

CHAPTER 2

ESTONIAN

This chapter discusses nominal and verbal morphology in Estonian and their acquisition in a first language. The first section provides an overview of DP morphosyntax and agreement morphology. The second section discusses the acquisition path of three Estonian children, and the third and final section compares the paths of each and summarizes the findings. The results indicate that functional feature representations grow for nearly all verbal and nominal categories at similar rates, with overall DP and CP complexity growth increasing steadily. Morphological growth is similar, though there is not a one-to-one relationship between morphological elements across the domains. Subjects and possessors also exhibit differences in the child data: subject growth is continual and large, while possessors remain rare throughout.

2.1 OVERVIEW OF ESTONIAN

This overview of Estonian will focus primarily on DP syntax, though a brief discussion of Subject-Verb agreement will also be included. Compared to the other target languages, Estonian represents a sort of middle-ground with respect to DP-CP morphosyntactic complexity. The case morphology is quite similar to Hungarian (see Chapter (??)) as is verbal agreement. Like English, on the other hand, Estonian lacks possessor agreement.

Estonian distinguishes three persons and two numbers in its pronouns, which are shown below in Table (2.1) in the three grammatical cases¹. The nominative case is used primarily for subjects, and the genitive is used for complements of postpositions, definite/whole objects, and, importantly, possessors. Norris (2014) suggests that Estonian also has an underlyingly accusative case which is suppletive with the nominative in the singular and with the genitive in the plural. Because of the inability to distinguish whether a genitive or nominative case form is *underlyingly* accusative in a child’s production, accusative case will not be coded in the children’s input. Nonetheless, its presence in the grammar highlights the structural and morphological parallels between the three target languages.

	Singular			Plural		
	NOM	GEN	PRT	NOM	GEN	PRT
1	mina, ma	minu, mu	mind	meie, me	meie, me	meid
2	sina, sa	sinu, su	sind	teie, te	teie, te	teid
3	tema, ta	tema, ta	teda	nemad, nad	nende	neid
DEM	see	selle	seda	need	nende	neid

Table 2.1: Estonian Pronouns- Grammatical Cases.
Long and short forms are included where they exist.

One aspect of the Estonian case system not shared by the other target languages is its partitive case, which may be used for both subjects and objects. Use of partitive subjects is related to both the definiteness of the subject as well as polarity/modality of the sentence, with negative or uncertain moods yielding a partitive case. The choice of partitive objects relates again to definiteness and wholeness of the object, as well as the telicity of the verbs, with atelic verbs requiring a partitive object.

¹Here and throughout. I draw a distinction between the *grammatical* cases and the *semantic* ones. Grammatical cases serve a grammatical function– distinguishing between subjects and objects, for example, and are assumed to be assigned structurally– that is, dependent on their syntactic position. The semantic cases are locative cases and mostly (though not always) reserved for adjuncts, serving similar roles as prepositions in English, for example.

Many pronouns come in long or short forms, both of which are indicated in the table when applicable. There is no grammatical gender, and number is limited to singular and plural. There are no articles, but definiteness may be represented via demonstratives, which may be plural or singular. The standard dialect does not make distal/proximal distinctions, though some varieties, such as Southern Estonian, do (Pajusalu, 2006). Traditionally, as in Tauli (1973), Estonian has been considered to have 14 cases, as Table (2.2) shows. The four highlighted cells at the end have been more recently analyzed as postpositions by Norris (2014) due to their not triggering case-concord in adjectives and quantifiers adjoined to their nouns. Following this, they will not be addressed in subsequent discussions of case acquisition.

Case	Singular	Plural	Meaning/Function
Nominative	raamat	raamatud	Subject
Genitive	raamatu	raamatute	Possessor
Accusative	raamatu	raamatud	Object
Partitive	raamatut	raamatuid	Partial Object
Illative	raamatusse	raamatutesse	<i>onto a book</i>
Inessive	raamatus	raamatutes	<i>on a book</i>
Elicative	raamatust	raamatutest	<i>from on a book</i>
Allative	raamatule	raamatutele	<i>into a book</i>
Adessive	raamatul	raamatutel	<i>to a book</i>
Ablative	raamatult	raamatutelt	<i>from inside a book</i>
Translative	raamatuks	raamatuteks	<i>into a book</i>
Terminative	raamatuni	raamatuteni	<i>up to a book</i>
Essive	raamatuna	raamatutena	<i>as a book</i>
Abessive	raamatuta	raamatuteta	<i>without a book</i>
Comitative	raamatuga	raamatutega	<i>with a book</i>

Table 2.2: Estonian Case Forms for *raamat* ‘book’

Semantic case forms and the nominative plural are formed by adding an appropriate suffix to the genitive form. The genitive itself, as well as the singular nominative and partitive forms, however, are unpredictable, with syncretisms commonly seen between two or even three of these forms. Tauli (1973) offers a detailed declension

class analysis, suggesting 15 different classes for partitives and 68 for genitives. Table (2.3) shows the case forms for a handful of words to show the patterns that exist, with varying degrees of suppletion.

