A Corpus Study of the Distribution of Possessives in Child and Adult **Emirati** Arabic[1]

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The development of construct state (CS) possessives in Emirati Arabic goes through stages of maturation before reaching target-like levels of frequency. CSs are characterized by morphosyntactic complexity because of their derivational path, in contrast to analytic genitives (AGs) which are derived by simple merge. In addition, CSs appear a lot more frequently in the ambient language than AGs. These facts lead to two opposite predictions for maturational and frequency-based systems: a maturational approach predicts that the CS will emerge later because of its structural complexity. In contrast, a frequency-based account predicts that the CS will be acquired earlier, due to its higher frequency in the input. The predictions are tested on a longitudinal corpus of four Emirati children, collected over a period of two years (age range 1;11-5;00). Child data does not match input frequency in child-directed adult speech as children at the early stages of acquisition (24-48 months) produce predominately AGs. In later stages (49-60 months) the percentage of CSs increases significantly to levels of child-directed adult speech while the frequency of AGs decreases. The results seem to confirm the assumption that CS is a morphosyntactically complex and marked structure and challenge frequency-based accounts of language acquisition, supporting a maturational process in the development of possessive structures in EA.

1. Introduction

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Acquisition of complex syntactic structures has been argued to be driven by numerous factors, including frequency of target structure in the input (see Ambridge et al 2015 for an overview) and morphosyntactic or processing complexity of structure (e.g. Diessel 2004). It is often extremely difficult to disentangle the interaction of these two mechanisms as it is often the case that syntactic complexity goes hand in hand with low frequency in the input that children are exposed to in various languages.

To see this, let us take the well-documented case of the acquisition of passive voice structures in English and other languages. Corpus-based and experimental work has shown that passive voice structures where the adjunct *by*-phrase expressing the agent/causer is overtly expressed are acquired late, at around 4-5 years old in English (e.g. Maratsos et al. 1985). Passives of this type are expressed in significantly low frequency in the ambient language (Pinker et al. 1987; Demuth 1989; Gordon and Chafetz 1990; Brooks and Tomasello 1999). While this can be the contributing factor in their late acquisition, it is also true that passives are derived through some type of complex syntactic derivational process which may be leading to maturation effects. Different accounts that more or less propose such an explanation of the late acquisition of passives are the "A-chain Maturation Hypothesis" (Borer and Wexler 1987); the "External Argument Requirement Hypothesis" (EARH) (Babyonyshev et al. 2001); the "Universal Phase Requirement" (UPR) (Wexler 2002); the "Canonical Alignment Hypothesis" (CAH), (Hyams et al 2005); and many others.

In the case of passive, low frequency and syntactic complexity seem to both contribute to the acquisition path, and thus disentangling frequency effects from other factors becomes an extremely difficult task. In frequency-based accounts of syntactic development, frequency of a structure in the input is significant when all other things are equal, but this is almost never the case. For example, the "Interaction Thesis" in Ambridge et al. (2015) clearly states that frequency effects almost always interact with other properties of the acquisition process making the former extremely difficult to detect.

In generative approaches to language acquisition frequency appears to have an effect but this is assumed to be indirect as it almost never straightforwardly predicts the order of acquisition of different structures and does not provide a direct explanation for non-target structures found in child language (e.g. Anderssen and Westergaard 2010).

This paper approaches the issue of frequency versus syntactic complexity from a different type of dataset in which, contrary to the example of passives discussed above, the lower frequency structure is

actually the syntactically simpler one. More specifically, the paper investigates frequency effects in two types of possessive structures in Emirati Arabic, by providing a corpus-based analysis of the distribution of these structures in adult and child language. The data clearly shows that the more complex/more frequent in the input set of construct state possessives goes through stages of a maturation process before reaching target-like levels of frequency.

In other words, complexity (possibly because of some type of movement operation) seems to be a stronger indicator of order of acquisition in this case than input frequency. The results in Emirati Arabic corroborate similar results in the acquisition of Norwegian possessives (see Anderssen and Westergaard (2010) who find that in early production, Norwegian children exhibit a preference for the possessive structure which is the least frequent one in the input, and which seems to be derived from an economy principle of movement which Anderssen and Westergaard (2010) argue to be operative in early child language).

