

# Constituent order or order of constituents: The acquisition of Hebrew DPs

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## 1. Introduction

In this paper I address the question of whether syntactic functional layers are available to children in the early stages of syntactic acquisition. According to the Strong Continuity approach (Poeppel and Wexler 1993), the full adult structure is available to the child from the beginning of the acquisition process. On the other extreme are those (Radford 1990) who claim that functional categories mature, and that early utterances consist of lexical projections only. An intermediate position is Weak Continuity (Clahsen et al., 1994), according to which the child constructs her functional projections according to the input.

Bohnacker (1997) shows that Swedish children by age 2 use at least one functional layer above the NP when using nominals, and suggests that in some cases children are able to use two DP internal functional layers, and that the child utilizes these positions for N movement. I present new and re-analyzed Hebrew data of constructions involving DP-internal movement, and claim that for Hebrew as well, the DP layer is present in children's utterances by age 2. These findings support Strong Continuity, and provide evidence against a previous analysis of the acquisition of Hebrew DPs (Armon-Lotem 1998).

## 2. Hebrew free genitive possessive structure

The adult form of the Hebrew free genitive possessive structure is showed in (1). In this structure, the possessed NP surfaces before the possessor. According to Siloni (1997), this linear order is a result of a movement operation of the possessed nominal to D. *šel* is analyzed by Siloni as a realization of Genitive case. The underlying structure suggested by her is presented in (2), (3)<sup>1</sup>.

1. *pe šel buba*  
mouth of doll  
'Doll's mouth'
2. [DP [D' POSSESSED<sub>i</sub> [NP *šel* POSSESSOR [N' t<sub>i</sub>]]]]
3. [DP [D' *pe*<sub>i</sub> [NP *šel buba* [N' t<sub>i</sub>]]]]  
mouth of doll

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<sup>1</sup> Ritter (1991) proposes a similar analysis, in which the landing site of the moved element is a NUM head. Siloni also motivates an intermediate functional projection between NP and DP, namely AGRP, yet only for the Construct State. Borer (1994), like Siloni, supports an N→D movement in the cases of free genitives. In this paper I adopt Siloni's analysis for illustrative simplicity, as for the present purposes the crucial point is that the free genitive construction necessarily (according to all abovementioned scholars) involves movement above the NP level and within the DP domain.

### 3. Acquisition of the Hebrew free genitive possessive structure

Berman (1987), describing the “developmental steps in acquiring Hebrew genitives” generalizes that free genitives are acquired at 2;4-3;00 years (p. 1061). Armon-Lotem (1998) provides a more detailed description of the acquisition of the free genitive, suggesting a 3-stage developmental path:

4. (a) **Possessor-Possessed order:**

*ze miryam sefer* [Smadar, 1;06;19].

this Miriam book

‘This (is) Miriam’s book’

(b) **Possessed-Possessor order:**

*sefer miryam* [Smadar 1;07;07]

book Miryam

‘Miriam’s book’

(c) **š<sup>el</sup> insertion**

*Arik š<sup>el</sup> miriami* [Smadar 1;10;19]

Arik of Miriami

‘Miriami’s Arik (Ernie)’

Armon-Lotem (1998) suggests a reanalysis model, based on her “minimalist hypothesis of acquisition (p. 17)”. This hypothesis assumes Strong Continuity, which is restricted by a strict economy principle of local well-formed structures. According to this principle, children start by using the minimal tree that utilizes only lexical categories, and only when they cannot generate a locally well-formed tree, they extend it by utilizing the functional domain.

Given these assumptions, Armon-Lotem suggests the following process. At the first stage, the child, lacking enough semantic information to bootstrap the correct syntactic structure, treats all NPs that are not clearly arguments as specifiers. Thus, the possessor is mapped to the SpecNP of the head noun, which is the possessed:

5. [<sub>NP</sub> [<sub>NP</sub> POSSESSOR] [<sub>N'</sub> [<sub>N</sub> POSSESSED]]]

At the second stage, the child encounters the need to accommodate two elements in the specifier position, as she produces sentences like (6). Armon-Lotem claims that due to the presence of the specifier ‘more’/‘another’, the child realizes that another projection is required, as “there is no way to accommodate two specifiers within one perfect projection” (p. 29). Thus, the child starts using the D layer, and therefore in these sentences the possessor and possessed are in the adult order (the structure in (7)).

