ENGLISH

This chapter explores the structure and acquisition of the English DP. Like previous chapters, the discussion first examines the morphosyntax of possession in English, with the goal of providing a detailed analysis of the relevant phenomena, supporting the DP-CP parallels discussed in Chapter **??**, and showing the subtle but substantial similarities between English and the other target languages. After this theoretical discussion, the second section of the chapter discusses the acquisition of the relevant parts of the DP and CP, focusing on whether the theoretical parallels are reflected in the acquisition process. It is shown that while there is evidence for parallel acquisition of syntax in both domains, the morphological and semantic picture is rather blurry.

## 4.1 OVERVIEW OF ENGLISH

The key issues that must be settled for English possession are the case of the possessor, the particular morphemes or features present in the possessor, and the structure of the possessed DP. This section will discuss the possessor's forms and suggest a few possible ways of analyzing them. Each possibility leads to a different analysis of the syntax and morphology of the possessor. The evidence supports an analysis that entails genitive case-assignment by a distinct (and morphophonologically overt) Poss projection within the DP.

As Table 4.1 shows, the important factors in determining the form a possessor may take must include person, number, gender, and animacy features, as well as the

| | Overt Possessum | | Null-/Post- Possessum | |
|---|---|---|---|---|
| **Person** | Singular | Plural | Singular | Plural |
| 1 | my | our | mine | ours |
| 2 | your | your | yours | yours |
| 3 | his<br>her<br>its<br>the boy's | their<br><br><br>the boys' | his<br>hers<br>its<br>the boy's | theirs<br><br><br>the boys' |

Table 4.1: Possessive forms for English

overtness of the possessum[1]. Any syntactic and morphological analysis must be able to reference these features. As shown in the rightmost columns of Table 4.1, possessors have an additional consonant when the possessum is not overt or when the possessor is post-possessum, followed by *of*. This consonant is *-s* in all cases but first person singular, where it is *-n*.

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[1]The examples in (i) below show the relationship between the form of the possessor and whether it is immediately followed by the possessum. Possessors may appear both before or after the possessum– if they appear after, they must be preceded by *of*.

(i)  a. My *(hat) is on the dresser

    b. The hat of mine is on the dresser

    c. *The hat of my is on the dresser

    d. Mine (*hat) is on the dresser

The choice of construction is affected by numerous factors, including at least animacy, information structure, and phonological weight, and has been widely studied (Rosenbach, 2005: and references therein). The post-nominal construction is an important part of the English possession puzzle, but both because it is so complicated and because it is so rare in child language, a full analysis of it will not be pursued in this dissertation. The basic facts of the post-nominal possessor will be used for the purpose of supporting a bi-morphemic analysis of the genitive pronouns.

Deciding on the appropriate syntax for the entire possessed DP involves not only the location of the possessor with respect to the possessum, but also the status of this *-s, -n.* The starting assumption will be that the consonant seen after the pronouns is identical in source and function as the *-s* seen after lexical possessors. Possibilities for this consonant include it being a determiner, an element of the genitive case allomorph (overt on lexical possessors), the realization of a distinct possessive head within the DP, or even an agreement marker[2]. Each of these issues will be discussed in turn below.

Rosenbach (2004) suggests that the *-s* seen in English is not a case-marker but a determiner. If *-s* is D (representing, perhaps, a [+POSS] feature on the determiner feature bundle), the only possible position for the possessor is the specifier of DP. With this situation, the pronouns forms do not reflect case morphology– contextual allomorphy determines the correct form of the pronoun and there is no agreement. Abney (1987) also suggests the *-s* is a determiner and that this D head assigns genitive case to the possessor in its specifier. This D head may also be null, as with pronominal possessors, and it would be sensitive to whether its noun complement was overt or not.

A problem with the SpecDP account is that assumptions regarding the assignment of case require more than the simple Spec-Head relationship Abney attributed to assigning case(Chomsky, 1999). To rescue this, D would have to agree with the possessor in a lower position and move it to its specifier. This D would be unique among determiners in assigning case and having an EPP. Also, specifiers are "escape-hatch"

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[2]Historically, the *-s* was the main English genitive case marker (Van Gelderen, 2006). First and second person genitives alternated between *my/mine* or *thy/thine* depending on whether the possessum began with a consonant or vowel, respectively ( *cf.* "This above all: to thine own self be true" (Shakespeare, 1904:1.3. 78) ). This alternation is reminiscent of *a/an* and can easily be dealt with in purely phonological terms. Despite the clear diachronic history, the synchronic data cannot be accounted for so easily.

positions– a possessor in this position is expected to be able to be extracted. This is not the case in English[3], though we saw it is the case in Hungarian. These facts suggest that ruling out both SpecDP as being the position of the possessor as well as the identification of *-s* as a determiner is possible, especially if another solution presents itself[4]. Another possibility is that possessor is not in SpecDP but adjoins to the *-s* D, though this requires that Spec-to-head be a licit movement.

Another alternative is that this *-s* is related to a genitive case allomorph, though this genitive-marked DP must not be SpecDP but lower. Treating the *-s* as a case marker is plausible, however possibly undesirable. Most pronominals with null possessa are also marked with *-s* (*eg. hers, ours* ). If the *-s* seen on lexical possessors is the same *-s* seen on these pronouns, one of two things must be true. Either genitive pronouns must have two forms, depending on their environment– e.g. *her* or *hers* depending on the overtness of the possessa. The other option is that genitive pronouns are sometimes doubly marked for case: *her* being [3SG, +FEM, +GEN] and *hers* with an additional GEN feature represented by *-s*, giving [3SG, +FEM, +GEN, +GEN]. It would also entail that lexical possessors show [+GEN] case overtly as well with this *-s*, making genitive unique in this regard among English cases. Doubly GEN-marked nouns appear in many languages (see Plank (1995) and references therein), though this is usually considered a result of case concord in addition to case-agreement, not doubly-marked case from the same source.

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[3]The possibility of an extracted possessor might be represented in examples such as "Look me in the eyes," though these construction appear limited to body parts (#grab me the book (as in *grab my book*; *grab the book for me* is the felicitous interpretation))

[4]Eliminating *-s* as a determiner raises the question of what the determiner might be. One option would be to suggest that the determiner in possessives is null, an analysis that could easily unite them with proper names, which also lack determiners and are inherently definite. The alternative is that there simply is no D projection, though this approach would create more problems than it solves.

The next part of the discussion explores the idea that the *-s* is not a determiner or case marker, but is a realization of a distinct syntactic head within the DP. As discussed in Section **??**, the morphological possessor may be base-generated in any number of specifier positions in the elaborated DP structure. Assuming that the genitive case is a structural case assigned to the possessor, it will be this syntactic head that assigns genitive case and establishes an Agree relationship with a lower DP.

The first of two possibilities for this *-s, -n* is that it is a realization of agreement between the possessor and this functional head. Agreement would be context sensitive– only being realized on lexical items or when the possessum is non-overt. It would only have a unique form for first-person singular, where it surfaces as *-n.* Though the facts could be plausibly captured in such a system, it seems undesirable to posit such an agreement system when English agreement is otherwise overt on verbs with third-person singular subjects and auxiliaries (not to mention number concord on demonstratives).

A similar proposal, which does rely on Agreement and will be ultimately adopted, is that *-s* is the realization of the Poss head. Figure 4.1 gives a structure of the possessed DP consistent with the facts discussed above. A possessor is first merged at Spec*n*P, per UTAH. A Poss head agrees with and assigns genitive case to the possessor, while an EPP feature on this head causes the possessor to move to Spec-PossP. (Recall that because *-s, -n* cannot be a determiner, the possessor cannot be in SpecDP.)

More support for the bimorphemic analysis of the possessive pronouns comes from nouns with morphological possessors that fulfill a variety of semantic roles. Consider the sets of sentences below:
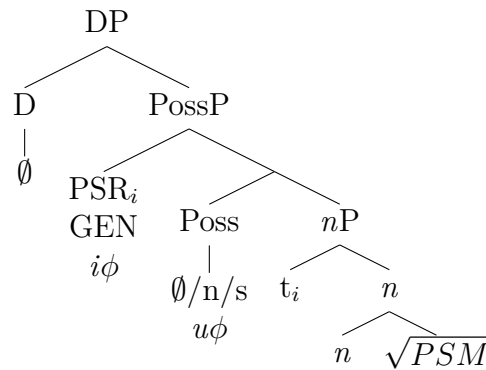
$$
\begin{array}{c}
\text{DP} \\
\diagup\diagdown \\
\text{D} \qquad \text{PossP}
\end{array}
$$

Figure 4.1: Proposed structure of English Possessive DP

(1) a. (My, Her, John's) portrait is hanging in the living room. *(=Possessor, Agent, Theme)*

   b. A portrait of (mine, hers, John's) is hanging in the living room. *(=Possessor, Agent only)*

The first sentence is ambiguous with respect to whether the morphological possessor is a semantic possessor, agent, or theme, while in the second sentence, only possessor or agent is an available reading. Because the *-s* on the lexical possessor and the *-n* on the 1SG pronoun in these examples have the same effect (eliminating the theme interpretation and forcing the agent/possessor one in 1b), they presumably have the same syntactic locus. Assuming lexical DPs do not overtly manifest case means that this morpheme is not a case marker, so both must be realizations of Poss.

