to establish whether child uses of *mit*
nicht or *nicht mit* are non-adult like on the basis of corpora. We therefore
focus on the patterns with allomorphy in what follows.

140 Because child language is frequently probabilistically converging towards
the target adult grammar (Yang 2002), we expect children to initially pro-
duce one or several of these patterns in addition to the adult pattern (just
ohne). In sum, our account predicts that German speaking children under-
go a developmental stage where both parts of the [ANTI CUM]/[CUM
145 ANTI] concept are articulated, potentially alongside adult-like productions.
In the following, we show that corpus data from German-speaking children
corroborates this prediction.

To our knowledge there has only been non-quantitative work on the
antonym pair *mit-ohne* so far. The first report comes from Stern and Stern
150 (1907), which is based on anecdotal observations of the authors' own chil-
dren. (Grimm 1975, p. 117) reports data from an observational study of over
100 children. She writes that '*mit ohne*' ('*with without*') is consistently used
for a long time instead of '*ohne*'. For English, we are only aware of Durkin
(1978), who carried out a comprehension study looking for an asymmetry
155 between English *with* and *without*, which revealed no evidence for such an
asymmetry. However, the study is of limited value because only children
aged 5 years and older were tested, and the 8 children whose results could
be analyzed all performed at ceiling.

In the next section, we report on a corpus study of the German *with-*
160 *without* antonymic pair. We return to the theoretical interpretation of the
findings in the conclusion.

2 Data Collection

We report data from German-speaking children's use of *ohne* ('without')
in all relevant transcripts collected in the Childes database (MacWhinney
165 2000). The transcripts are listed in table 1. The many/Sza-corpus includes
data from children with a cochlear implant, while all others only include
typically developing children. We saw no reason to exclude children with
cochlear implants, but investigate whether they differ from the typically
developing children below. We accessed the transcripts via the LuCiD Lan-

child/corpus	age(s)	source
Leo	1;11–4;11	Behrens (2006), doi:10.21415/T5N01B
Caroline	0;10–4;3	doi:10.21415/T5NS5S
Kerstin	1;9–4;0	Miller (1979), doi:10.21415/T56592
Simone	1;3–3;4	Miller (1979), doi:10.21415/T56592
many/Sza	2;1–5;9	Szagun (2001), doi:10.21415/T5KG7T
many/Wei	7;0–11;0	Weissenborn (1986), doi:10.21415/T5301C
many/Wag	1;5–14;10	Wagner (1985), doi:10.21415/T5ZC8K
Corinna	2;8–7;6	Lieven and Stoll (2013), doi:10.21415/T50S34
Cosima	1;9–7;2	Lieven and Stoll (2013), doi:10.21415/T50S34
Pauline	1;10–7;11	Lieven and Stoll (2013), doi:10.21415/T50S34
Sebastian	2;1–7;5	Lieven and Stoll (2013), doi:10.21415/T50S34

Table 1: List of transcribed corpora of child spontaneous speech used

170 guage Researcher’s Toolkit (Chang 2017), extracting all utterances containing the string *ohne* from all relevant German corpora.

After extraction, we manually categorized each utterance into one of the four categories in table 2 and added the corresponding codes to the data points. Category 0 was assigned to cases of the string ‘ohne’ occurring
175 not as the word ‘ohne, but e.g. as part of *wohnen* (‘reside’). Category 0 was excluded from analysis. Utterances where *ohne* was used in an adult-like way were assigned to Category 1. Category 2 was assigned to data points where *ohne* was immediately preceded by *mit*. All other data points were assigned to Category 3. This included occurrences of *ohne* other than category 2
180 that we judged either to be ungrammatical to an adult and occurrence we judged to have a double expression of negation where only one negation was intended.

number	code	category	count
0	–	irrelevant	159
1	ohne	<i>ohne</i> used adult-like	306
2	mit ohne	<i>mit ohne</i>	52
3	ohne+	<i>ohne mit, ohne kein, nicht ohne</i>	7

Table 2: Categories for occurrences of the string *ohne* (‘without’) by number and code as explained in the text, with the count of items in each category

The categorization of a few items gave rise to some difficulty. Of the category 0/irrelevant utterances, only 5 could not be clearly categorized
185 because the word *mohne* does not exist, but might be a contraction of *mit ohne*, a mispronunciation of *ohne*, or something else we couldn’t reconstruct.