6. *od sefer tmunot* [Leor 1;09;11]

more book picture

‘Another book of pictures – picture book’

7. [<sub>DP</sub> *od* [<sub>D</sub> *sefer*<sub>i</sub>] [<sub>NP</sub> [<sub>NP</sub> *tmunot*] [<sub>N</sub> *t<sub>i</sub>*]]]

more book pictures

After a short transition period in which the child uses the correct order only when another specifier exists in the structure, she understands that this structure is obligatory as it is attached to other features. Once she understands that, she is ready to insert the case marker *š<sup>el</sup>*, and does so first only in contexts where it helps to disambiguate genitive NPs from Nominative ones. This usage is later expanded to all contexts. This reanalysis model, however, has both theoretical and empirical problems, which I now turn to discuss.

#### 4. The reanalysis model – theoretical problems

As reviewed above, Armon-Lotem suggests that the trigger for the utilization of functional layers within the DP is the presence of more than one specifier – since no more than one specifier per head is allowed, the child changes her original analysis in which the possessor was analyzed as the specifier of the possessed noun. However, the basic assumption, according to which no more than one specifier can be accommodated in a structure, has been challenged. First, in Chomsky's (1995) system multiple specifiers are permitted, based on the claim that specifiers and adjuncts should be treated alike. Given this, multiple specifiers are widespread throughout languages as a very basic mechanism. Since Armon-Lotem is assuming a strong continuity between the child and adult grammar, it must be that the restriction she imposes is not supposed to describe only the child's type of restrictions. This restriction, however, according to Chomsky, is not found in the adult grammar.

Even if we adopt a less strict version of the approach that unifies adjuncts and specifiers, there are still cases in which it has been claimed that multiple specifiers take place. For example, Grewendorf (1999) suggests to capture by them the properties of Japanese multiple *wh*-in-situ questions, and Doron and Heycock (1999) claim that SpecTP positions ('broad subjects') are available in Modern Hebrew and Modern Standard Arabic. From a developmental perspective, the mechanism of multiple specifiers should be initially available to the child, as her target language might or might not consist of such a mechanism. Thus, even if the analysis of Hebrew turns out to be more accurate keeping the adjunct-specifier distinction, the child should still not rule out the potential of having multiple specifiers. Note that for this line of argumentation to hold, the different types of maximal projections (CP, IP/TP, DP) are irrelevant. This is so, as the argument addresses the availability of a structural configuration, which is derived through a general structure-generating mechanism.

Armon-Lotem's claim that the child starts by misanalyzing the input data as a result of semantic problems is problematic as well. Contra this claim, Berman and Clark (1989) showed that Hebrew acquiring children understand the semantic relations in the possessives by age 2.

An additional concern rises when thinking of Armon-Lotem's proposal in the light of other Hebrew structures involving noun movement to functional layers. Following Koopman and Sportiche (1991), the clearest case of such a structure is of DP movement to SpecIP. This is mastered by Hebrew speaking children by age 2. Friedmann (2004) presents experimental data that support the claim that Hebrew speaking children make the distinction between unaccusatives and unergative verbs by age 2, showing both SV and VS order in the case of the former and not the latter, thus showing the adult pattern. This distinct pattern supports the claim that the SV order exhibited in the children's utterances is a result of a movement, as without any additional material intervening between SpecIP and the VP, only in the case of raised unaccusatives the difference between a derived and a non-derived structure is evident through the linearization. As discussed, Armon-Lotem assumes that the child moves a constituent only if she cannot generate a well-formed structure locally (note that word order is not considered a well-formedness violation here). According to Armon-Lotem, however, Case checking features are acquired only after the structure that is a result of a movement is acquired due to structural motivations.

If this is so, it is difficult to explain how is the correct SV order achieved in regular subject-predicate sentences – in these sentences, there is no other motivation for the movement but Case checking<sup>2</sup>, yet they are achieved very early in the acquisition.

In this section I showed that the reanalysis model lacks in its theoretical assumptions and in explaining some established Hebrew acquisition data involving similar mechanisms to those it attempted to capture. In the next section I turn to checking the predictions that this model makes about the acquisition of another Hebrew structure that is parallel to the free genitive in requiring intra-DP noun movement, and show that the predictions are not borne out

## 5. The reanalysis model at test – the acquisition of the Hebrew attributive adjective structure

A straightforward case of noun movement in Hebrew can be found in the relative order of nouns and attributive adjectives. In the adult surface grammar, Hebrew attributive adjectives follow the nouns they modify (8). This is claimed to be a result of noun movement within the DP, as the adjective is generated to the left of the noun (Siloni 1997, Shlonsky 2004, Pereltsvaig 2006<sup>3</sup>). The structure according to Siloni (1997) is presented in (9), and involves a left-adjunction of the adjective and a noun raising to the D head.