Section 2 of the paper discusses possession in Emirati Arabic and explains how the different possessive structures available in the language differ in terms of structure and in terms of frequency in the adult language. Section 3 moves to the discussion of child language and shows how the patterns observed in the data do not match the patterns of two types of free possessive structures in the input, while Section 4 specifically discusses bound pronominal possession in child Emirati Arabic. Finally, Section 5 provides some concluding remarks.

2. Possession in Emirati Arabic

Possession in Emirati Arabic is expressed with pronominal suffixes (1), a construct state (CS) (2) or in an analytic genitive form (AG) with the use of the particle *ma:l* (3) (Harning 1980; Holes 1990, among others):

(1) ʔxo -j ʃu nɛ-saw-i ʃɛɣɛl-na haða
brother-1SG what PL-do-2SG job-1PL this
"What can we do my brother, this is our job."

(2) marwan j-ʃtɛɣɛl fɛ məktabat əl- ɣamʕah ʕalaʃan j- qɛdar
Marwan 3SG-work in library the-university because 3SG- able
j- ʕəjjɛʃ ʕɛmrah
3SG-live himself
“Marwan works at the university's library to be able to live.”

(3) sɛqatˁ-t fɛ ɛl-ʔɛmtħan ma:l ɛl-ʔɛnglizi
failed-3SG in the- test POSS the-English
“She failed in the English test.”

The different instantiations of the CS or *idˁa:fa*, as it is known in Arabic, has received great attention in the study of Semitic languages and has been extensively studied in the context of Modern Standard Arabic and a few spoken Arabic dialects. It exhibits a number of properties which indicate some degree of syntactic complexity which goes beyond the properties of a simple merging derivation. Thus, CS structures exhibit (in-)definiteness spread in that only the rightmost nominal element can carry the definiteness prefixal marker *(ə)l-*. The definiteness feature of the possessor spreads to the whole of the CS structure:

(4) ʔasrar əl- mudiir
secrets the- manager …
“the manager's secrets ...”

c.f. * əl-ʔasrar (əl)-modir

In addition, the possessor and possessee DP have to be adjacent separated only by the rightmost DPs definiteness marker. An adjective following the CS structure creates ambiguity, as it could potentially modify either of the two nouns, the possessor or the possessee. The ambiguity is resolved when the two nouns have different gender features as the adjective must agree with the modified noun in gender:

(5) ʔɪstaʕart ktaab tˁ-tˁaaliba əl-jidiida
I.borrowed book.M the student.F the new.F
“I borrowed the new student’s book.”

(6) ʔɪstaʕart ktaab tˁ-tˁaaliba əl-jidiid
I.borrowed book. M the student.F the new. M
“I borrowed the student’s new book.”

In addition to these morphosyntactic properties, CS usually acts as a single prosodic unit for purposes of stress assignment (see Benmamoun 2003), pointing towards an idiosyncratic word-like structure.

Because of this set of properties, the derivation of CS structures has been assumed to involve some sort of process that adds complexity to the structure. This process may involve movement of a head or phrase inside the DP domain. For example, a number of researchers have proposed head-movement of the possessed noun N to D (Mohammad 1988, 1999; Ritter 1991; Siloni 1991; Fassi Fehri 1993; Borer 1996, 1999). This type of movement would explain the definiteness effect as the D slot of the possessed DP would be occupied by the moved nominal head and would not be available for a second determiner. In addition, the strict adjacency between possessor and possessee can be explained, as the movement operation would bring the two nominals to a close position where nothing else could intervene. On the other hand, head movement in general has been criticised in later approaches to generative syntax as problematic, given recent proposals that syntactic movement should always have some sort of interpretive effects. This has resulted in allocating most head-movement effects to the phonological component of grammar (Chomsky 1999).

Moving away from head-movement, a number of accounts have assumed a phrasal-movement derivational process for the formation of CS. For example, in Shlonsky (2004), the phrasal construct NP containing the possessee and the possessor moves to spec-DP. The lack of a determiner head in the possessee DP can be explained as an instance of the more general doubly-filled Comp filter which forbids the presence of an overt head in a projection where the specifier is also filled by overt material.

Abstracting away from the details of the above types of proposals, the common underlying characteristic of movement-based derivations of the CS is that the resulting structure entails a higher level of complexity because of the movement operations involved. As a result, and following current thinking in generative approaches to language acquisition, children are expected to start with the least costly grammar. In minimalist terms, this is a grammar that does not involve movement (e.g. Platzack 1996; Zuckerman 2001). In such accounts where economy principles determine the path of morphosyntactic acquisition, children are expected to start with the least marked possible grammar. Markedness in these accounts translates to, for example, the existence of overt movement operations in the grammar.