What the possessor and agent have in common, to the exclusion of the complement, is that, in line with the UTAH as discussed in **??**, these arguments are both merged above the head noun. Following Kayne (1994)'s analysis of *of*-constructions like these, the head NP is moved leftward to SpecDP, followed by *of*-insertion. An argument originally merged as a complement to $n$P, rather than above it, could not be

moved above its antedecent. A thorough discussion of the syntax of *of-* constructions would take us too far afield, though see Kayne (1994); Den Dikken (1998); Alexiadou and Wilder (1998) for more discussion.

With the syntactic structure thus described, the morphology and the spell-out of the syntactic structure outlined above can be addressed. Table 4.2 shows a specification of vocabulary items for pronouns, following Harley and Ritter (2002), using the feature set [±Author, ±Participant, ±Plural][5], as well as specifications for the Poss head, which sensitive to the pronominal status of the possessor DP (assuming that pronouns are DPs (Abney, 1987) specified for [±pron feature] (Chomsky, 1981; McCloskey and Hendrick, 1990)) and the overtness of the possessa.

| | | -Pl | | +Pl |
|---|---|---|---|---|
| +Auth, -Part, [GEN] | | $\rightarrow$ my | $\rightarrow$ | our |
| -Auth, +Part, [GEN] | | $\rightarrow$ your | $\rightarrow$ | your |
| | +Masc | $\rightarrow$ his | | |
| -Auth, -Part, [GEN] | +Fem | $\rightarrow$ her | $\rightarrow$ | their |

Poss
$\rightarrow$ n / DP$_{[+Pron,+Auth,+Part,-PL]}$ __ $\emptyset$
$\rightarrow$ $\emptyset$ / DP$_{[+Pron]}$ __ X$_{overt}$
$\rightarrow$ s / Elsewhere

Table 4.2: Vocabulary Items for Genitive Pronouns and POSS

These tables assume that the forms of the possessor can be morphosyntactically decomposed both as a genitive pronoun and a context-dependent Poss head. This head shows up as *-n* between the first person singular pronoun *my* and a null possessum. Poss is null when it is spelled out between pronouns and overt possessa, and

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[5]This vocabulary specification predicts a form *his's* for null possessa with the third-person masculine possessor. Following Stemberger (1981)'s explanation for the interaction between plural *-s* and with the possessive *-s*, it is assumed there is a phonological explanation for the haplology.

it is *-s* elsewhere[6]. This last step gives the possessive pronouns giving *yours, hers, ours, theirs* with non-overt possessa. Lexical possessors receive the *-s* allomorph in all contexts. This analysis shows Poss to be affected by the $\phi$-features of the possessor, and superficially looks like agreement, though it seems more apt to just call it contextual allomorphy. It is important to note that these spell-out conditions are limited by what is accessible in the current phase, assuming that D is a phase head that triggers spell-out. In Figure (4.2), we see the proposed structure for the DP.
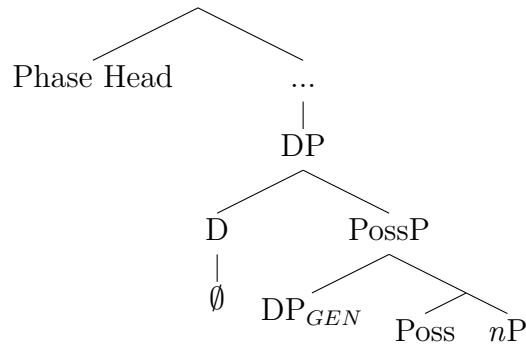


Figure 4.2: Syntatic structure of English Possessive DP

Assuming that D is a phase head, the merging of the next immediate phase head triggers spell out of everything to its right. This leads to the vocabulary items shown in Table (4.3), each of which represents a possibility described in (4.2).

A PP or CP in *That book of mine [$_{PP}$on the shelf] [$_{CP}$that you borrowed]* or the TP in*[$_{DP}$Mine][$_{TP}$ is on the shelf]* will not be present in the workspace while the vocabulary items in the DP are being inserted: only items in the complement of the possessum's D will be relevant for Vocabulary Insertion (Bošković, 2014).

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[6]This specification suggests that the inanimate pronoun *it* would appear without the possessive marker when the possessum is overt. This is not the case. One possibility is that this specification also must include a [+Animate] feature, but this would introduce the complexity that a plural, inanimate pronoun is identical to the animate: *their(s)*. Another possible solution is that *it*, despite being like the personal pronouns in many respects, is not actually specified as being [+Pron].

| DP$_{GEN}$ | Poss | $nP$ | | |
|---|---|---|---|---|
| my | -n | $\emptyset$ | $\rightarrow$ | *mine* |
| my | $\emptyset$ | puppy | $\rightarrow$ | *my puppy* |
| her | $\emptyset$ | puppy | $\rightarrow$ | *my puppy* |
| her | -s | $\emptyset$ | $\rightarrow$ | *hers* |
| The dog | -s | puppy | $\rightarrow$ | *The dog's puppy* |

Table 4.3: Possible linearized structures and vocabulary items

Because this project seeks to understand the relationship between verbal and nominal aspects of language acquisition, it is important to understand the aspects of the CP in English as well. Syntactically, English is similar to Estonian and Hungarian: T assigns nominative case to and agrees with the subject (Chomsky, 1980). Agreement is overt on main verbs in the present tense for all third-person singular subjects; other person-number combinations exhibit agreement only with auxiliaries, as shown in Table 4.4:

| Feature Combination | NOM Form | Verb AGR | BE-AGR | HAVE-AGR |
|---|---|---|---|---|
| 1SG | I | $\emptyset$ | am, was | have |
| 2SG | you | $\emptyset$ | are, were | have |
| 3SG | he she it NP | -s | is, was | has |
| 1PL | we | $\emptyset$ | are, were | have |
| 2PL | you | $\emptyset$ | are, were | have |
| 3PL | they NP-PL | $\emptyset$ | are, were | have |

Table 4.4: English NOM case and Agreeing Verbal Forms

Compared to the other target languages, English morphosyntax seems to provide fewer challenges to the learner. Verbal agreement is sparse, nominal agreement is non-existent. There are only three case-forms to acquire. The syntax of all three languages,

on the other hand, is rather similar, though English allows less flexibility with respect to movement than the others. Before examining the actual data, it might be expected that English learners would master the relevant morphology more quickly though develop the syntactic structures in a similar manner. That said, it might be that the extensive morphology available in Estonian and especially Hungarian help the child identify relevant structures more quickly and allow a quicker acquisition. The next section of the chapter continues to the analysis of *how* the three target children acquire the components of English, while the next chapter will provide a comparison of all three sets.

## 4.2  Acquisition of English Morphosyntax

An analysis of three English-speaking children represented in the CHILDES database (MacWhinney, 2000) was carried out to understand how the morphosyntactic phenomena described in the previous section are acquired. These three children are quite well-known from a number of other studies, such as Brown (1973); Vainikka (1993) and Radford (1998), among others. They were chosen because their age range and number of sessions were most similar to those examined in previous chapters. The particular CHILDES corpus, start and end ages, number of sessions, and average number of utterances and MLU for each child is summarized in Table 4.5. Adam has the largest number of sessions and they are the longest in length, though they range over a shorter time period. Ross has the widest range of data, starting just after his first birthday and continuing for two years; he also has the highest MLU average. Eve's average utterances, MLU, and age range is between that represented by the others.

| Corpus | Speaker | Start | End | Sessions | Avg Utterances | Avg. MLU |
|--------|---------|-------|-----|----------|----------------|----------|
| Brown | Adam | 2;03.04 | 2;11.28 | 19 | 557 | 2.89 |
| Brown | Eve | 1;06.01 | 2;03.15 | 11 | 335 | 3.02 |
| MacWhinney | Ross | 1;01.11 | 3;01.05 | 10 | 141 | 3.49 |

Table 4.5: CHILDES Corpora for English

To make the analysis of the English speakers as compatible as possible with the analysis of the learners of the other languages, the same types of analyses were carried out for all groups. This presents something of a challenge– English does not have the wide range of case-morphology or agreement exhibited by the other languages. Nonetheless, MLUs for learners during this early period were quite similar. Additionally, the syntactic analysis of the languages show that, despite surface morphological differences, the underlying syntax is quite similar within the DP, in accordance to Minimalist thinking.

For each of the three children, the following variables were tracked and analyzed. First, the rate of verbal agreement was calculated, which includes all third-person-agreeing verbs, as well as *be* and *have* forms, which show person and number-specific forms. The overall rate will be much lower than those languages with obligatory agreement across all verbs, however differences over time and between the children and their input targets will still give a sense of the growth.

Pronouns represent the same person and number distinctions, with the additional feature of gender being represented. Like the other languages, the growth of pronouns usage was tracked as it increased toward adult-like levels. The largest difference between English and the others is the lack of case-morphology on lexical nouns and the minimal amount of case even on pronouns. To get some sense of case on the DP, the use of *of* was also tracked. Assuming *of* is inserted post-syntactically, its presence

should be a good indicator of the functional DP structure (Chomsky, 1993). These results will be discussed for each child, though ultimately it did not appear to offer any interesting insights into the development of case on nominals.

A comparison of children's MLU at the point of acquiring verbal agreement morphemes to their MLU when they acquired the interpretable, pronominal counterparts was not carried out as it was for the other languages. This was due to the lack of person/number unique agreeing forms, though it was possible to compare the differences in possessor- and subject-related syntax and morphology. Overall syntactic growth of DPs and CPs were straightforwardly compatible as well, and these developmental milestones were tracked in the same manner as the other target languages.

Having described the general outline of the type of variables analyzed for the English-speakers, the discussion can now turn to the specifics of their learning paths.