Case	<i>book</i>	<i>green</i>	<i>earth</i>	<i>honor</i>
Nominative	raamat	roheline	maa	au
Genitive	raamatu	rohelise	maa	au
Partitive	raamatut	rohelist	maad	au

Table 2.3: Estonian Declension Examples

Example (1) shows concord between the possessor and the possessor’s modifier, as well as between the possessum and its modifiers, including the phrase-initial quantifier *iga* ‘every’. The possessor *maja* ‘house’ and its adjective *suure* ‘big’ are both genitive; the possessum *uks* ‘door’ and its modifiers (*iga* ‘every’ and *rohelise* ‘green’) are in the adessive case, ending with *-l*. Because the genitive form is the same as an unmarked form, it could be argued that the adjective and the noun of the possessum have not had their case-feature valued or that possessors are not DPs but something smaller. If this were true, however, it would mean that a caseless adjective appeared within a larger environment where both a preceding quantifier and a following adjective element appeared with overt semantic case. This would be surprising and require an explanation for why these nominal elements do not receive case yet do not crash the derivation.

- (1) *igal suure maja rohelist uksel*
 every.ADE big.GEN house.GEN green.ADE door.ADE
on every green door of the big house

The possessor receives genitive case via the functional *Poss* head within the possessum, giving the structure seen in Figure (1), below. The adjective within the possessor DP receives the genitive case via case concord. Following the syntactic approach

of Baker (2008), concord would be achieved via direct assignment of genitive to the adjective and the head noun from Poss. Alternatively, following Norris (2014), the case feature is assigned to the possessor DP and copied to dissociated AGR nodes post-syntactically. Importantly, the case feature of the possessor will be valued and will not participate in the round of case concord that gives case to other elements of the possessum DP. In the example in Figure 2.1, this is the adessive *-l*.