Possession can additionally be expressed in an Analytic Genitive (AG) form, with a preposition-like element which sometimes has a nominal

origin. In Emirati Arabic this is predominately the possessive particle *ma:l*, which is homonymous with a nominal expression meaning "property; possession":

(7) ʔ-ba-k baʕad t-xal-hom j-dˁahhɛr-o-ni fɛ
1SG-want-2SG.M also 2SG-let-3PL 3SG-show-PL-1SG in

ɛl-barnamag ma:l ɛt-tɛlfɛzjon ma:l ɛrrɛjadˁah
the-program POSS the-television POSS the-sport
"I want you to let me be in the television sports program."

(8) ɛl- ʔɛmtħan ma:l ɛl- ʔɛnglizi
the-test POSS the-English
"the English test"

(9) ħqɛl ma:l bɛtrol
field POSS oil
"oil field"

AG structures seem to be preferable in cases of ambiguity resolution (Harning 1980, 78-79; Holes 2004, 209-210) (examples from Holes 2004, 210):

(10) [ɛl-be:t ɛl-ʄbi:r] ma:l sˁadi:g-i
the-house the-big POSS friend-1SG
"my friend's big house"

(11) be:t sˁadi:g-i ɛl-ʄbi:r
house friend-1SG the-big
"my elder friend's house" (preferred)
"my friend's big house" (with context)

In terms of syntactic derivation, these structures do not involve any movement operations and are derived from simple merge of a nominal head with a complement PP (or PrtP). Thus, in terms of syntactic complexity, the AG structures in ((7))-((9)) are simpler/less marked than the CS structures of (1)-)3). There seems to be no other factor that forces the use of one possessive structure over the other.

Both AG and CS forms appear with alienable (AP) and inalienable possession (IP) although the former are extremely rare with inalienable possession. Of the 130 CSs produced in child-directed speech in our corpus, 48 denote inalienable possession and 82 alienable possession.

Similarly, in the child data, of the 139 total CS, 64 denote inalienable possession and 75 alienable possession. AGs have a much smaller number of inalienable possession structures with only 3 out of 48 items in the CDS and only 5 out of 339 in the child data.

(12) *ABD: məftaaħ maal əl-ħədʒra (46.20) (AP)
key POSS DET-room
"the room's key"

(13) *FAT: ħalaawa maal teffaħa (54.26) (IP)
candy POSS apple
"apple candy"

(14) *ABD: ʔana sajaart babati zərrga. (42.03) (AP)
I car father-1SG blue
"My father's car is blue."

(15) *FAT: ʔum xammaas . (54.26) (IP)
mum Hammaas
"Hamas' mother"

As far as we can see, in all available corpora there is no other factor that seems to give preference to either the AG or the CS structure over the other, including the expression of information and contrastive focus, or other marked contexts.

Finally, possession can be expressed by adding a possessive affix after a nominal:

(16) ʔxo -j ʃu nɛ-saw-i ʃɛɣɛl-na haða
brother-1SG what PL-do-2SG job-1PL this
"What can we do my brother, this is our job."

The particle *ma:l* can also be suffixed with postnominal possessive affixes when in predicative position:

(17) jaʕni mob ma:l -i
mean neg POSS -1sg/gen
"So, it's not mine."

Pronominal possession seems to share a number of properties with CS structures but involves additional morphophonological issues that are

relevant for the study of the form's development. In the following sections I will concentrate on AG and CS cases with free possessor/possessee nominals. I will return to the discussion of pronominal possession at the final section of the paper.

Before moving to the discussion of how these forms are acquired by Emirati children, let's first discuss also the frequency of these forms in adult-to-adult conversations. Harning (1980) notes that the number of CSs structures in Gulf Arabic varieties is much higher than the number of AGs, but in the texts that represent the Gulf region in Harning's study (drawn from Johnstone 1967) "the frequency of the AG … is so low as to be insignificant" (see also Holes 1990 and Brustad 2000, 88 for discussion).

Brustad (2000) also states that the Moroccan AG particle *dja:l* has a much wider distribution than the Emirati Arabic *ma:l*, in that it is used in quantificational and inalienable contexts, which do not readily allow *ma:l* in EA.