- (5) *na das Kleid ohne*
 well the dress xxx
 ‘the dress without’ (Sza/Lara, 4;09, CI)

Among the adult-like uses of *ohne*, we classified as adult-like many fragments without taking into account whether the context would actually license the use of a fragment for an adult speaker. Furthermore, we included
 190 9 utterances where *ohne* was repeated. Most such repetitions (see (6) and (7)) were produced by very young children, but also a 10 year old produced the repetition in (8). As repetitions are abundant in adult language as well, we regarded them as adult-like speech errors throughout.

- 195 (6) *die Schokolade ohne Eis ohne ohne ohne ohne*
 the chocolate without ice without without without without
Schokolade krieg ich
 chocolate get I
 ‘I get the chocolate without ice.’ (Caroline, 2;4)

- (7) *ohne ohne sich zu stossen*
 without without self to bump
 ‘without bumping into something’ (Sza/Laura, 2;01, CI)

- (8) *[...] und der der da was tut ohne ohne was*
 [...] and he he something does without without something
 ‘... and he does something without something’ (Wag/Regina, 10;07)

As stated earlier, utterances that corroborate our hypothesis are subsumed under category 2, while category 3 contains other non-adult uses of
 200 *ohne* (‘without’). Three examples illustrating category 2 from three different children are shown in (9).

- (9) a. *ich ein Brötchen haben mit ohne Käse drauf*
 1SG.NOM a roll have with without cheese on it
 ‘I (want) to have a roll without cheese.’ (Sza/Falko 2;09;15)
 b. *und die hatte auch ein Schokoladenbus mit*
 and DEF.3SG.NOM had also a chocolate bus with
ohne Räder
 without wheels
 ‘And she also had a chocolate bus without wheels.’ (Leo 2;07;12)

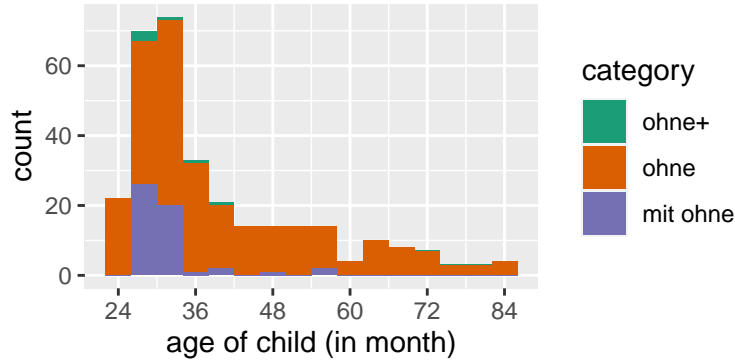


Figure 1: Number of occurrences of *ohne* (‘without’) in German child language by age and category (see table 2). Ages are binned into 4-month intervals from 22–25 months (youngest) to 82–85 month.

c. *schmeckt mir nicht mit ohne Butter*
 tastes 1SG.DAT not with without butter

‘I don’t like it without butter.’ (Caroline 2;07;14)

205 Category 3 included non-adult uses of *ohne* other than occurrences of the sequence *mit ohne* but including the four other non-adult patterns we listed in (4).

3 Results and Discussion

Figure 1 shows the distribution of the different uses of *ohne* (‘without’) by age, for ages up to 8;00. The histogram reveals that most of the uses of *mit ohne* (‘with without’) (47 out of 52) occur between ages 2;3 and 2;9. Two of the other five occurrences of *mit ohne* are from a child that had received a cochlear implant. One of these utterances is shown in (10), while the other was a partial repetition of (10). Though children with cochlear implants do not necessarily exhibit a typical trajectory of oral language acquisition, we include these two occurrences in the analysis below.