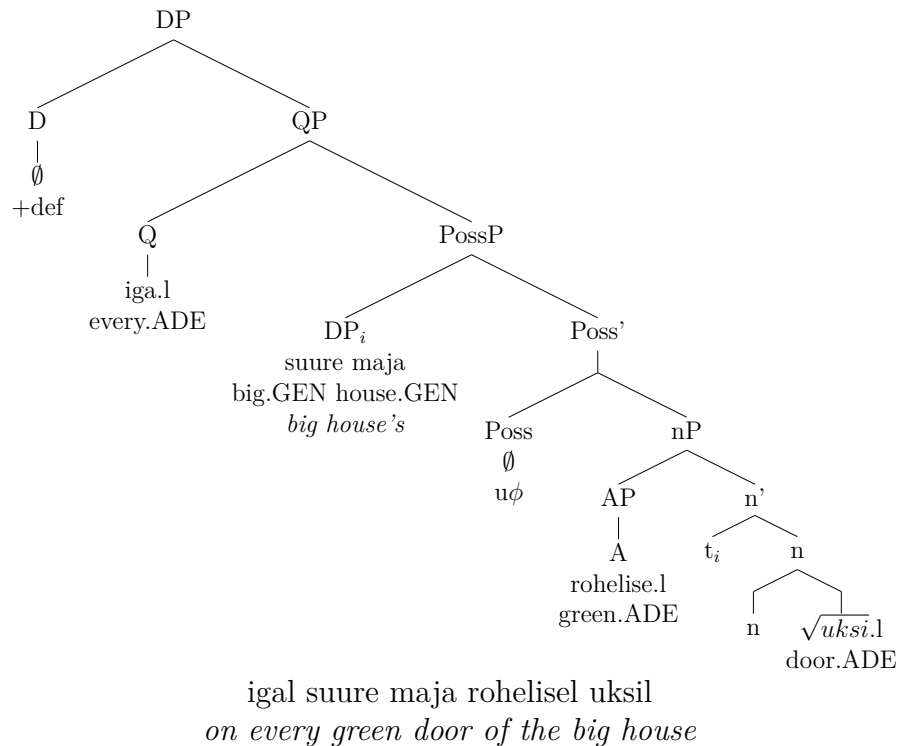


Figure 2.1: Proposed structure for Estonian Possessed DP

The precise mechanics of case concord in Estonian are not crucial to this project, though a brief note on the grammatical cases is warranted to gain an understanding of the acquisition problem for the child. Nominative is assumed to be assigned by T and accusative assignment is considered to be the result of agreement and case-assignment by a functional head in the extended projection of the verb, such as Voice (Kratzer, 1996) or *v* (Chomsky, 1995), within the verbal extended projection. As mentioned earlier, however, because accusative surfaces as genitive in the singular

and because it is difficult to impute underlying forms in a developing grammar, it is assumed that genitive objects receive their abstract case feature from *v*, even though the morphological realization is often the same as case assigned DP-internally. True genitive, on the other hand, is assigned within the DP. The examples in (2) illustrate several types of subjects and objects in various case forms.

- (2) a. küülik-ud hüppa-sid hein-ale
 rabbit-PL.NOM hop-PAST.3PL hay-ALL
 The rabbits hopped into the grass.
- b. küülik-uid hüppa-s hein-ale
 rabbit-PL.PRT hop-PAST hay-ALL
 Some rabbits hopped into the grass / There were rabbits hopping into the
 grass.
- c. Peeter jahu-s küülik-u
 Peter.NOM hunt-PAST.3SG rabbit-GEN
 Peter hunted the rabbit (*Telic/definite*)
- d. Peeter jahu-s küülik-ut
 Peter.NOM hunt-PAST.3SG rabbit-PRT
 Peter hunted for rabbit (*Atelic/indefinite*)

Argus (2009) takes a close look at both Hendrik and Andreas— two of the children studied in the next sections. Argus concludes that they *begin* to make the correct semantic distinction early, before 2;0, yet they do not achieve 90% correct use of case morphemes for another year. She suggests this is because of the complicated rules

regarding both telicity and whole/partial distinctions that determine which case form is appropriate.

As the correct acquisition is a challenge for the child, the structural locus of partitive case-assignment is difficult to pin-down for the theoretician. Partitive DPs can be both subjects and objects, (see (2b) and (2d), above), though not possessors. Kiparsky (1998) discusses the Finnish partitive, which is quite similar to the Estonian partitive. He first shows that partitive is structural, and, pointing out that partitive subjects are intransitive or existential, suggests partitive case is assigned VP internally both for subjects and objects. Hietam (2004) explores the connection between partitivity and transitivity and shows that partitivity is related to phrases with low transitivity. These findings together suggest that the locus somewhere in the verbal extended projection— a head above *v* but below T- perhaps Aspect or Voice. How to account for this while still satisfying T's need to assign nominative case is still an open question, though the fact that partitive subjects do not agree both confirms the connection between agreement and nominative case and suggests more questions regarding the role of partitivity in the grammar.

The genitive case assigned by a functional head is not limited to possessors. Themes, such as *house* in (3a), or agents, as *Peter* in (3b), may also be assigned case by this head and move to the prenominal position, as seen in (3)²:

- (3) a. *maja-de ehita-mine Peetri poolt*
 house.GEN-PL build-NML Peetri.GEN by³
 houses' building by Peter

²Examples in (3) from (Koptjevskaja-Tamm, 2002:294). Other examples are from my own fieldwork, unless otherwise cited.

- b. *Petri* *maja*(-*d)-*ehita*-mine
 Peter.GEN house(*PL)-build.NML
 Peter's house building

These examples show an argument being promoted to the possessor position. In (3a) it is the theme *maja* ‘house’, and, in (3b), the agent *Peetri* is promoted to this position. The second example’s possessum *ehitamine* ‘house-building’ is a nominalized compound. As such, it does not combine a full DP with a verb but, following Harley (2009), simply a root. This rules out plural marking, as indicated, and means that any case on *maja* ‘house’ would be ungrammatical.

The aim of this project, ultimately, is to examine the way children acquire seemingly parallel morphosyntactic elements in their language. Partitive case is not clearly related to either T nor to Poss, though nominative and genitive cases are assigned by parallel functional heads in the extended projections of N and V, so these are clearly elements whose features need to be studied. Despite Estonian not having morphological agreement between possessors and possessa, agreement between subjects and verbs will be tracked as well. This will provide additional information about the development of the head T and may be useful when comparing to Hungarian, which features subject agreement as well as possessor agreement. The rich agreement paradigm for all persons and numbers is shown in Table (2.4).