8. *yalda xaxama*

girl smart

‘smart girl’

9. [DP *yalda*<sub>i</sub> [NP [AP *xaxama*] [NP *t<sub>i</sub>*]]]

girl smart

Armon-Lotem’s analysis of the free genitive will predict that since there is no structural motivation for moving the noun to the left of the adjective, children acquiring the use of adjectives will initially use only the lexical heads of N and A, thus surfacing an Adj-N order:

10. *xaxama yalda*

smart girl

‘smart girl’

This prediction was tested in a corpus study.

### 5.1 Naturalistic data analysis

*Materials.* CHILDES data from 5 native Hebrew acquiring children were examined (Table 1). 4 of them (1-4) are the same children whose utterances were examined by Armon-Lotem (1998). The age range spanned from the earliest transcription available for each child to the latest transcription that was discussed by Armon-Lotem (1;4.14-2;0.10). It should be noted that the utterances of children (1-4) examined in this study are a subset

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<sup>2</sup> EPP would not be such a consideration, as overt subject is not obligatory in Hebrew.

<sup>3</sup> These scholars disagree about the nature of the element that moves (the head noun or a maximal projection), as well as about the landing site and the nature of the adjectival attachment (whether it involves adjunction or selection). Again I ignore those differences and adopt Siloni’s analysis for presentational purposes. Note that all three approaches involve an obligatory movement of the nominal, using functional layers, in order to achieve the adult surface order. Thus Armon-Lotem’s theory makes the same predictions regardless of the analysis adopted.

of those examined by Armon-Lotem, as not all data were made available to public use through CHILDES. On the other hand, the utterances of child (5) were not analyzed by Armon-Lotem, thus their inclusion made the sample more diverse. The data is available on CHILDES under Berman Longitudinal Corpus and Na'ama Corpus.

**Table 1.** Data.

Child	Sex	Age Range	Average MLU	#Files
1. Hagar	F	1;07.02-1;07.24	1.876	9
2. Leor	M	1;09-1;10.23	2.2999	10
3. Lior	F	1;05.19-1;11.13	1.310154	13
4. Smadar	F	1;4.14-1;11.13	1.769111	9
5. Na'ama	F	1;07.08-2;0.10	1.453286	7
<b>Total</b>	<b>4F 1M</b>	<b>1;4.14-2;0.10</b>	<b>1.74169</b>	<b>48</b>

*Procedure.* All occurrences of adjectives were counted and classified.

*Results and discussion.* The adjectives appeared in four main patterns (Table 2; Figure 1): in the canonical noun-adjective (N-A) order, in the ungrammatical adjective-noun (A-N) order, in isolation with no modified noun (A), and with the copula (N (be) A)<sup>4</sup>.

**Table 2.** Distribution of adjectives.

Child	N-A	A-N	A	N (be) A	Total
Hagar	23.34% (n=7)	0% (n=0)	66.67% (n=20)	10% (n=3)	(n=30)
Leor	53.85% (n=7)	0% (n=0)	46.15% (n=6)	0% (n=0)	(n=13)
Lior	13.64% m(n=3)	4.54% (n=1)	77.27% (n=17)	4.55% (n=1)	(n=22)
Smadar	76.47% (n=13)	0% (n=0)	5.88% (n=1)	17.65% (n=3)	(n=17)
Na'ama	11.54% (n=3)	3.85% (n=1)	46.15% (n=12)	38.46% (n=10)	(n=26)
<b>Total</b>	<b>30.56%</b> <b>(n=33)</b>	<b>1.84%</b> <b>(n=2)</b>	<b>51.85%</b> <b>(n=56)</b>	<b>15.74%</b> <b>(n=17)</b>	<b>100%</b> <b>(n=108)</b>

The most common occurrence of adjectives in the children's speech was in the "isolated" A form, showing up in 51.85% (average 48.99%) of the tokens involving adjectives. This is not surprising, due to the relatively low MLU of the children at the sampled stage. This pattern is non-revealing regarding the questions of the adjective structure and N-A construction, as it is impossible to tell the relation of the single constituent to the larger structure.