### 4.2.1 Adam

Adam's production was tracked for 19 sessions between the ages of 2;03.04 and 2;11.28, providing a relatively brief window into a somewhat later stage of his development. Despite the size, there is significant increase in his average MLU, as shown in Figure 4.3.

As mentioned in the section introduction, verbal agreement on main verbs was tracked, as well as the percentage of verbs that were functional– either *be* forms or auxiliary *have*. For nouns, the pronoun-use rate as a percentage of total nominals was tracked, as was done for the other languages, and the number of nouns preceded by *of* were also tracked. Figure 4.4 shows the growth for all these categories.

This graphs shows a steady growth of functional elements in his production data, as evidenced by his use of pronouns and verbal agreement/auxiliary verbs. The steadiest and sharpest growth comes from his inclusion of pronouns, which approach 50% of
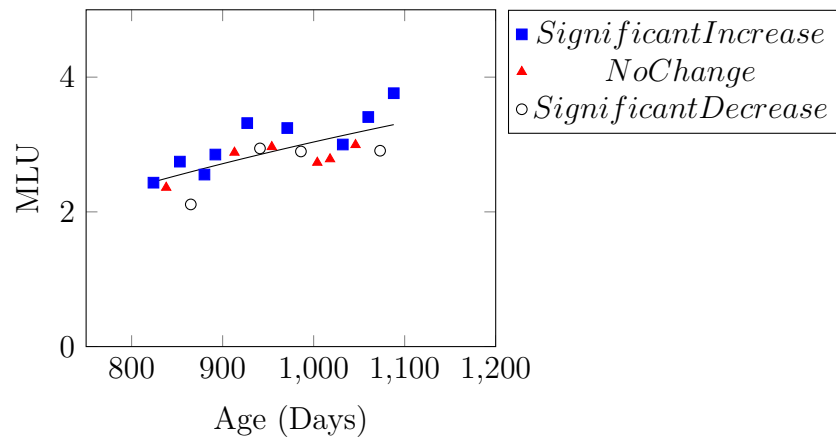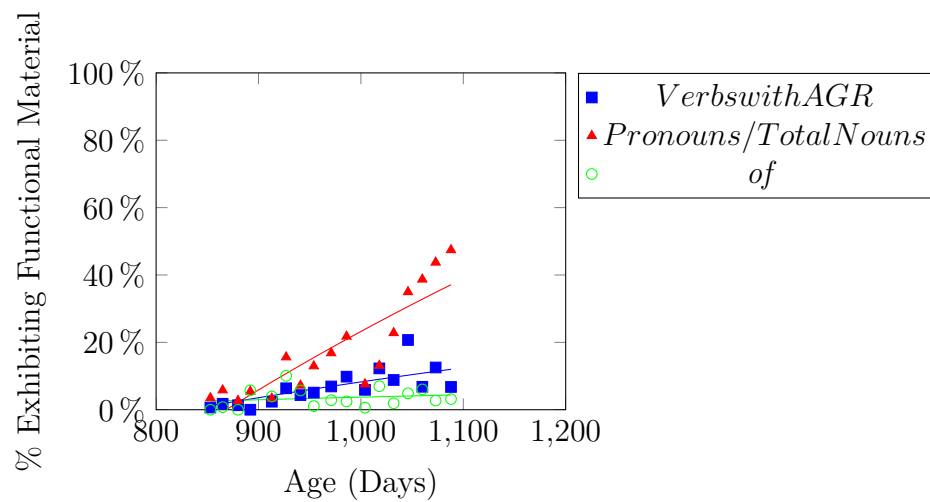
Figure 4.3: Adam MLU



Figure 4.4: Adam Functional Heads Over Time

all nominals by the end of the session. For comparison's sake, his input used pronominals 27% of the time, suggesting his use actually surpassed his input. The use of *of*, which is purely functional and indicates the presence of a DP complement, starts and remains low, suggesting that, contrary to the hypothesis, it is not as interesting an indicator of growing functional representation as hoped.

These past graphs indicate that over the period of time examined, functional material related to both verbs and nouns is steadily increasing. The questions specifically about the relationship between the development of morphology in these extended projections can now be addressed. The first place to look is the development of the syntax related to the DP and the CP.

Because Adam's data collection starts relatively late, he already has a complete selection of DP- and CP-related syntactic positions and morphology acquired. His first session, at 2;03.04, contains possessors, tense, determiners, and adult-like questions. Example utterances are depicted in 4.6:

| | Largest Nominal Projection | Largest Verbal Projection |
|---|---|---|
| **2;03.04** First Poss First T | my bunny rabbit | I got horn |
| **2;03.04** First D First C | the ball | who's that? |

Table 4.6: Adam's Structure Development

Though little can be seen from a developmental point of view, the results are still of interest. From this early age, all the elements required by the syntax are present in Adam's grammar. If there was a difference in how the syntax developed across domains, it would have had to have occurred before Adam's first session at 2;04.03. From what has been shown for the other study languages, it is expected that the syntax would develop along these lines.

Seeing that syntax of nominal and verbal constructions do seem to grow in parallel, it is worth asking whether this pattern is seen again when looking specifically at the number of subjects and possessors in the data. Figure 4.5 shows the percentages of all nouns that are possessors or subjects in the data, as well as the percentage of utterances which contain a subject.
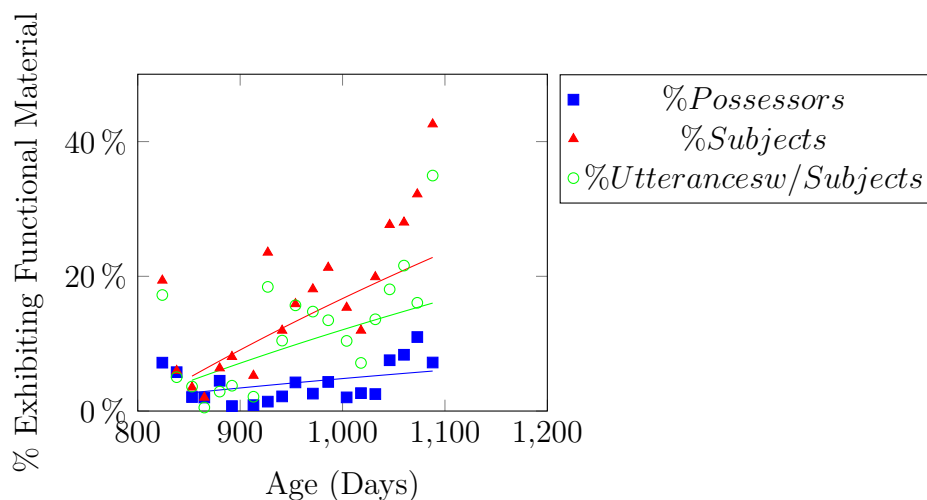
Figure 4.5: Adam Possessors & Subjects Over Time

The graph shows steady growth over time for subjects, based on either their percentage relative to other nouns (red) or the proportion of all utterances which contain a subject (green). There are two things to keep in mind when looking at this graph. Given that subjects are obligatory in sentences and possessors are optional, we would expect subject rates to always be high and possessor rates to always be low. Any

increases seen represent an increase in the capability of a child to represent enough syntactic structure to host both possessors and subjects. An important question is whether and how these rates increase.

For possessors, the graph shows an overall increase which ends at a rate of 7.2%– rather close to the adult possessor rate of 7.9%. The initial two sessions, where MLU is around 2.4, actually has relatively high possessor percentages, which then drops a couple sessions later, followed by a steady increase throughout the rest of the sessions. This is consistent with a growing ability to support a possessor position that eventually reaches a target-like ceiling. Inclusion of subjects also proceeds as expected, at higher rates and more quickly then possessors, consistent with their obligatory nature.

The next place to look is the morphology, whose growth is displayed in Table 4.7. This table shows the age at which a feature was first uttered in a lighter shade and the point at which there was sufficient evidence to consider a feature acquired in a darker shade. Evidence for acquisition was appearing in multiple, different contexts. For example, as shown in (2), the first person singular pronoun was considered to be fully acquired at the first session for the NOM and GEN forms, while ACC and GEN+Poss forms were not acquired until a few sessions later, when each form appeared in different contexts.

(2) a. *NOM:* I get horn; I wash hand (2;03.04)

b. *GEN:* my shadow; my screwdriver (2;03.04)

c. *GEN+Poss:* mine (2;03.04); that mine (2;04.30)

d. *ACC:* give me screwdriver (2;03.04); next to me (2;04.03)

| P,# | Feature | 2;03.04 | 2;03.18 | 2;04.03 | 2;04.15 | 2;04.30 | 2;05.12 | 2;06.03 | 2;06.17 | 2;07.01 | 2;07.14 | 2;08.01 | 2;08.16 | 2;09.04 | 2;09.18 | 2;10.02 | 2;10.16 | 2;10.30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1SG | NOM | | | | | | | | | | | | | | | | | |
| | GEN | | | | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | | | | |
| 2SG | NOM | | | | | | | | | | | | | | | | | |
| | GEN | | | | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | | | | |
| 3SG, MASC | NOM | | | | | | | | | | | | | | | | | |
| | GEN, GEN+POSS | | | | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | | | | |
| 3SG, FEM | NOM | | | | | | | | | | | | | | | | | |
| | GEN | | | | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | | | | |
| 3SG (it) Lexical 3SG | NOM | | | | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | | | | |
| 1PL | NOM | | | | | | | | | | | | | | | | | |
| | GEN | | | | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | | | | |
| 3PL | NOM | | | | | | | | | | | | | | | | | |
| | GEN | | | | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | | | | |

Table 4.7: Adam's First Use and Acquisition of Feature Combinations

Defining when GEN+Poss was fully acquired is a challenge, as they occur in the same context. A conservative view was taken here, as it occurs several times as a standalone utterance in the first few sessions, though not until two months into the recordings does it appear in a truly different utterance "that mine". It could alternatively have been considered to have been acquired by the very first session, where Adam uses *my* with a wide variety of possessa, uses *mine* as a standalone utterance multiple times, and finally utters *my XXX mine*, where "XXX" is unintelligible. This utterance shows that Adam correctly produces *mine* when it is not followed by an NP, though it's similar enough to his previous utterances of just "mine" that it's unclear whether it should count as acquired. That said, the environment required for producing *mine* (being $DP_{GEN,PRO}$ __ $\emptyset$) is rare enough, occurring with only about 6% of adult possessive pronouns, that it's impressive the child does get it right this early. There are no examples of Adam pronouncing Poss inappropriately.