	Singular	Plural
1	-n	-me
2	-d	-te
3	-b	-vad

Table 2.4: Estonian Verbal Agreement present tense paradigm

In addition to agreement, T is also the locus of nominative case-marking and the tense morphology itself ($-\emptyset$ for present, *-s* for past). The development of all these

features will also be tracked for the Estonian children in order to give a sense as to how the features of T come to be acquired.

With the description of the relevant aspects of Estonian completed, the predictions of the approach outlined in Chapter (??) can be reviewed. First, recall that T and Poss are assumed to be parallel projections in a meaningful way— both being intermediate heads within their respective extended projections and both assigning case. The prediction, then, is that these two projections will be acquired around the same time, as each represents a similar feature-set. T’s presence will be indicated by tense or agreement morphology; Estonian provides no direct evidence for the acquisition of Poss. That said, each projection is responsible for the case-assignment and structural position of subjects and possessors. This suggests that subjects and possessors will also be present at the same time— once there is a position for them and a head to assign them case. The following sections will closely look at the development of case-marking, agreement, and subjects/possessors to determine whether these predictions are borne out.

2.2 ACQUISITION OF ESTONIAN MORPHOSYNTAX

To carry out this study, corpora from CHILDES (MacWhinney, 2000) for three different Estonian children were analyzed, for the periods described in Table (2.5). For each child, the presence of agreement morphology on verbs, case-marking on nouns, and the appearance of pronouns were all tracked in order to get a sense for the state of the child’s developing morphosyntactic system. Words per Utterance and MLU were calculated over time for each child. Appearance of subjects and possessors were also tracked. This section will address each child in turn, noting their particular paths and any interesting contingencies that show up in the data.

Corpus	Speaker	Start	End	Sessions	Avg Utterances	Avg. MLU
Vija	Andreas	1;07.24	3;01.3	8	400	3.67
Argus	Hendrik	1;8.13	2;5.30	17	87.9	2.5
Kohler	Martina	1;5.11	1;11.28	10	363	4.97

Table 2.5: CHILDES Corpora for Estonian

2.2.1 ANDREAS

Andreas’s data represents the most complete picture of Estonian acquisition. The 8 sessions for Andreas cover an age of 1;07.24 through 3;01.13. Each session has an average of 400 utterances, which would seem to present a very clear picture of his productive capability at any point. His MLU increases steadily over time with no sessions having a significantly lower average than the previous sessions⁴— his final session includes an utterance with 26 morphemes. This progress is graphed in Figure (2.2). The horizontal axis plots Andreas’s age in days (which begin at 1;08.13 or 518 days) against his Mean Length Utterance. It shows a very steady increase across the sessions, with the initial sessions cataloging less than two morphemes per utterance and the final session five times longer at approximately 9 morphemes. Also of note, his longest utterance in the first session was just two monomorphemic words, while his last session featured an utterance with 26 morphemes. Andreas is quite clearly learning the target language.

Like MLU, Andreas’s percentage of items appearing with functional material also increases steadily across the time of his recordings— showing that utterances are not just getting longer but the individual words themselves are becoming more complex. This growth is depicted in Figure (2.3). Each set of data indicates the growth of a

⁴Between 2;08.13 and 3;00.02, Andrea’s MLU goes from 4.9 to 4.8. A two-tailed T-Test shows this is not a significant difference ($p=.31$)