(10) *ich kann auch mit ohne Stützräder steh’n bleiben*
 I can also with without support wheels stand stay

‘I can also stop without support wheels.’ (Eileen 4;08)

The remaining three utterances containing *mit ohne* (‘with without’) by children older than 3 years are the following: one utterance of *mit ohne Brille* (‘with without glasses’) by Rig/Cosima at age 4;00;01, and the utterance (11), which was furthermore partially repeated and therefore counted twice.

- (11) *nur ganz kleines Schneckenhaus mit ohne Schnecke drin*
 only very small snail shell with without snail inside
 ‘only a very small shell without a snail

Only seven utterances were assigned to category 3, one of which was
 220 outside the age-range of up to 8;0.⁵ As mention above, our hypothesis pre-
 dicts at least one pattern of undercompression should occur, which is borne
 out by the occurrence of *mit ohne*. But given our uncertainty about the
 young children’s morphosyntactic knowledge, at least three other patterns
 of undercompression may also occur (see table (4) above). Namely the op-
 225 posite order *ohne mit* and the patterns *ohne nicht* and *nicht ohne* with the
 interpretation of a single negative like adult *ohne*.

The six utterances in category 3 by children younger than 8 all fit to
 one of the other three error patterns theoretically predicted. Four of the six
 exhibit the *ohne mit* sequence,⁶ which even occurs twice in (12).⁷

- 230 (12) *xxx willst Bohne oder nur Bohne ohne mit Milch ohne*
 xxx want bean or only bean without with milk without
mit Zutter
 with sugar
 ‘xxx, do you want bean or only bean without milk without sugar?’
 (Sebastian, 3;05;04)

One of the two other utterances in category 3 is (13). The utterance is
 only coherent if the pattern *nich[t] ohne* is understood as expounding on [NOT
 CUM]; alternatively, the child may have omitted a negation.

- (13) *ich erzähl alleine nich ohne die Oma xxx*
 I tell alone not without the grandma xxx

‘I will tell it alone, without grandma.’ (Corinna 3;01;21)

235 Finally, (14) exhibits a non-adult use of the sequence *ohne keine* (‘with-
 out none’) that is interpreted as a single negation, even though it nega-
 tion, specifically ANTI, seems to be articulated twice: *ohne* is the negative
 antonym of *mit* (‘with’) and *keine* is the negative antonym of the positive
 indefinite *ein-e* (‘a-FEM’). We therefore analyze (14) as involving the re-
 240 alizations of CUM as *ohne*, ANTI as *k-*, and EXIST as *eine*.⁸ Furthermore,

⁵The seventh error is an utterance of *mit was ohne* (‘with something without’) from
 Teresa/Wag (9;07), which may be a speech error.

⁶Leo (2;04;25) once produced the sequence *ohne mit ohne* as a fragment utterance
 which we assigned to category 2 on the assumption that it was a self-correction of Leo’s.

⁷The discourse situation in (12) is similar to (3) above, but the order of *ohne* and *mit*
 is fully ungrammatical for adults.

⁸We assume that the concept EXIST expresses existential quantification.

the structure [[CUM ANTI] EXIST] of the three concepts is more plausible than [CUM [ANTI EXIST]] since contextual allomorphy generally requires a close structural relationship of the allomorph and the trigger of allomorphy (Bobaljik 2011) and in the structure [[CUM ANTI] EXISTS] the two—CUM and ANTI—are sisters. If this reasoning is correct, (14) essentially amounts to a realization of the predicted non-adult sequence *ohne nicht* (‘without not’) as predicted in table (4) with *k-* instead of *nicht*.

(14) *Ohne keine xxx*
without none xxx

‘Without any (potatoes)’ (Leo 2;02;07)

In sum, we have shown evidence that all four patterns listed in table (4) actually occur. In the following analysis of number of occurrences we focus on the pattern *mit ohne* (‘with without’) because it is the most frequent non-adult pattern.

The overall picture that emerges is that children frequently produce *mit ohne* (‘with without’) during the third year of life, but hardly ever afterwards. Instead, the older children almost always produce *ohne* (‘without’) alone, i.e. not preceded by *mit* (‘with’). To confirm the significance of the generalization, we performed a chi-square test with the two binary variables age (below 3 years vs. 3 years and older) and mit-ohne (category 1 ‘*ohne* used adult-like’ vs. category 2 ‘*mit ohne*’; see table 2 above). The test indicated that the interaction between the two variables is statistically significant (chi-squared(1) = 22.292, p-value < .00001).