This data can be discussed from a variety of perspectives. With respect to $\phi$-features, the order seen is consistent with Harley and Ritter's predictions. First person singular forms appear before all others and are all present at the initial sessions, suggesting a [+Author] feature was the first to be added to pronominal feature bundles. Gendered pronouns were not fully acquired until after the others, though third-person agreement and possessive marking were acquired, again consistent with a view that puts these features rather far from the hierarchical root.

Plural forms come after singular forms in all cases, consistent with an acquisition process that can handle simpler feature bundles (those not specified +PL) before more complicated ones. Third-person plural forms were among the rarest: well after first person plural and third-person singular were acquired, these forms were nearly unaccounted for. This is somewhat difficult to account for given a morphological complexity account, as these forms do not include animacy, gender, nor

Author/Participant features. Second-person plural was not analyzed for Adam, as is not possible to distinguish it from the singular, and given that Adam primarily interacted with one person during his sessions, it was assumed that all uses of *you* have a singular referent.

Agreement was defined by either the third-person *-s* which appeared very early, or through the use of *be* or *have* for the other person/number combinations. Notably, the third person forms came very early, and the next form to appear was *am*, which, unlike the other, later-appearing auxiliary forms, is not syncretic, representing only the first-person singular feature combination.

Differences in case acquisition can also be examined via this table. Looking at each person/number/gender combination on its own, no pattern holds entirely. Nominative appears at the same time as or before genitive in every case except for 3SG, feminine. Accusative occurs latest for the singular pronouns, but first for the plural pronoun. These results are surprising given that the syntactic positions associated with nominative and genitive case appear at the same time.

Looking specifically at the genitive case compared to the genitive combined with the Poss heads *-s, -n*, we see that the combined form is quite rare. This is not entirely surprising, given the analysis in the previous section which suggested that these are not simply allomorphs but two distinct heads in the syntax. The combined form actually does not even appear except 1SG, 2SG, and lexical possessors, for which they are always required: *hers*, *ours*, and *theirs* are all absent from the data.

(3) a. 2SG GEN: your hat (2;07.14)

   b. 2SG GEN+Poss: Put it. Yours. (2;09.04)

The GEN+POSS forms for lexical nouns appear rather early, being acquired before the third person pronouns. One place they do not appear, however, is with proper

names: Adam consistently produces utterances like the ones below, well after he is using the possessive -*s* for lexical nouns:

(4) a. Adam tow-truck, *2;07.14*

b. Robin home, *2;09.18*

c. That's Perro honey, *2;11.28*

This is months after he first makes use of the -*s* for other lexical nouns; Adam seems to have learned the rule for when to omit the Poss head associated with pronouns and extended it to proper names. Though this is not the rule in the target language, Adam is correct insofar as proper names do behave like pronouns with respect to other properties: they do not allow adjectival modification nor prepositions, they are referential, definite, and (in English) may not take determiners (Longobardi, 1994). There is little here that suggests a relationship between the two case forms. It is, however, another example where underlying syntactic similarity is at odds with the morphological results.

Before moving on to the analysis of Eve's data, a brief summary of what Adam has showed us about the DP/CP parallels is in order. Adam's grammar develops significantly over the period he is tracked, with every functional feature or projection that was tracked steadily increasing. Both his DPs and his CPs exhibit the same, high level of complexity from the first session, but the morphological reflexes of the relevant features develop differently. Nominative pronouns appear before genitive in all cases. The syntactic/semantic notions of possessor and subject do not follow each other, either: while both appear at the earliest session, subjects rise greatly over the period, and possessor growth, while slower and peaking lower, does gradually approach adult-like levels. Taken together, this suggests that the DP-CP parallels may manifest in

the acquisition of syntactic phenomena but not in the morphology. The patterns seen in the following two children yield further evidence of this pattern.

### 4.2.2 EVE

Eve was recorded for 20 sessions, starting at 1;06.01 and continuing until 2;03.15, with an average of 335 utterances per session and an average MLU of 3.02. Figure 4.6 shows her MLU across the sessions, showing a steady increase across the duration of the data-intake.
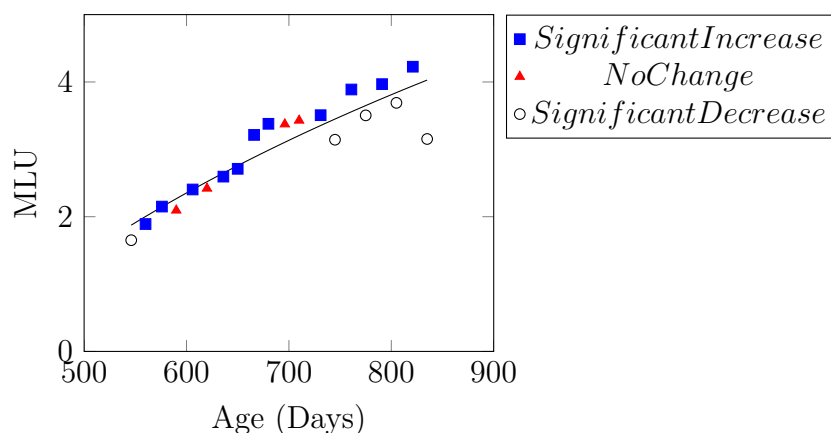


Figure 4.6: Eve MLU

As mentioned previously, to get a sense of the development of Eve's grammar, auxiliary and agreeing verbs were tracked, as well as the ratio of pronouns used, and the number of nouns preceded by *of.* The first two variables track the availability of T as a syntactic position, while the second two are related to functional material in the DP. Figure 4.7 shows the growth rate of all three of these variables. The most striking increase is for pronouns, which are initially very low but approach 50% by the end of the session. Evidence for T and agreement also starts low and stays low for quite awhile, however at approximately 2 years it begins a steady increase. "*Of*" starts and

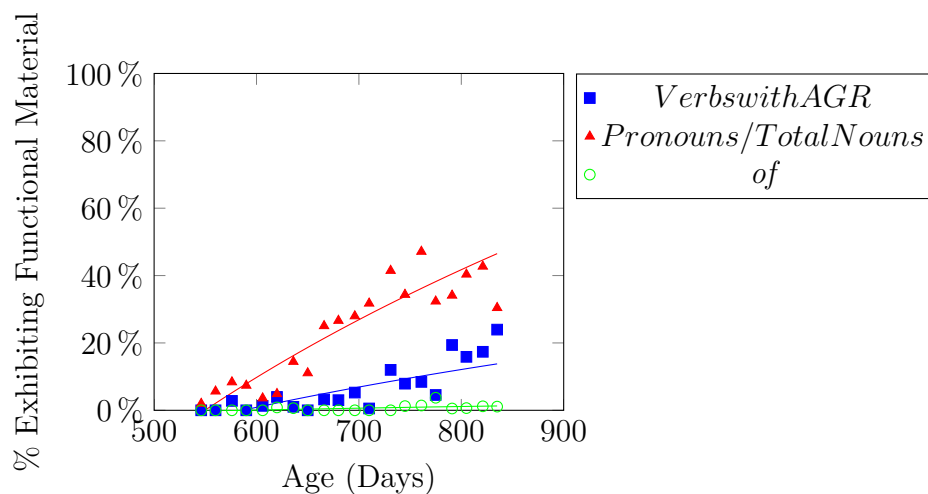stays low, again suggesting it is not actually a meaningful measure of grammatical development.



Figure 4.7: Eve Functional Heads Over Time

Like Adam, Eve showed evidence for all the functional categories and morphology from the first session. Unlike Adam, the data for Eve starts rather early, at just 18 months, making the wide variety of structures less expected. Table 4.8 shows the most complex structures in her production data from this first session. Though there is evidence for T from the past tense form, agreeing forms are not present in the data at the earliest session. Nonetheless, even if T only represents tense itself and assigns nominative case, it is still present syntactically.

The first evidence for agreement comes a month after the first session, at 1;07.01, where third-person singular *is* appears (shown in 5); it is not until 1;10;01 that agreement is seen on a main verb and that an agreeing form appears for a non-third person form (shown in 6):

(5) The dog is stuck, *1;07.01*

|  | Largest Nominal Projection | Largest Verbal Projection |
|---|---|---|
| **1;06.01**<br>First Poss<br>First T | [tree: PossP — DPᵢ (my, GEN), Poss — ∅, nP — tᵢ, n — n, √telephone]<br>my telephone | [tree: TP — DPᵢ (I, NOM), T — Tⱼ (+PAST, do), vP — tᵢ, vP — vⱼ, VP — V (tⱼ, √do), DP (it)]<br>I did it |
| **1;06.01**<br>First D<br>First C | [tree: DP — d (the), nP — n, √puzzle]<br>the puzzle | [tree: CP — DPⱼ (what), C — C (-∅ₖ), TP — DPᵢ (that), T — tₖ, SC — tᵢ tⱼ]<br>what that? |

Table 4.8: Eve's Structure Development

(6) When Cromer comes.