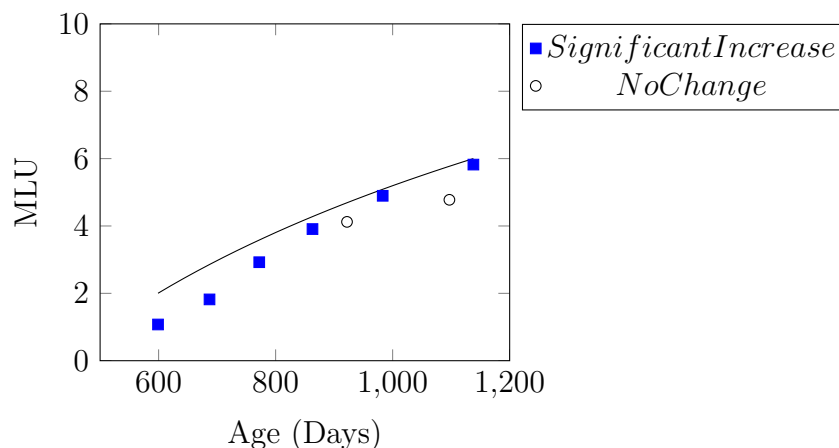


Figure 2.2: Andreas MLU

particular type of feature as a percentage. For example, in the initial sessions, no verbs appeared with agreement morphology (represented by blue square and a blue trend line), while at the final sessions, more than 40% of verbs appeared with agreement morphology- lower than the 65% in the input, but as high as was seen for the Estonian children. This is an indication of the growing capacity for the child to represent formal features. Another manifestation of purely formal features is represented in red. This is the portion of all nominal items that are pronouns. In early stages, the child uses no pronouns whatsoever, though after months of steady growth, the final sessions show approximately 30% of all nominal elements are pronouns, not including any non-overt, dropped subjects. Finally, the green circles and trend-line represent overt case- that is, any case-markers other than nominative. This number also increases steadily, confirming again the growth of functional elements in the child's utterances.

There are a few dips, but the trend is consistently upwards. Overt case and verbal agreement nearly perfectly parallel each other in their trends. This is important as

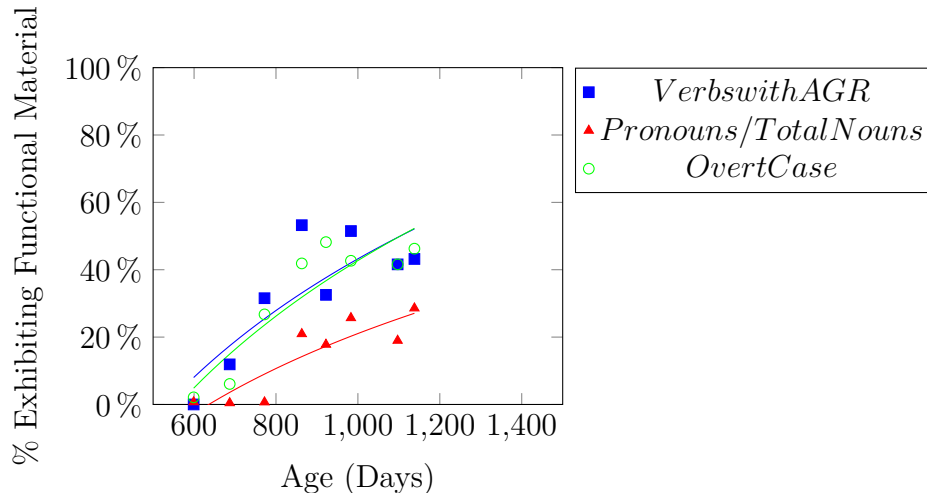


Figure 2.3: Andreas Functional Heads Over Time

it indicates that there is not a preference for DP morphology over CP or vice-versa. Object case-marking will be assigned by the same head responsible for agreement, so seeing such a close temporal relationship between case and agreement here is promising. That said, tracking overt case misses nominative case purposefully, as it is unmarked in Estonian. Nonetheless, it is good to see functional material inclusion increasing in both domains, as expected.

No personal pronouns whatsoever appear for the first few sessions, and the earliest pronominal elements are demonstratives, but once they appear, they also steadily increase. All categories show a jump around 2 years— a growth spurt commonly found across all language cohorts studied in this dissertation. A closer look at the relationship between agreement and personal pronouns, which are both reflections of person and number feature combinations, is below.

Table (2.6) shows the appearance and acquisition of person and number feature combinations, with blue shades representing pronouns with that feature combination and gray shades showing verbal agreement with that combination. Lighter shades indicate the first appearance of a feature set, while darker ones show that a set has been acquired— meaning that it has appeared in a variety of case-forms or attached to more than one verb root.

P,#	Category	1;07.24	1;10.22	2;01.12	2;04.13	2;06.12	2;08.13	3;00.02	3;01.13
1SG	Pronoun V-Agr			Light Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
2SG	Pronoun V-Agr			Light Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
3SG	Pronoun V-Agr		Dark Gray	Dark Gray	Dark Gray	Light Blue	Dark Blue	Dark Blue	Dark Blue
1PL	Pronoun V-Agr		Light Gray	Dark Gray	Dark Gray	Dark Blue	Dark Blue	Dark Blue	Dark Blue
2PL	Pronoun V-Agr								Dark Gray
3PL	Pronoun V-Agr		Light Gray	Dark Gray	Dark Gray	Dark Blue	Dark Blue	Dark Blue	Dark Blue