The data in table 1 suggests that the use of *ohne* (‘without’) in child language follows a U-shaped curve similar to over-regularization found with inflectional morphology. A robust finding in the acquisition literature on irregular forms is that children at some stage of development produce over-generalizations of the regular morphological process such as *goed* for ‘went’ and *heared* for ‘heard’ (Ervin and Miller 1963 and others). In such cases, children’s development exhibits a U-shaped trajectory: initial productions are adult-like, then over-regularizations occur, and only later, children return to adult-like productions (Marcus et al. 1992). Figure 1 seems to exhibit three similar stages, an initial adult-like *ohne*-stage up to age 2, then a six-months stage when *mit ohne* is produced, followed by the adult-like stage starting from age 3 in this case. While the U-shaped pattern is similar for both phenomena, their linguistic character is not comparable: there is no general rule in German grammar of inserting *mit* (or another preposition) before prepositions, while English past tense *-ed* is used to express past tense with almost all verbs. Therefore, children’s use of *mit ohne* itself does not constitute an over-regularization. Consequently the observed U-shaped pattern is surprising, and deserves further scrutiny.

280 We therefore looked more closely at the productions of *ohne* in the
 1;8–2;1 (22–25 months) age bin, which we initially categorized as adult-like.
 These utterances were all from Pauline ($n = 4$) and Leo ($n = 14$), except
 for one utterance by Laura/Sza (2;01;14), a child with a cochlear implant.
 All 4 of the relevant utterances by Pauline, and 7 by Leo consisted of only
 285 the word *ohne*. These one-word utterances may be due to the child being
 in a one-word stage of language development where its cognitive resources
 are too limited to produce sentences consisting of more than a single word.
 They therefore do not support the claim of a true U-shaped curve since the
 early, seemingly adult-like utterances of *ohne* can reasonably be explained
 290 by independent constraints at the one-word stage.

All eleven other occurrences of *ohne* ('without') by children who are at
 most 25 months old are listed in (15).

- (15) a. so ohne ('so without', Pauline 1;11;06)
 b. do ohne ('[s]o without', Pauline 1;11;06)
 c. den ohne ('the one without', Pauline 1;11;06)
 d. oben ohne ('above without', Leo 2;00;19)
 295 e. oben oben ohne ('above above without', Leo 02;00;26)
 f. ohne Gleise ('without tracks', Leo 2;01;10)
 g. Glocke läuten ohne Rauch raus ('bells ring without smoke out',
 Leo 2;00;22)
 h. ohne Gleise ('without tracks', Leo 02;01;25)
 300 i. Frösche ohne Auto fahren ('frogs without car drive', Leo 02;01;25)
 j. ohne Frösche ('without frogs', Leo 02;01;25)
 k. ohne ohne sich zu stoßen ('without without hit oneself', Laura/Sza
 2;01;14)

Of these, the first two with the particle *so* (once mispronounced or mistran-
 305 scribed as *do*) are akin to one word sentences because the *ohne* explicates
so, as in the English 'Like this – without'. The other nine occurrences of
ohne, however, constitute genuine sentences of two or more words.

We furthermore checked whether the three children who produced these
 adult-like occurrences of *ohne* went on to produce the non-adult like *mit*
 310 *ohne* later in their development as expected from a U-shaped developmental
 curve. For Laura/Sza, there were no other occurrences of *ohne*. For Pauline,
 there are five additional occurrences of *ohne* between age 2;02 and 2;12 of
 which all are adult-like.⁹ In the Leo corpus, there are 31 occurrences of

⁹Pauline's later uses of *ohne* are also adult-like, which is unsurprising because they are
 from age 5;07 and older.