   Where are you?, *1;10.01*

These examples show that while the syntactic position is available from the earliest age, the morphology takes a little bit to catch up– just as was seen for Adam. Another look at the morphology is provided in Table 4.9, which charts the first use and acquisition of the various cases and agreement. Though all the target syntactic positions were evidenced from the start, the morphology shows a much wider spread, allowing a better sense of Eve's acquisition path.

Regarding person-number combinations and the acquisition of the range of morphology, another preference for 1SG forms is seen, followed by the variety of third person forms for both genders. This is followed a concentration of 2SG forms appearing at 1;11.01. Third person plural forms are seen last. Agreement is earliest for third person singular, appearing first on the copula as *is*, followed by *has* and finally main

| P,# | Feature | 1;06.01 | 1;06.15 | 1;07.01 | 1;07.15 | 1;08.01 | 1;08.15 | 1;09.01 | 1;09.15 | 1;10.01 | 1;10.15 | 1;11.01 | 1;11.15 | 2;00.01 | 2;00.15 | 2;01.01 | 2;01.15 | 2;02.01 | 2;02.15 | 2;03.01 | 2;03.15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1SG** | NOM | | | | | | | | | | | | | | | | | | | | |
| | GEN | | | | | | | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | | | | | | | |
| **2SG** | NOM | | | | | | | | | | | | | | | | | | | | |
| | GEN | | | | | | | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | | | | | | | |
| **3SG, MASC** | NOM | | | | | | | | | | | | | | | | | | | | |
| | GEN, GEN+POSS | | | | | | | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | | | | | | | |
| **3SG, FEM** | NOM | | | | | | | | | | | | | | | | | | | | |
| | GEN | | | | | | | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | | | | | | | |
| **3SG, *it*** | GEN+POSS | | | | | | | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | | | | | | | |
| **Lexical 3SG** | GEN+POSS | | | | | | | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | | | | | | | |
| **1PL** | NOM | | | | | | | | | | | | | | | | | | | | |
| | GEN | | | | | | | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | | | | | | | |
| **3PL** | NOM | | | | | | | | | | | | | | | | | | | | |
| | GEN | | | | | | | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | | | | | | | |

Table 4.9: Eve's First Use and Acquisition of Feature Combinations

verb agreement at 1;10.15. Auxiliaries for the other forms appear later than the 3SG-agreeing auxiliaries, but only at 1;10.01– just one session prior to 3SG main verb agreement.

The relationship between the appearance of nominative case and genitive case is as with Adam– NOM consistently appears either before or at the same time as GEN. The one exception is for the 3SG feminine pronouns, where genitive enjoys a slight advantage. It is also unclear whether these differences in timing– often just a matter of weeks between the appearance of nominative and genitive– are significant and how much they are related to frequency in the input, a question which will be addressed in the section comparing the three English-learners.

The final point to be made about this data is the relationship between form expressing only the genitive and forms with the genitive plus the possessive suffix. For the items where these forms are different, the affix-less form appears earlier or at the same time as the form with the affix. There are no cases where the genitive is learned first as the longer form, showing that Eve is successfully finding an adult-like representation.

The next step is to examine how syntactic and semantic aspects of the DP/CP parallel are reflected in acquisition by looking at rates of subjects and possessors. Syntactically, the required position for subjects and possesors was available at the very earliest session, yet the rate of usage for subjects and possessors was very different across data sessions, as seen in Figure 4.8.

As is often the case, possessors started and stayed much lower than subjects, achieving their highest rate of 16% right in the middle of the recording session, with an average of around 7&. Notably, the first few sessions all had very low possessor percentages, which increased dramatically around the sixth session and then stayed
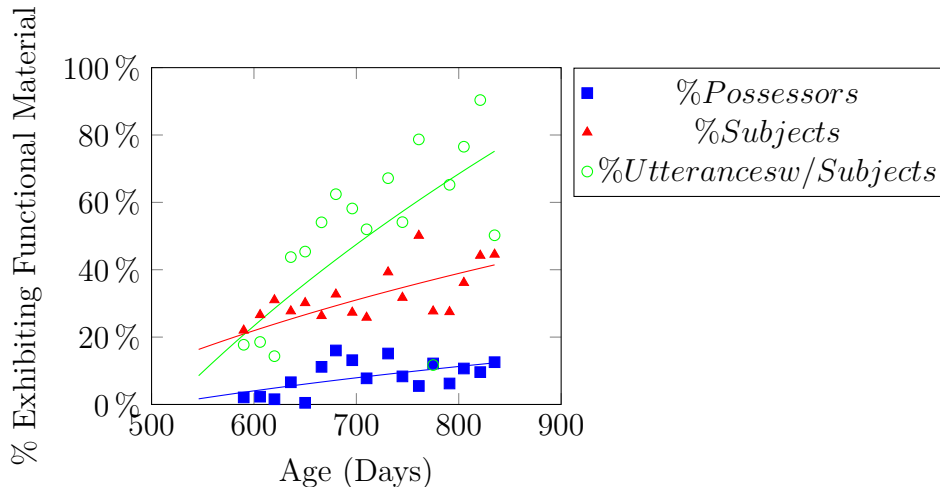
Figure 4.8: Eve Possessors & Subjects Over Time

at this level. The portion of possessors in the input was around 9%, indicating that the child actually did achieve a target-like possessor rate during this period.

Subject use, based on percent of nouns that were subjects and percent of utterances which contained subjects, grew rapidly, with 80% of all utterances containing subjects. Though there will always be some portion of utterances with no subjects, due to fragments, imperatives, and other structures smaller than TP, Eve's use of subjects indicates a grammar that contains substantial functional structure most of the time. That possessors do not follow this dramatic growth rate reflects another difference between the acquisition of the DP and CP and a difference in the role and requirements related to possessors and subjects in language generally, though the jump and then leveling out of possessor levels indicates that once the structure was firmly acquired, there were no problems producing possessors like an adult.

The pattern seen with Eve matches what was seen with Adam, across nearly every variable. MLU steadily increases as do the prevalence of pronouns, and agreement.

Syntactically, all the structure for both subjects and possessors are available at the earliest stage, and indeed subjects and possessors appear at the onset, though nominative case marking precedes genitive for every options. Subject inclusion increases steadily, though possessors do not. This again points to a result where the parallels are reflected in the syntax, not the morphology nor semantics. Whether the same pattern holds for Ross will be addressed in the next section.

### 4.2.3 Ross

The last English learner to examine is Ross, whose 10 recordings cover a span of approximately 2 years, from 1;01.11 until 3;01.05. Each session produced an average of 141 utterances, with an average MLU of 3.5.

MLU did increase over the entire span, however the irregular timing between the sessions clouds the picture somewhat; 10 months passed between the third and fourth sessions, during which time MLU increased by more than 50%. Though there are not the regular intervals between sessions like Eve nor the steady growth seen in either of the previous two children, there is still a significant increase across the span, as shown in Figure 4.9.
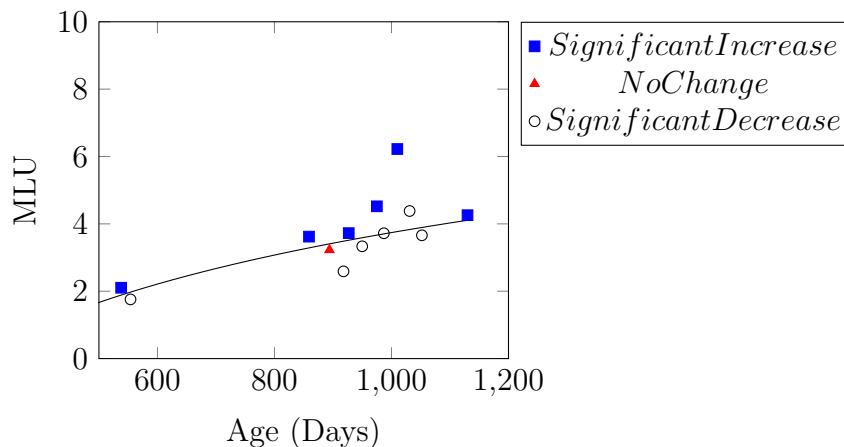


Figure 4.9: Ross MLU

Figure 4.10 shows the percentage of agreeing verb forms (blue), percentage of pronouns (red), and percentage of nouns preceded by *of* (green). Agreeing verb forms increase the most, though they start relatively high, with the initial sessions clustering around 10-15%. By later sessions there is a big increase, however. Pronouns represent around 40% of nominals at the start, rising only to around 50% by the end of the session. Finally, *of* appears rarely throughout his data. As the third child that shows very little use of this indicator of Case, it seems that this is not in fact an interesting indicator of grammatical development.
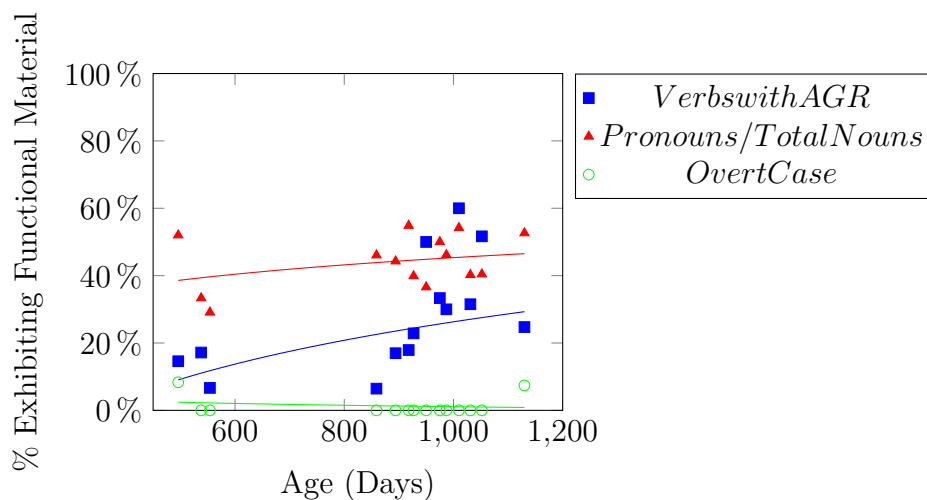