To confirm these facts, we checked frequencies of AG and CS structures in EA, using a small transcribed corpus of spoken adult Emirati Arabic (around 5000 words, Leung 2008)). We found a total of 1853 possessive structures from which the greatest percentage was structures containing a possessee nominal suffixed with a genitive pronominal suffix (including cases of the particle *ma:l*)

Of the remaining 320 cases of possessor-possessee strings, 305 structures are of the CS type and 15 structures of the AS type. Thus, the adult corpus confirms the generally accepted assumption that the Emirati Arabic dialect uses predominately CSs (95.32% of the total number of non-pronominal possessive structures) while the AG is used only 4.68% of times.

3. Child language

For maturational accounts of language acquisition, CS structures should be acquired much later than AG because of their greater morphosyntactic complexity. In contrast, a frequency-based account would predict that CSs should be acquired earlier and in greater numbers than AGs to match the higher frequency of the former's production in child-directed speech.

In order to test these predictions, we used a corpus of Emirati Arabic child language collected through the EMALAC project (Ntelitheos and Idrissi 2017). The EMALAC corpus is based on 41 half-hour recordings of six Emirati children, three girls and three boys, taken roughly every two weeks, for a period of two years. The recorded material has been transcribed in broad IPA transcription following a simplified version of

Codes for the Human Analysis of Transcripts (CHAT, MacWhinney 1991). Table 17-1 provides some basic statistic information of the database, including child names and age-ranges with number of words and number of utterances per child, as well as the total of adult, child-directed utterances.

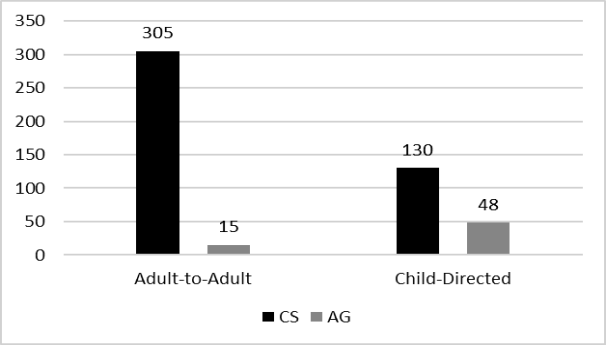
All possessive structures in the corpus, including in child-directed adult speech and in child utterances were coded as CS and AG structures with additional information about whether the possession was inalienable or alienable and whether it contained a definite or indefinite possessor DP.

Table 17-1. Basic EMALAC statistics

Child Name	Age (months.days)	Utterances	Words
Fatima	46.14-69.21	4183	11326
Abdulaziz	42.03-65.09	4737	17017
Mohammed	45.05-68.06	4853	15418
Alreem	31.19-54.05	1215	2636
Hind	21.11-42.17	367	569
Hamad	20.00-40-18	824	1873
Child-Directed Adult Speech		8512	29478
Total		24695	78326

Once annotation was completed, we checked first the number of possessive structures in the ambient language. Not surprisingly, we found a significant increase in the number of AG structures and corresponding decrease in the number of CS structures in adult child-directed speech when compared to the adult-to-adult corpus. Adults produce 178 non-pronominal possessive structures of which 130 are CSs (73%) and 48 are AGs (27%). Thus, the input the children get still has a higher frequency of CS structures but AG structures are also more frequent than in Adult-to-Adult speech:

Figure 17-1. Comparison of AG and CS frequencies in adult-to-adult and child-directed speech



It is known that adults are highly selective in the words and syntactic constructions they use when addressing young children (Snow and Ferguson 1977; Gleitman et al. 1988; Cameron-Faulkner 2003, among others). More specifically Cameron-Faulkner et al. (2003) find that frequency of certain structures in child-directed speech does not match frequency of identical structures in adult-to-adult exchanges.

Turning now to children, they produce both AG and CS structures at different stages of language acquisition:

(18) la: nʕaalət hannu:d (FATIMA, 4;05)
NEG shoes Hindi
"No, (these are) Hindi's shoes."