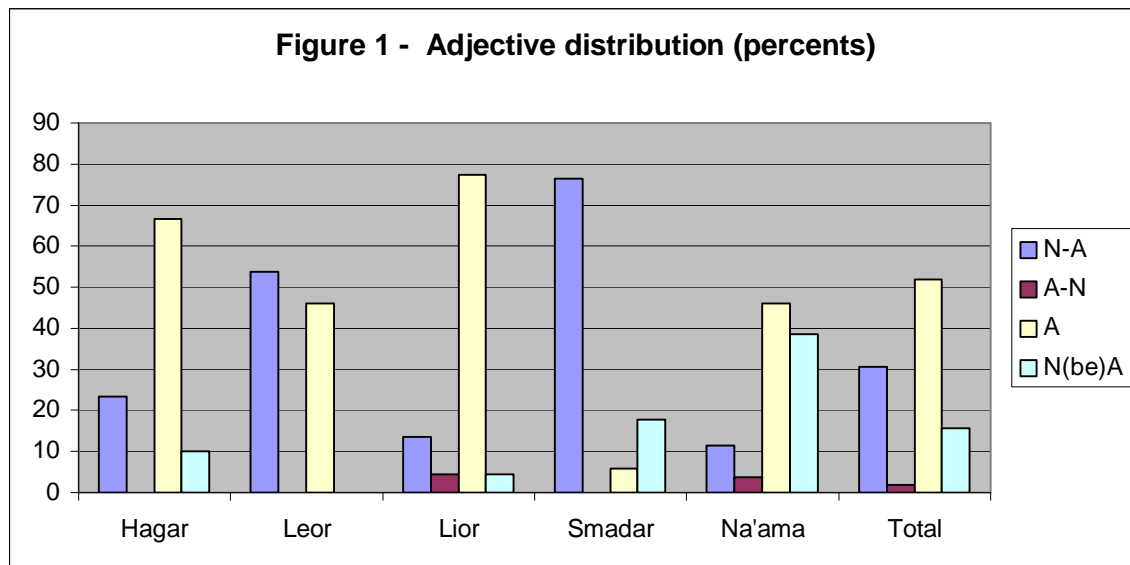
The participle form was found in 15.74% (average 14.4%) of the tokens involving adjectives. This usage was treated as a separate category, as it seems that the adjective was analyzed as verbal, presumably with a regular intransitive verb analysis. This category consisted of both N(be)A, N-A and A, which were suspected to be verbal in nature, according to both the lexical item and the context:

11. a. *Bobi ima hu xaxam!* [Smadar, 1;10.19]

<sup>4</sup> Hebrew has a participle form (*benoni*), which can be homophonous with the adjective. Tokens which were suspected as not truly adjectival were thus counted in the N (be) A category, even if no copula was phonologically overt.

- bobi mommy is-3<sup>rd</sup>.msc.sg smart-3<sup>rd</sup>.msc.sg  
 ‘Bobby, mommy, is smart!’  
 b. hu xole<sup>5</sup>. [Na’ama, 1;11]  
 he sick-3<sup>rd</sup>.msc.sg.pres  
 ‘He is sick’  
 c. xola. [Lior, 1;06.13]  
 sick-3<sup>rd</sup>.fm.sg

Since it is unclear if these occurrences were given by the children the same structure as the uncontroversial adjectival structures, these were set aside from the counts of the N-A/A-N ordering. Note, however, that if these are indeed treated by the children as adjectives, then they make the pattern of the adult-like N-A order even more robust (of course, the verbal analysis of these constructions supports the claim that the young children are capable of performing movement, just as any other subject-verb clause which involves raising of the subject out of the VP).



The most straightforward contrast is between the N-A and A-N orders – while the former consists of 30.56% (average 34.9%) of the adjective occurrences, the latter consists of only 1.84% (average 1.71%) of them, with only 2 occurrences all in all. In other words, as soon as children start combining nouns with adjectives (the earliest occurrence in the sample was of Smadar, age 1;06), they do so in the adult surface order in the vast majority of the time. This contradicts the predictions consistent with Armon-Lotem’s proposal, since if the modifiers are analyzed as occupying a specifier position and noun movement is triggered only when the functional D head has proven to be necessary, then the ordering to be found is the non-canonical A-N order surfacing to S-structure.

This finding is of significant importance as it shows that that within the domain of the DP, in the same ages with the same children, different patterns of movement are found when comparing free genitive possessives and adjectival constructions. In order to explain this discrepancy, Armon-Lotem’s data were re-examined.