Figure 4.10: Ross Functional Heads Over Time

One issue with the lack of a growth trajectory is that it is possible that the important growth actually happened before the sessions began. This seems unlikely at first, given the early date of the recordings, but Ross was an early learner; his early utterances were in fact quite complex, as shown in Table 4.10. His longest overall utterance (*Can I have some of that?*) contains a modal in C, which represents not just functional structure but movement, and the object DP itself contains a recursive DP within it *[DP some [DP of that]]*. That also qualifies as his largest DP in his first session.

|  | Largest Nominal Projection | Largest Verbal Projection |
|---|---|---|
| **1;04.01** First N,D First C, T, V | some of that | Can I have some of that? |
| **1;05.23** First Poss | your car | |
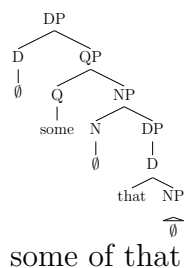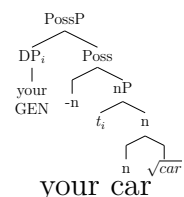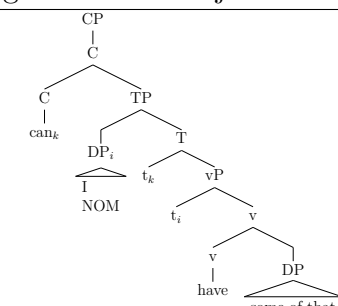
Table 4.10: Ross's Structure Development

The earliest sessions include possessors, determiners, tense, and complementizers. Though there is not evidence of how Ross developed to this point, that all this functional material appears at the same time is important. The inclusion of *of* in the CP also clearly indicates that Ross's grammar includes case in its representations.

Table 4.10 shows structures that demonstrate Ross's syntactic and morphological capabilities. As was seen with the other children, Ross exhibits the entire range of functional projections at the very start. The only possible exception is the appearance of the possessor. Though at the first session (1;04.01), Ross utters *mine*, no other possessive forms appear, suggesting that this is unlikely a fully-formed, complex DP. At the next session (1;05.23), however, Ross produces *Is that your car?* If the early example is not a true possessive construction but an unanalyzed chunk, there is much better evidence that the structure is a part of Ross's grammar a month later.

Though the complex syntax combined with the rather stable use of other functional elements suggests that there was not significant growth in his grammar during the period of recordings, tracking pronominal morphology does show development over time, shown in Table 4.11.

Unlike Adam and Eve, there are not large differences between the different person-number combinations, though case forms and agreement for plurals do come much later than their singular counterparts. Nominative appears before genitive for all pronouns, while accusative forms appear earlier for some and later for others. A notable exception is for the feminine pronouns, which appears first for accusative, months later as a genitive, and not in the nominative form until nearing the end of the sessions.

The last item to look at is the use of subjects and possessors in Ross's speech. Like other items discussed, there is relatively little change from the start to the finish for either of these. Possessors rise a slight amount from the very first sessions to the later sessions. The portion of nouns that are subjects does not increase from the earliest to the latest, though the amount of utterances with subjects does increase. By the end, individual utterances are more likely to have subjects than not, suggesting the functional structure is becoming obligatory.

All together, there is nothing about Ross's data that distinguishes him from the other children. Unfortunately, there is relatively little change in any of the variables, so determining what Ross can tell us about the DP-CP parallels in acquisition is difficult. The little change over time that he does display is limited to the morphology, though these differences mostly conform to the NOM before GEN pattern seen with most other children. The next section will directly compare all children and discuss what the overall results from the English learners can show us.

| P,# | Feature | 1;04.11 | 1;05.23 | 1;06.09 | 2;04.09 | 2;05.14 | 2;06.08 | 2;06.17 | 2;07.10 | 2;08.05 | 2;08.17 | 2;09.10 | 2;10.01 | 2;10.22 | 3;01.05 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1SG | NOM | | | | | | | | | | | | | | |
| | GEN | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | |
| 2SG | NOM | | | | | | | | | | | | | | |
| | GEN | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | |
| 3SG, MASC | NOM | | | | | | | | | | | | | | |
| | GEN, GEN+POSS | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | |
| 3SG, FEM | NOM | | | | | | | | | | | | | | |
| | GEN | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | |
| 3SG, *it* | GEN+POSS | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | |
| Lexical 3SG | GEN+POSS | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | |
| 1PL | NOM | | | | | | | | | | | | | | |
| | GEN | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | |
| 3PL | NOM | | | | | | | | | | | | | | |
| | GEN | | | | | | | | | | | | | | |
| | GEN+POSS | | | | | | | | | | | | | | |
| | ACC | | | | | | | | | | | | | | |
| | AGR | | | | | | | | | | | | | | |

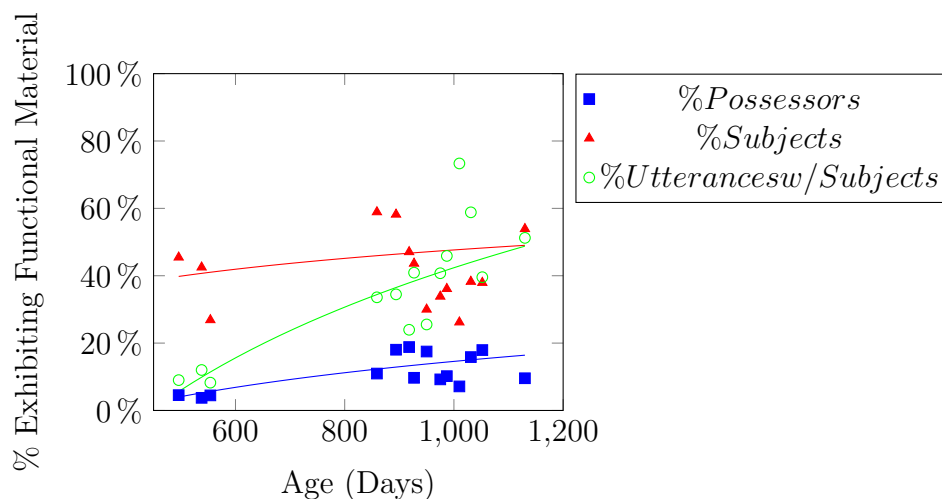Table 4.11: Ross's First Use and Acquisition of Feature Combinations

Figure 4.11: Ross Possessors & Subjects Over Time

## 4.3 Comparison and Summary

The last step in the discussion of the English acquisition of DP and CP is to compare the results from the three children so far. First, the basic facts of each individual's development will be discussed to ensure their acquisition was similar. Next, the specific details of their acquisition will be analyzed to see what overall trends can be found.

The first variable to analyze is MLU growth. Though the actual ages of the children during their recording was different, they actually had quite similar MLU trajectories, as shown in Figure 4.12

This result is somewhat surprising, especially since Eve and Adam's ages do not overlap at all. Nonetheless, they all have MLUs of just over two at their initial sessions and move steadily– up to around four for Eve and Ross and to just above three for
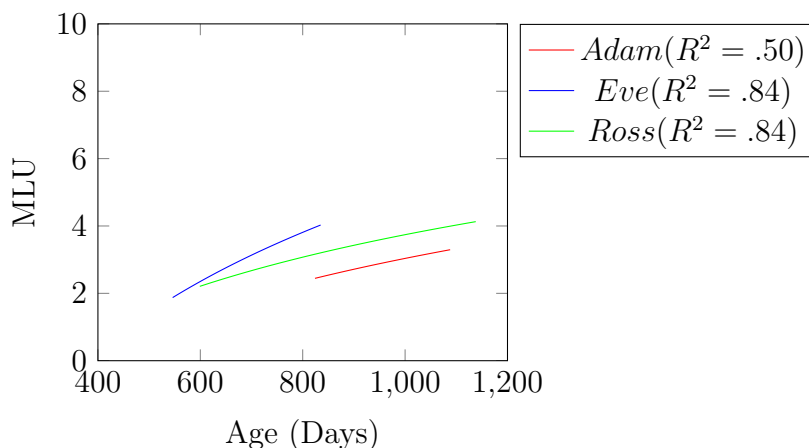
Figure 4.12: Combined MLU

Adam. This provides some confidence that the complexity of their grammars and linguistic capability are comparable on a broad level.

| | N/V | | Poss/T | | C/D | |
| | Age | MLU | Age | MLU | Age | MLU |
|---|---|---|---|---|---|---|
| Adam | 2;03.04 | 2.36 | 2;06.03 | 2.88 | 2;03.18 (D) | 2.36 |
| | | | | | 2;05.12 (C) | 2.85 |
| Eve | 1;06.01 | 1.65 | 1;07.01 | 2.15 | 1;06.15 | 1.9 |
| Ross | 1;04.11 | 1.71 | 2;04.09 | 3.6 | 1;04.11 | 1.7 |