Table 2.6: Andreas Acquisition of Person/Number Features

■ Pronouns, ■ AGR

First Use light shaded, Evidence for Partial Paradigm dark shade

For Andreas, a feature combination is first manifested as verbal agreement, or as a pronoun and an agreement morpheme in the same sessions. The order in which different person and number combinations are produced is only partially consistent with the predictions made by Harley and Ritter (2002)'s feature-geometry. They predict that first person will precede second and that singular will precede plural, but that there will not necessarily be a relationship between first and third persons. Andreas acquires first and second person singular pronouns at the same time, followed shortly by first person plural. This is expected. In contrast, the third person plural appears

before singular. In contrast, 3SG *agreement* occurs before plural agreement, which is expected. The early examples of 3G agreement occur along with overt subjects, so it is not the case that early pronouns are dropped. Considering the length of each recording, it seems somewhat unlikely that this is just an artifact of the recording process.

Andreas has a tendency to refer to himself by his name (“Atsu” actually), which may have led to a delay in first-person pronouns, though they still appear rather early. Another interesting point is that verbal agreement for first-person plural appears before agreement for first person singular. This could be related to his preference for referring to himself by name. This hunch is confirmed by utterances such as (4), below⁵:

- (4) Atsu aita.p
 Andreas help.3SG
 Andreas helps, 1;10.22

To gain a more qualitative sense of Andreas’s progress, the utterances which contain the relevant features in the sessions where they were first considered *acquired* are shown in Figure (2.4). A few notable things can be seen from the examples. First, by the first session in which agreement is manifested, there is also evidence for past tense (in *kadu-s-id* disappear-PAST-3PL). The previous session (1;07.12) had neither agreement nor tense, suggesting that Andreas acquired the [+PAST] and ϕ features in close succession. Most of the first appearances of agreement occur with dropped subjects. In contrast, early pronouns tend to occur as objects in utterances that also contain an agreeing verb or negation, both indicators of an elaborate verbal structure.

⁵Third person singular agreement morpheme should be *-b*, though Andreas consistently pronounces it as *-p*. Estonian does not distinguish voicing in stops; Andreas is apparently still learning the nuances of the phonology.

	1;10.22	2;01.12	2;04.13	2;06.12	2;08.13	3;01.13
1SG				ma taht-si-n issi-t ISG want-PAST-1SG father-PRT <i>I wanted daddy, 2;04.13</i>		
		too-n kasti-st ala bring-1SG box-ELA NEG <i>I'm bringing from on the box, 2;01.12</i>				
2SG				oota-b sind wait-3SG 2SG.PRT <i>He waits for you, 2;01.12</i>		
		pälast mäng-id selle-ga kiisu-ga after play-2SG this-COM kitten-COM <i>After you play with this cat., 2;01.12</i>				
3SG					aga ta ei küsi palun . but 3SG.NOM NEG ask please <i>But he doesn't say please, 2;06.12</i>	
	emme otsi-p mother look-3SG <i>Mom is looking, 1;10.22</i>					
1PL				ei saa meie alla minna NEG get 1PL.NOM down go.INF <i>we can't go down there, 2;04.13</i>		
	lahti tee-me open.NOM do-1PL <i>We'll open it, 1;10.22</i>					
2PL						siis tule-te tagasi then come.2PL back <i>Then y'all come back., 3;01.13</i>
3PL					nad on palja-d 3PL.NOM be.3 bare-PL <i>They are bare, 2;06.12</i>	
	kadu-s-id ära disappear-PAST-3PL <i>They disappeared, 1;10.22</i>					

Figure 2.4: Andreas Example Utterances
Gray boxes are for agreement, blue boxes for pronouns

Andreas has the most fully filled case paradigm of all the Estonian children, as shown in Table (2.7), which makes sense given the length and breadth his sessions represent. Like the previous table, light shades indicate the first instance of a case, while darker shades indicate acquisition, as evidenced by the appearance on at least two different roots or person/number combinations. Nominals show the widest variety of case markers, appearing with all grammatical and semantic cases.