<sup>5</sup> Note that *hu* is a different lexical item in 10(a,b) – while in (a) it is a copula (with agreement of 3<sup>rd</sup> sg), in (b) it is the 3<sup>rd</sup> sg pronoun.

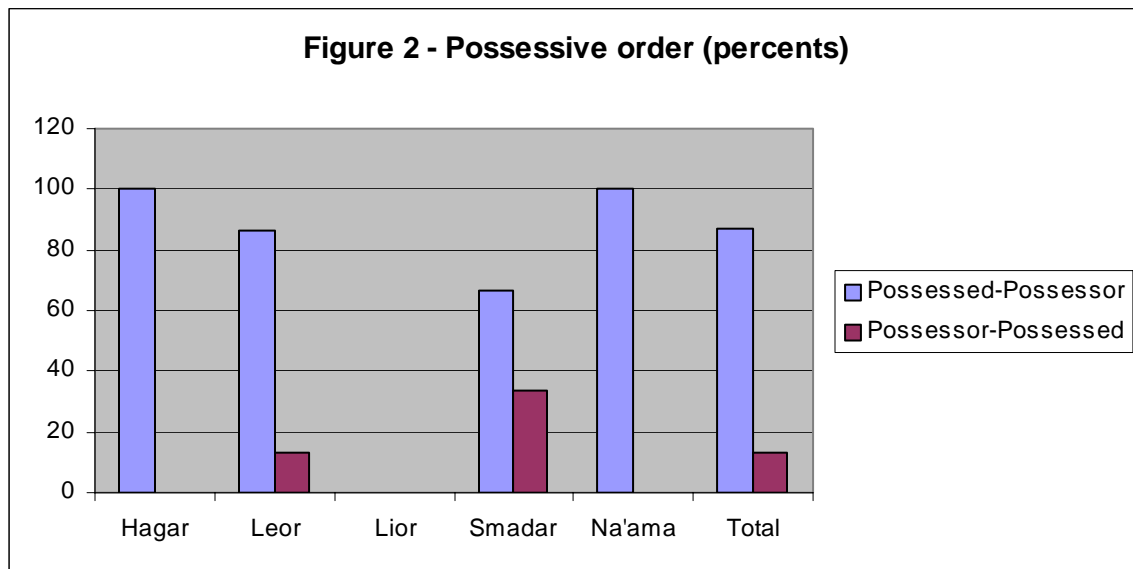
## 6. The acquisition of Hebrew free genitive possessive re-examined

*Materials.* As in the previous section (Table 1).

*Method.* All occurrences of the free genitive possessive structures were analyzed.

*Results and discussion.* The findings are summarized in Table 3 and Figure 2 below.

Child	Possessed-Possessor	Possessor-Possessed	Total
Hagar	100% (n=9)	0% (n=0)	(n=9)
Leor	86.667% (n=13)	13.334% (n=2)	(n=15)
Lior	0% (n=0)	0% (n=0)	(n=0)
Smadar	66.667% (n=4)	33.334% (n=2)	(n=6)
Na'ama	100% (n=1)	0% (n=0)	(n=1)
<b>Total</b>	<b>87.097%</b> <b>(n=27)</b>	<b>12.903%</b> <b>(n=4)</b>	<b>100%</b> <b>(n=31)</b>



As reviewed in (4) above, Armon-Lotem describes an acquisition path, repeated here for convenience:

12. a. Possessor-possessed order.
- b. Possessed-possessor order.
- c. *šel* insertion.

In the current examination, however, no such pattern was shown. First of all, only 4 occurrences were found in which the ungrammatical possessor-possessed surfaced. This can be explained partially due to the limited nature of the current sample as opposed to the data which was available to Armon-Lotem. Not all of the files of the relevant ages' transcripts were available on the CHILDES database, with some of the files Armon-Lotem cites missing. As Armon-Lotem does not mention the counts of the occurrences in the ungrammatical type, it is difficult to assess whether the percentages found in the

current examination reflect those that are found in the wider sample. It is, however, difficult to imagine that the percentages were much different, so I will treat the current sample as reflecting the actual data (and note that in the current sample, data from an additional child were added).

The fact that only four occurrences of the possessor-possessed order were found in the whole current sample, and that they were not found for all children (Leor 2, Smadar 2, the other none), suggests that maybe a pattern does not actually exist. Further support for this claim can be found in the co-occurrence of the two alleged stages in the same child's utterance, one after another:

13. *miryam šafan, šafan miryam.* [Smadar, 1;06.14]

Miriam bunny, bunny Miriam

'Miriam's bunny, Miriam's bunny'.