Table 4.12: Summary of Acquisition Points for Parallel Structural Positions: English

A closer look at the details of their production reveals that the similarities don't end at the length of their utterances. Table 4.13 shows the percentage of their verbs which either show agreement or are auxiliaries– each of which is evidence of a T projection in their syntax. As MLU increases, evidence for T also increases for all the children, though Ross shows the most movement and the highest portion of his verbs contain morphology that requires T. This data suggests that not only the general

complexity of their utterances is the same, as shown in the last graph, but that relevant functional material is also similar.
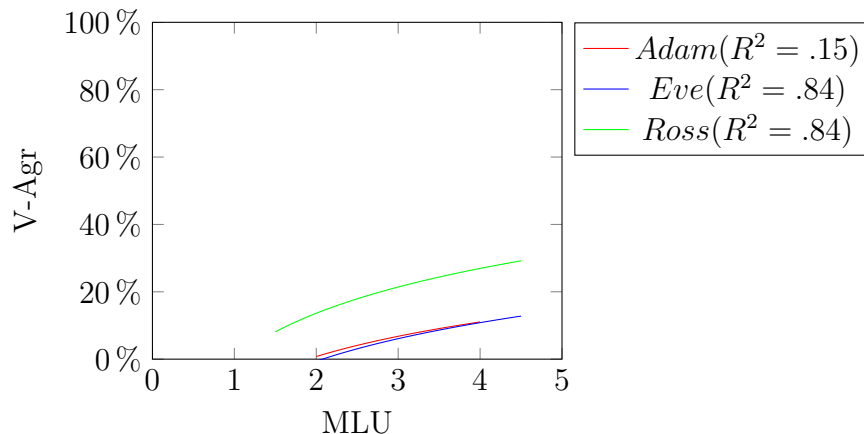


Figure 4.13: Combined V-Agr

Table 4.14 attempts to understand the growth of functional elements in the DP by graphing the growth of pronouns as a portion of all nouns. Again, Adam and Eve's growth, represented by the red and blue lines, respectively, are nearly identical. Ross, on the other hand, has a consistently high percentage of pronoun usage. As MLU approaches four, however, all three children appear to hit the same ratio. Though both of these are imperfect measures of the functional representations of the children's grammars, they tell us that both overall complexity is increasing as well as the usage of functional elements in the extended verbal and nominal projections.

So far it has been shown that the children's grammars are all growing at a similar rate and that the CP and DP are growing in complexity as well. The next step is to specifically address the research questions and look at the syntactic, morphological, and semantic aspects of CPs and DPs to see how they compare and what can be learned. In the previous sections, the most complex DPs and CPs for each child demonstrated that the potential for syntactic complexity was quite high from the
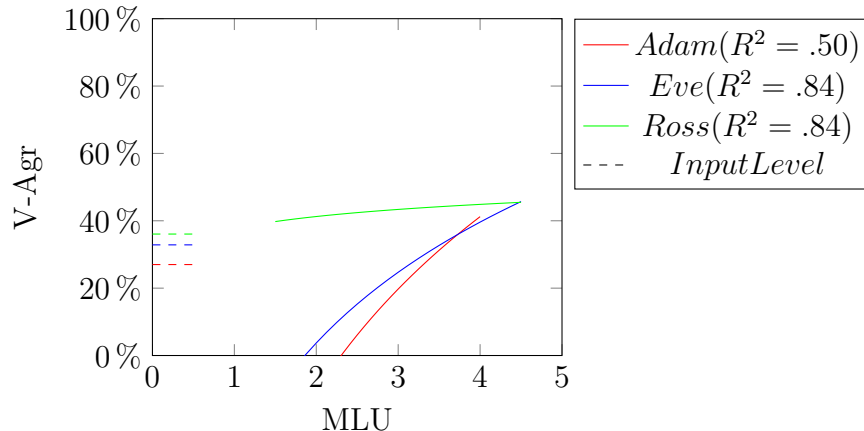
Figure 4.14: Combined Pronoun Pct

start and that each of the theoretically parallel structures were present at the same time. Table 4.13 reviews these largest structures for each child.
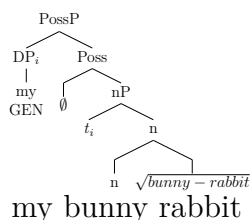
These trees show not just a high degree of complexity, but a high degree of similarity between the children. Also notable is that both past-tense forms (for Adam and Eve) are irregular forms– a single vocabulary item is expressing both the root and the tense. Ross, on the other hand, makes use of a modal in this utterance, which similarly avoids using a bimorphemic word.

This fact might be related to the over-regularization of past tense forms seen in children (Marcus et al., 1992). At an early stage, irregular forms are produced correctly, later treated as regular -*ed* verbs, until finally being pronounced in a target-like way. This phenomenon suggests that once the -*ed* rule is learned, it is over-applied. It related to the data in that the children seem to avoid situations where the rule *might* apply, instead choosing monomorphemic words. Alternatively, these results could simply be because irregular verbs, though in a minority by *type* are actually the
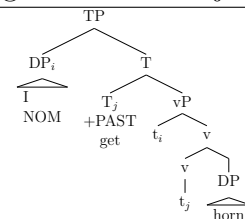
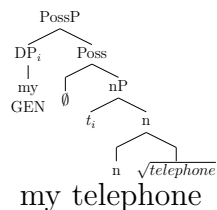| | Largest Nominal Projection | Largest Verbal Projection |
|---|---|---|
| **Adam** 2;03.04 MLU: 2.43 | PossP [ DP$_i$ [ my GEN ] Poss [ ∅ nP [ $t_i$ n [ n √$bunny-rabbit$ ] ] ] ] — my bunny rabbit | TP [ DP$_i$ [ I NOM ] T [ T$_j$ +PAST get vP [ $t_i$ v [ v $t_j$ DP horn ] ] ] ] — I got horn |
| **Eve** 1;06.01 MLU: 1.65 | PossP [ DP$_i$ [ my GEN ] Poss [ ∅ nP [ $t_i$ n [ n √$telephone$ ] ] ] ] — my telephone | TP [ DP$_i$ [ I NOM ] T [ T$_j$ +PAST do vP [ $t_i$ v [ v $t_j$ DP it ] ] ] ] — I did it |
| **Ross** 1;04.01 MLU: 1.71 | DP [ D ∅ QP [ Q some NP [ N ∅ DP [ D that NP ∅ ] ] ] ] — some of that. | CP [ C [ C can$_k$ TP [ DP$_i$ [ I NOM ] T [ $t_k$ vP [ $t_i$ vP [ $v_k$ VP [ V$_k$ [ V √$have$ ] DP some of that ] ] ] ] ] ] ] — Can I have some of that? |
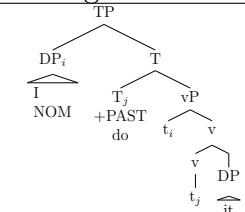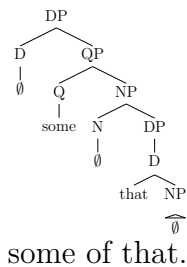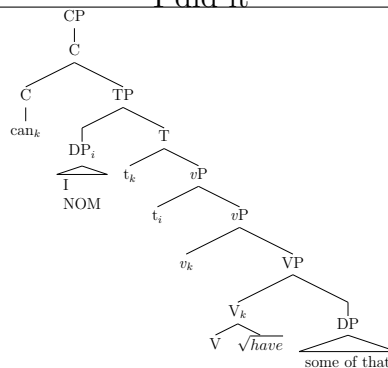
Table 4.13: English Structure Development- Largest Trees

majority when considered by *token* (Francis and Kucera, 1967), giving the children much more opportunity to learn them.

Given that the syntax is equally complex for each child and for each domain, the assumption is that nominative and genitive case-marking should also have been similarly acquired. Table 4.15 shows the MLU for each child when they first produced and then acquired different case forms. Adam and Ross' production suggests simultaneous acquisition of all forms, which confirms this assumption. Eve, on the other hand, shows a much wider spread: the first utterances including the different case forms are close together, but actual acquisition evidence in the form of a more fully formed paradigm proceeds in a NOM, GEN, ACC order, with great differences between them.
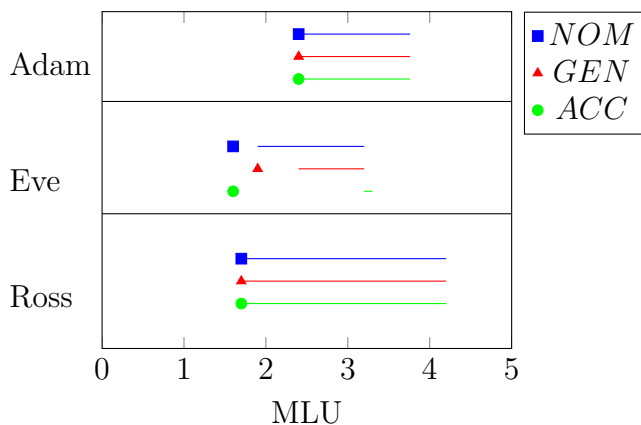


Figure 4.15: English Pronoun Case Acquisition Timeline
Symbols indicate first appearance of pronoun in specified case; lines show period during which form was acquired

Though initial analysis looked merely at when a form was first acquired, subsequent work was done to determine to what extent the children were acquiring the pronouns correctly, as was found by (Radford, 1996:503) and discussed in the first chapter. Though there were errors made by all three children, there were in fact very rare. No child ever incorrectly uses the nominative form of any pronoun. On one

occasion, Adam incorrectly used a genitive where a nominative was called for, as does Ross. Eve makes more errors in total, with six attested throughout her corpora, but these amount to less than a half a percentage of total pronouns. Eve's errors are different, too– she uses accusative forms where nominative is called for 5 times and once uses genitive when nominative is called for. Despite these occasional errors, it does not seem that any are frequent enough to warrant a reanalysis of the basic acquisition patterns seen.