(19) ħalaawa ma:l teffaħa (FATIMA, 4;07)
sweet POSS apple
"Sweet(ness) of apple …"

Based on the frequency of the structures produced at different ages we roughly distinguished three stages in the development of these structures as illustrated by Figure 17-2:

Figure 17-2: Development of possessive structures in child EA

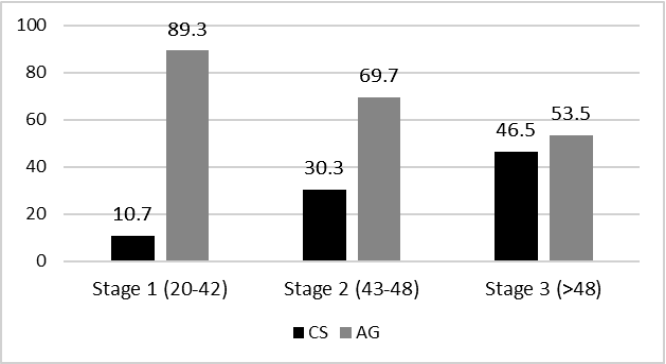
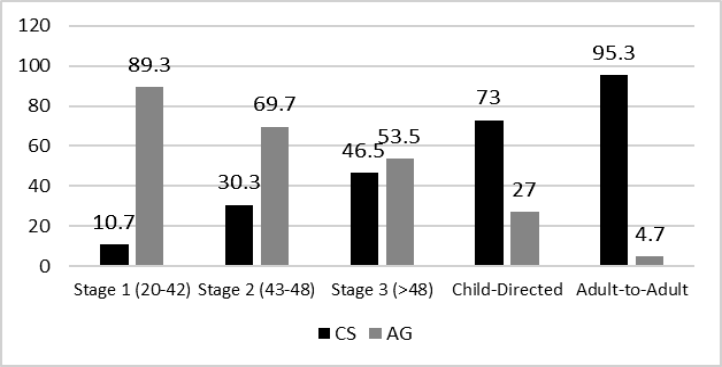


Figure 17-3 compares CS and AG frequencies in the three stages of child development, in child-directed adult speech and in adult to adult exchanges:

Figure 17-3. Comparison of child Emirati Arabic to A-to-A and CDS



As can be seen in the Figure 17-3, CS structures appear in a much more frequent fashion than AG structures in the dialect. However, the higher frequency of CS structures and the lower frequency of AG structures in CDS is not matched by comparable frequencies in child language. A high frequency of CS structures in child-directed speech (73%) corresponds to a very-low CS frequency at the first stage of acquisition (10.7%), reaching comparable levels only at around the third stage (46.5%). A relatively lower frequency of AG structures in child-directed speech (27%)

corresponds to an extremely high frequency in the first stage of acquisition (89.3%), again reaching comparable levels only at around the third stage (53.5%). Therefore, frequency alone is not a reliable indicator of the acquisition path the children follow.

The mismatch between input-output of possessive structures in child language cannot be explained in terms of context. As we have seen in Section 2, *ma:l* possessives are not common in inalienable contexts. However, children's use of possessives most frequently targets exactly these contexts. General references are to relatives, including fathers and mothers, and thus one would expect a higher use of CS possessives in child language. The numbers exhibit the exact opposite pattern, which makes the high frequency of AG possessives in the early stages of acquisition more puzzling.

Output frequency observations follow a path which strongly correlates with the age of acquisition of the two structures. For the three children for which early acquisition stage recordings exist (around two years old), the AG appears a lot earlier in the data than the CS.

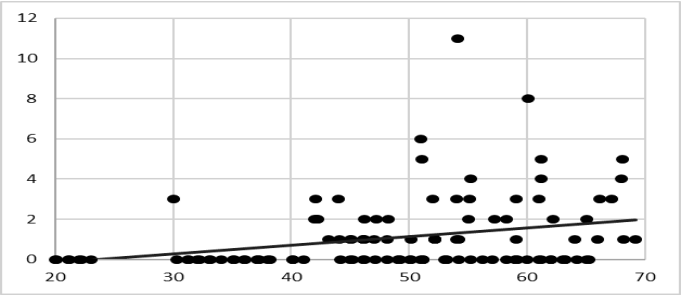
Table 17-2. Age (in Month.Day format) of first appearance of AG and CS structures in the younger children

	AG	CS
Hind	21.11	42.17
Hamad	22.13	30.01
Alreem	31.19	44.13

A maturational account predicts that the CS, due to its complexity, will not be available in the children's output at the early stages. The possessive relationship is expected to be realized with the much simpler AG form, explaining the higher frequency of the latter at the early stages of acquisition.