315
mit ohne between age 2;02 and 2;07. Leo’s data does indeed conform to
320
a true U-shaped pattern, with 7 early, adult-like uses of *ohne* followed by
31 uses of *mit ohne*, and only adult uses after age 2;07. Unfortunately, the
corpus data is too scarce to establish whether this finding is due to chance;
at this point all we can say is that the available data weakly suggest a U-
shaped pattern, which would be surprising from a theoretical perspective as
discussed above. More data is needed to investigate this issue further, but
our main conclusion is unaffected by this uncertainty.

4 Conclusion

325
We argued that child production data provide new evidence for a decompo-
sitional analysis of at least some antonyms. Specifically, we argued in favor
of such a decompositional analysis for the case *without* as the prepositional
antonym of *with*. Our data comes from German *ohne* (‘without’), which
unlike its English counterpart is monomorphemic. We showed that German
2-year olds frequently produce the complex *mit ohne* (‘with without’) in-
stead of just *ohne*. The children’s behavior is creative and non-adult-like,
330
and we find the same behavior across different children that were not in con-
tact to each other. As far as we can see, our data provide strong support for
the assumption that *ohne* (‘without’) cannot correspond to a single mental
concept, but must be decomposed into two pieces, one corresponding to *with*
and another corresponding to negation or antonymity.

335
The result of our study also provides evidence for the Meaning First
approach of Sauerland and Alexiadou (2020). The approach predicts errors
of the type we reported because the approach views conceptual structure
and language as separate, but closely linked by a relation of compression.
Children are expected to diverge from adults with respect to compression
340
leading to errors of both over- and undercompression; the latter in cases
where non-pronunciation of a concept is obligatory for adults. Since English
without is morphologically complex, it is natural to assume the concept it
expresses is complex. Because the Meaning First approach assumes that
conceptual structures do not vary across language, it predicts that German
345
ohne (‘without’) also expresses an underlying complex concept despite not
being morphologically complex. Our result confirms this prediction.

Consider now the difference between English and German adult lan-
guage. Because we argued that *without* and *ohne* indicate complex concepts
in both English and German, there must be a difference between the two
350
languages with respect to whether the concept CUM is articulated or not.
The difference seems not to be arbitrary, but is rooted in morphological
properties of the two languages. Namely, the exponent of the ANTI concept
as part of the complex concept [ANTI-CUM] is *out* in English, but *ohne* in
German. But while *out* occurs in other contexts as well, *ohne* is restricted

355 to cases where the complex [ANTI CUM] is being expounded. The presence
of CUM can therefore be directly inferred from any occurrence of German
ohne, while English *out* does not license this inference. In order for German
children to arrive at the adult-like production of *ohne* then, they first have
to learn that *ohne* is limited to the [ANTI CUM] contexts, and that the real-
360 ization of the CUM concept in such contexts is therefore redundant and can
be left out.

Two general predictions of our result concern other languages and other
antonym pairs. We expect similar under-compression errors to arise with
the exponent of [ANTI-CUM] in all other languages where the exponent is not
365 at least bi-morphemic. We have not examined this prediction systematically
yet, but we have collected anecdotal evidence in favor of this prediction from
several languages including Dutch (Jaqueline van Kampen, p.c.), Italian
(Maria Teresa Guasti, p.c.), and Portuguese (Elaine Grolla, p.c.).

We also predict that asymmetries in antonym pairs should be more vis-
370 ible in child language. Unfortunately, there is relatively little previous work
on the acquisition of antonyms in general. Some early studies have found
asymmetries in the acquisition of adjectival antonym pairs (Clark 1972), but
more recent work such as Tribushinina et al. (2013) is less conclusive on the
matter. Outside of adjectives, some cases exhibit asymmetries which are in
375 line with a compositional account along the lines outlined above (Kotzor
2021, among others). For quantificational determiners, Katsos et al. (2016)
report that across more than 30 languages, five-year old children accomplish
higher rates of correct understanding with *some* compared to its negative
antonym *no*. We plan to explore both predictions in future work.

380 A Supplementary Files

The study data and analysis scripts to reproduce the data reported in this
paper are available and will be published.

B Research Ethics

No ethical review was required since the results we report were achieved by
385 reusing data from the cited sources that are in the public domain.

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arising from this submission. Further data to be supplied.

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