The data summarized in the previous table is shown in greater details, looking at each person number combination on its own. Table 4.16 shows the difference between MLUs for each child at the point where NOM and GEN was acquired for each child for each pronoun. If each case is acquired at the same time, the difference should be zero– the further from zero it is, the larger the difference there is between the two. In this graph, positive numbers indicate a preference for DP-internal case-marking.
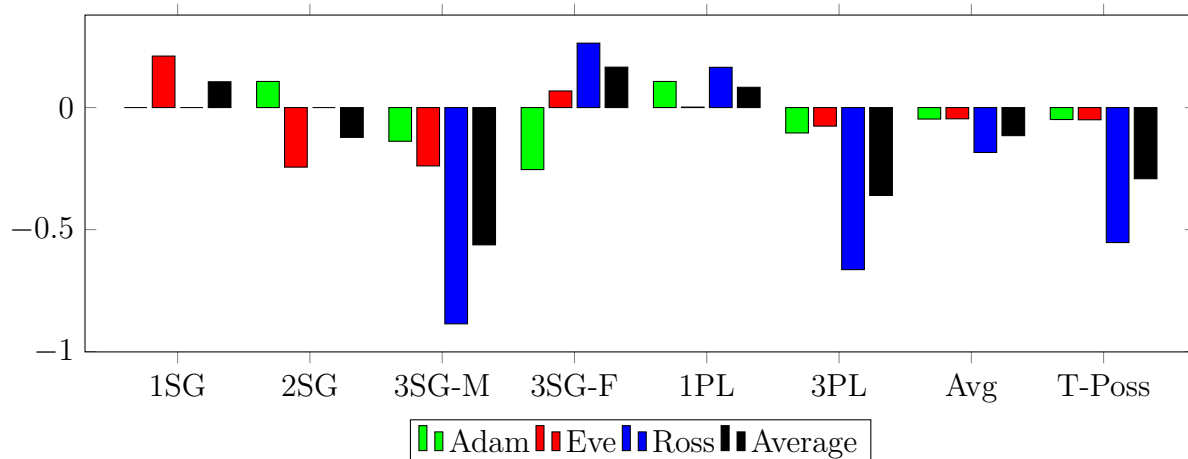


Figure 4.16: Nominal / Verbal Feature Preference
Positive numbers indicate GEN/Poss preference;
negative numbers indicate NOM/T preference

From table 4.16, we see that MLU is on average 11% smaller when NOM is acquired compared to GEN. Looking more closely at individual pronouns, we see that this overall average appears to be driven by significant preferences for 3SG-Masculine

and 3PL pronouns in Ross's data– other pronouns and learners are actually much more evenly divided. Despite these large preferences for genitive for Ross, he still does acquire genitive forms earlier for some of the pronouns. The eventual averages for the three children is 4.7%, 4.6% and 18% for Adam, Eve, and Ross, respectively. To compare, MLU changes on average 2.6% ±12%, and 2.8% ±28% across all their sessions. Ross's seemingly large preference for nominative is smaller than the standard deviation for MLU. Looking at these trends along with the data for MLU averages suggests that the case morphemes are acquired at the same time.

Another way to understand development of nominal and verbal functional material is to look at morphological evidence for the intermediate functional heads of T and Poss. Though there is not always a requirement that there be overt material in this head, looking at the first appearance of these elements can at least show when they were available to the children. The last column from Figure 4.16 depicts the MLU difference between when Poss was first evidenced and when T was first evidenced. It shows a very small preference for T over Poss, with Ross's results the most lopsided of the three, though again within a standard deviation of MLU average.

The next place to compare the children is their use of subjects. Figure 4.17 shows the growth rate of subjects, analyzed two different ways. The solid line indicates the portion of all nouns that are subjects, and the portion of all utterances which contain subjects is indicated by the dashed lines.

In all cases and in both measures, there is an increase in the amount of subjects included in the child's speech. The higher $R^2$ values for the per-utterance analysis suggests that these growth trajectories are more representative of the child's actual growth. For Eve, who has the highest rate of subject-inclusion, her utterances are complex enough to include a subject nearly 80% of the time by the end of her sessions. There is clearly representational growth occurring for the verbal extended projection.
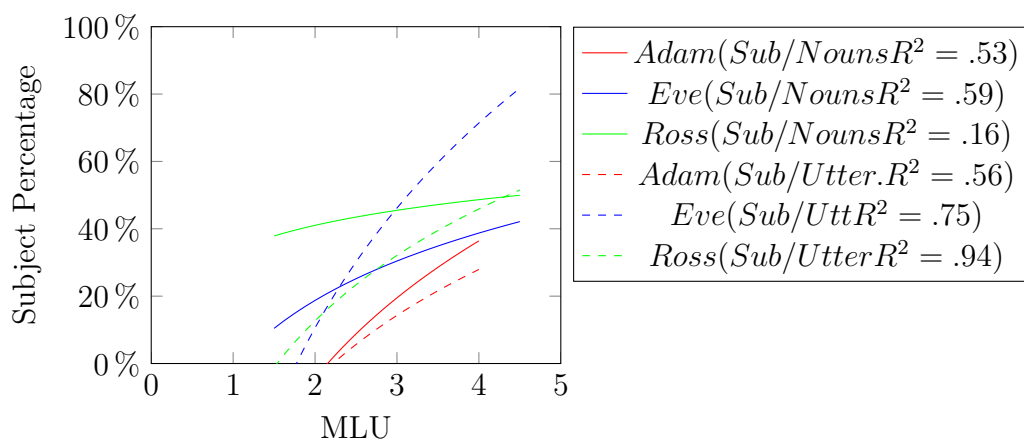
Figure 4.17: English Learners Subject Development
Solid lines indicate % of nouns that are subjects;
dashed lines indicate % of utterances with subject

To see within the nominal extended projection, growth of possessors can be analyzed, as seen in Figure 4.18:

The rates for possessor use increase as well, but not as quickly as subjects and not to as high a level. Though this at first seems evidence against the parallel structure being relevant for acquisition, it is actually suggestive of the opposite. Taking the genitive and nominative case acquisition patterns seen in Figure 4.16 into account, we see that genitive is acquired much earlier than would be expected given the differences in subjects and possessors. Since subjects are so much more common, it would be expected that nominative case would be acquired much earlier. Instead, we see both case-forms acquired in a similar time frame, despite the relative rarity of possessors in the child's production. Possessors are at most 15% of nouns, and much lower for Adam, and their growth is slow. Nonetheless, the morphological aspects of possession appear nearly in line with those associated with T.
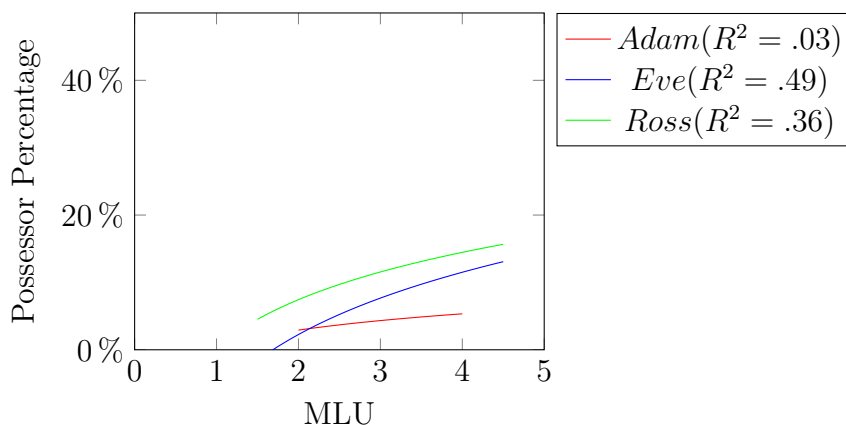
Figure 4.18: Combined Possessor Pct

Results for the three children were mostly the same. For all three, the syntactic structures of DPs and CPs were all present from the first sessions. While earlier data could have refuted or confirmed parallel syntactic development, the fact that the initial DP and CP complexity were roughly equal is more suggestive of confirmation. This is especially true given that the low MLUs of all the children indicate that all three were barely producing two-word utterances at this point.

There is more evidence for morphological development over this period. Case-marking of subjects with nominative comes slightly before genitive case-marking, though only slightly so. There is no DP-internal agreement to serve as a comparison, but other elements associated with T likewise come before elements associated with Poss– specifically the *-s, -n* possessive suffixes. Though we do see changes in the appearance of this morphology over time, it appears the vocabulary items for both heads are acquired at essentially the same time.

Finally, subjects grow rapidly both in terms of proportion of nouns and utterances with subjects, as do possessors, though their overall rate remains much lower than

subjects, likely due to the low rate of possessors used in the target language. To answer the research questions explicitly, it can be said that structural positions related to DP and CP syntax are related, verbal agreement and pronominal features in CP and DP are not related, and there is some evidence that case-marking between the two domains is related. The following chapter will combine these results found for English and the results found for Estonian and Hungarian to determine what can be said about child language overall when it comes to these inter-domain parallels.

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