In addition to her own data, Armon-Lotem gives examples of the possessed-possessor structures that were mentioned by other researchers. However, these scholars themselves do not mention a time-course of these occurrences compared to the possessor-possessed one. Actually, Borochofsky (1984) notes that the two orders occur in parallel during the acquisition of the free genitive possessive structure. Likewise, Berman (1985) notes that "in general, early combinations manifest considerable fluctuation in the ordering of elements" (p. 308). Specifically in the context of possessive relations, Berman claims that two-year olds have semantic difficulties in identifying the possessor-possessed relations, and that even older children mix the order of the nominals. These claims should be revised in the light of Berman and Clark's (1989) work, where experiments established that age 2 Hebrew speaking children understand possessive relations in compounds, though indeed have trouble in producing them. Thus the current study's findings are on a par with those studies cited by Armon-Lotem.

As opposed to the above reasoning against the developmental path regarding the ordering of the nominals, the data seems to support one claim regarding the chronology of the possessive construction. Namely, the claim that the use of *šel* ('of') is not acquired at the same time as the early possessive combination. While very scarce uses of *šel* were found in the early combinations (14), after a certain point all children used it exhaustively in their possessive construction<sup>6</sup>.

14. *orly, shel orly* [Leor, 1;09.11]

Orly, of Orly

'Orly, Orly's'

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<sup>6</sup> Interestingly, Berman (1986) reports cases where the possessor-possessed ordering was found with *šel*: *ha-yeled šel ha-kova* 'the-boy of-the-hat', when the intended meaning was 'the hat of the boy'. This might suggest some disassociation between the relative order of the nominals and *šel* insertion. In the current data, a somewhat different example was found:

i. *ze ze šel aba mixnasayim*

this this of daddy pants

'this this is daddy's pants'.

This example cannot be treated as an adult PP fronting, as such fronting requires a definite article on the possessed (*ze šel aba ha-mixnasayim* this of daddy the-pants 'this is daddy's, the pants'). Furthermore, it can't be determined from the context whether the utterance consisted of only one clause, or two clauses, the first exclaiming that the object is daddy's, and the second identifying it. I thus leave the disassociation question open.



Thus, it seems that at least one path-like development can be supported by the data and needs an explanation – the one of acquiring the possession preposition/case marker *šel*. The lack of use of *šel* in the early occurrences can be explained if, as Armon-Lotem suggests, its function as a case marker is realized only later. It might also be that although its functional role is recognized earlier, the child omits it due to MLU conflict – since at the stage where children start producing the possessive structure, their MLU is very low, they express overtly only the semantically crucial elements of the sentence. When they further develop and their MLU raises, they can express the elements that are required by the formal properties of the language.

As for the simultaneous usage of both possessive orders, Armon-Lotem notes that “the questions raised by the reverse order remain as valid even if there’s some alternation with the adultlike order” (p. 20, note 2). This theoretical approach is indeed reasonable, yet should be restrained, as some utterances can be attributed to performance errors and thus should not be accounted for. Given the current data results, it is reasonable to suggest that the reverse order of possessive is exactly the type of phenomena that should be ignored, given its scarcity and its co-occurrence with the other order.

## 7. Conclusion

Naturalistic data of children’s use of two structures involving DP internal movement show that by the age of 2, Hebrew acquiring children utilize functional layers, contradicting Armon-Lotem’s reanalysis model’s predictions.

Data of the occurrences of the Hebrew free genitive possessive structure in child speech was re-examined, and it was shown that the pattern described by Armon-Lotem does not actually exist. The only developmental pattern found was the emergence of *šel* in the possessive structure, being inserted between the possessed and the possessor NPs.

The data of the use of Hebrew adjectives show that children use the adult-like N-A order almost exclusively. Regardless of which theory about the nature of Hebrew adjectives is assumed, utilization of functional layers is required to achieve that order.

Given the cross-linguistic empirical evidence for the initial accessibility of the DP projection to children, established further in the current study for Hebrew, and given the problematic theoretical grounds on which Armon-Lotem bases her theory, it is concluded that the reanalysis theory is theoretically and empirically inadequate. Instead, it is claimed that children utilize functional layers from the early stages of syntactic acquisition, supporting Strong Continuity.

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