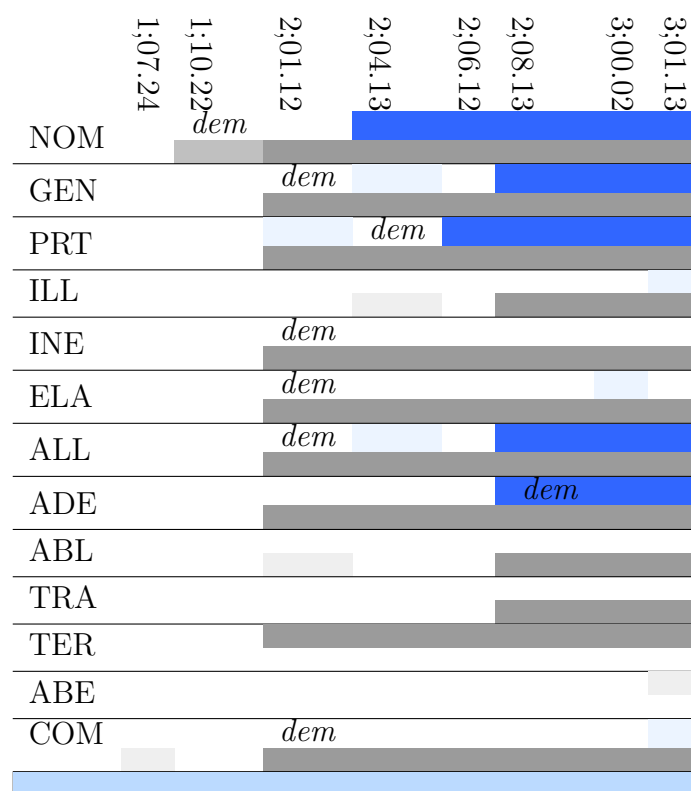


Table 2.7: Andreas's Case Acquisition

■ Pronouns, ■ Nominals

First Use light shaded, Evidence for Partial Paradigm dark shade

Pronouns do appear with all the grammatical cases, but only a handful of the semantic cases. The table also shows where demonstratives appeared for the first time, which were in nearly all cases before personal pronouns and at the same time as lexical nouns. Demonstratives share properties with personal pronouns and lexical

nominals. Like pronouns, they are referential, represent a bundle of features such as [+DEF, 3SG], and may replace full nominals. Demonstratives may also appear alongside nominals within a DP, and their acquisition behavior is much closer to nominals.

	Pronouns	Substantives	Demonstratives	Total
Nominative	76%	42%	65%	56%
Genitive	6.2%	15%	17%	12%
Partitive	6.1%	14%	13%	11%
Semantic	11%	29%	5%	22%

Table 2.8: Andreas: Percentage of Cases in Input

The frequency with which various cases appear in the input may affect the time at which the forms appear. When comparing semantic case forms to grammatical case forms in the input, as shown in Table (2.8), some important differences emerge. Though there are plenty of pronouns and full nominals in the input, pronouns occur in a grammatical case form nearly 90% of the time, the vast majority of the time as nominative. Genitive and partitive forms account for only around 6% of the input, yet both appear for the first time around the same time as nominatives, though evidence for their full acquisition is not present until later.

Full nominals also skew toward structural forms, though the spread is not as extreme, with 70% in NOM, GEN, or PRT case forms. For both pronouns and lexical nouns, the percentage of genitive and partitive combined is equal to the semantic cases. This suggests that the difference in acquisition is affected by frequency, though there are enough pronouns in semantic case in the input that there must be something else delaying their appearance in the child’s language. Interestingly, the demonstrative *see* ‘this’ has a distribution in the input whose distribution is right between that of lexical nouns and pronouns, which surely contributes to the early and wide-ranging case morphology of demonstratives seen in Andreas’s utterances.

After seeing the trajectory of the functional elements in Andreas’s developing grammar, the data for possessors and subjects can be analyzed. Recall Figure (2.3), which showed a steady increase of both verbal and nominal functional items, indicating a steady growth in Andreas’ capacity for functional material. The picture presented in Figure (2.5) is not straightforward and does not coincide with the overall functional growth. It shows the percentage of all nouns which are subjects (in red) and the percentage of all nouns which are possessors.