As the children mature linguistically, they use the CS structure more frequently, reaching child-directed speech levels by the second stage, while the AG structure drops gradually but still maintains a higher frequency than that in child-directed speech. A linear regression analysis between the two variables (age/number of CSs) shows a significant correlation ($\beta=0.298$, $F(113)=10.910$, $p<0.001$). In other words, as the children get older the number of CS increases significantly, indicating a maturation process:

Figure 17-4. Age-CS production correlation



4. Pronominal possession

As discussed in the introduction, Emirati Arabic additionally uses a series of pronominal suffixes to express possession:

(20) ʔxo -j ʃu nɛ-saw-i ʃɛɣɛl-na haða
brother-1SG what PL-do-2SG job-1PL this
"What can we do my brother, this is our job."

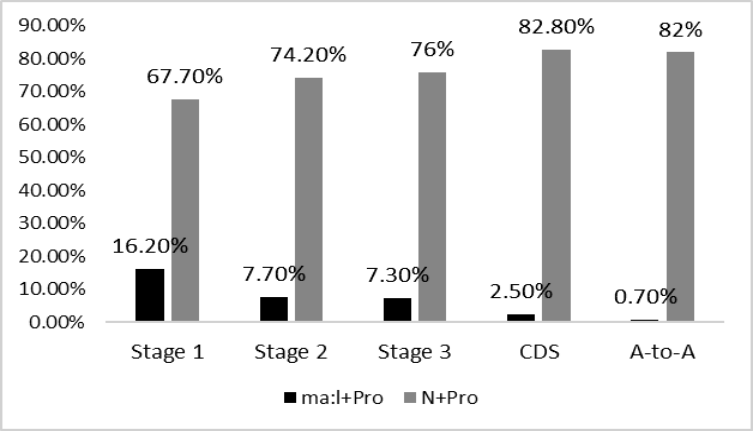
In addition, the possessive particle *ma:l* can also be suffixed with postnominal possessive affixes when in predicative position:

(21) jaʕni mob ma:l -i
mean NEG POSS-1sg/gen
"So, it's not mine."

The adult-to-adult corpus shows an extremely high frequency of use for such pronominal possessives. Adults produce 1520 tokens of pronominal possession or 82% of the total number of possessive structures and in child-directed speech the proportion remains similarly high with 1246 instances (82.8% of the total possessive structures).

Children produce pronominal possessives from the very first recorded stages of development in the corpus. In addition, the frequency of produced pronominal possessives comes close to that of adult-to-adult and CDS in all stages of development. However, in the earlier stages a great number of these possessives are suffixed on the *ma:l* form resulting in a non-adult like frequency of output.

Figure 17-5. Production of pronominal possessive forms in Emirati Arabic



It is true that in the case of pronominal possession, frequency in the input matches output frequency. However, the prominence of *ma:l* possessives in these early stages remains problematic for a purely frequency-based account. In addition, given the discussion about both AG and CS appearing in similar contexts and in free variation, it is not clear why there is a prevalence of AG forms in these early stages of acquisition.

Finally, in the early stages it is not clear whether children decompose the complex suffixed possessive forms or whether in certain cases they take them to be single units. A more careful investigation is needed in order to pinpoint the exact point when children start processing the pronominal possessive suffix as a separate morpheme. Some evidence that this is not always the case in early stages of acquisition comes from the fact that children occasionally disregard the definiteness effect that characterizes the possessive suffixes and interpret suffixed possesses as indefinite forms to which they attach the definite determiner prefix, resulting in a type of form which is ungrammatical and unattested in adult language:

(22) b-alʕab luuħi bə-l-liid-i (b-iidi) (Mohamed, 3;11)
FUT-play.1SG myself by-D-hand-1SG.POSS
'I will play by myself with my hand.'

In (22), the nominal "hand" is doubly marked for definiteness: once with the prefixal determiner *l-* and once with the possessive suffix *–i*. This is not attested in adult language, where possessive suffixation excludes

definite determiner prefixation. It seems then that the children in these early stages are not aware of the presence of the possessive suffix as an independent element in the syntactic structure and possibly process the noun-possessive suffix complex string as an individual word, which would explain why these structures are a lot more frequent in the early stages of acquisition.

5. Conclusion

The frequency of AG structures in Emirati Arabic adult speech is much lower than the frequency of CS structures. Despite the fact that adults use fewer CS and more AG structures when addressing children, the frequency of CSs in child-directed speech remains considerably higher than the frequency of AGs. In contrast to predictions by pure frequency-based accounts, children produce almost no CS structures in early stages compensating with AG structures. In later stages the frequency of CSs in child speech approaches that of adult speech but AGs are still produced at higher frequencies. We attribute this pattern to the added complexity of the morphosyntactic structure of CSs.

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