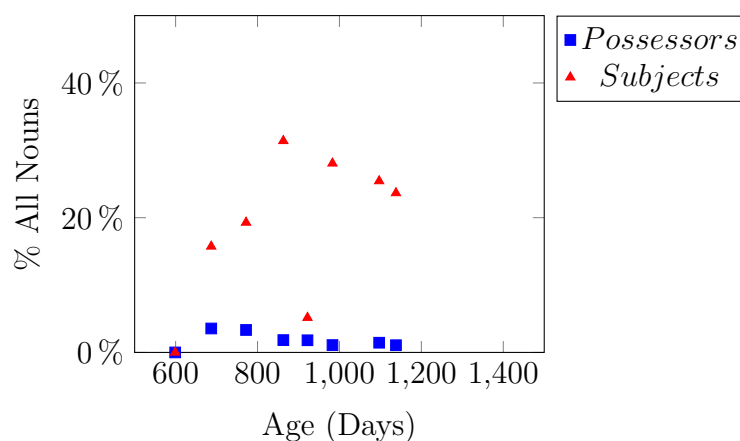


Figure 2.5: Andreas Subjects and Possessors Over Time

Though growth of subjects increases over the first few sessions, it seems to level off, while possessors begin low and stay low. What this ultimately means to the overall analysis is unclear. The first conclusion that can be drawn is that the lack of subjects initially and subsequent growth may be related to the developing capacity of children. With possessors, however, there is little growth—there even appears to be a dip in the middle sessions. Whatever changes in the extended projection of the verb that allow for a rise in subjects does not correspond to any sort of similar gains in DPs. A fuller discussion is included in Section (2.3). For now, the data in Figure (2.5) shows how the occurrence of possessors and subjects change over time.

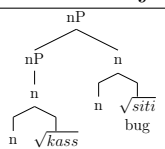
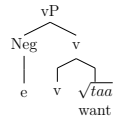
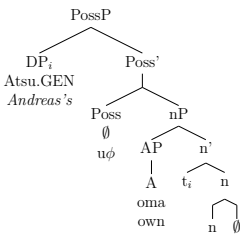
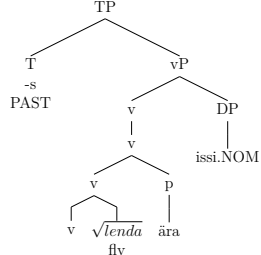
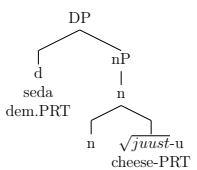
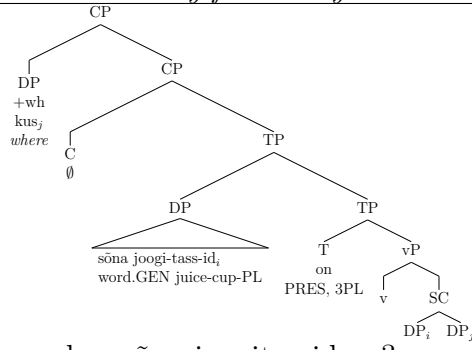
	Largest Nominal Projection	Largest Verbal Projection
<p>1;07.24 First N First V</p>	 <p>kass siti <i>box bug</i></p>	 <p>ettaa <i>don't want</i></p>
<p>1;10.22 First Poss First T</p>	 <p>Atsu oma <i>Andreas's own</i></p>	 <p>lendas ära issi <i>Daddy flew away</i></p>
<p>2;01.12 First D First C</p>	 <p>seda juustu <i>this cheese</i></p>	 <p>kus sõna joogitassid on? <i>Where is the word for juicecups?</i></p>

Table 2.9: Andreas Structure Development

The final data address how the extended projections of the noun and the verb develop relative to each other. Figure (2.9) shows the structure of the largest nominal and verbal phrases produced in the sessions during which various syntactic objects were first attested. Andreas first produces a noun in his first session, and his largest nominal structure from this session is included in the first row. Utterances his his first verbs, possessors, tense-markings, complementizers, and determiners are included in the figures other cells.

For Andreas, the data is actually very suggestive. The first evidence for a noun occurs at 1;07.24– the first session. This is also the first session where a verb is attested; it is also the first session recorded. It is not surprising that he will have early use of verbs and nouns. What is surprising is that at the next session, both the first tense markings and the first possessors appear, and in the third session, the first determiners and complementizers appear. This pattern is just what one would expect given the architectural parallels discussed.

2.2.2 HENDRIK

Hendrik was recorded 17 times from an age of 1;08.13 until 2;05.30, with an average of 115 utterances per session. Figure (2.6) shows that MLU, represented on the vertical axis, rose steadily, though slowly, throughout the time he was tracked. Blue squares represent sessions where the MLU was significantly higher than the previous session ($p < .05$), white circles are sessions with no significant change from the previous session, and the red triangle represents a significant decrease. The majority of sessions showed significant increases, providing reasonable confidence that Hendrik's overall linguistic capacity is steadily growing over the course of the sessions.

Hendrik's functional element growth rate, shown in Figure (2.7), is similar to his MLU growth. He is clearly acquiring functional material in the nominal domain:

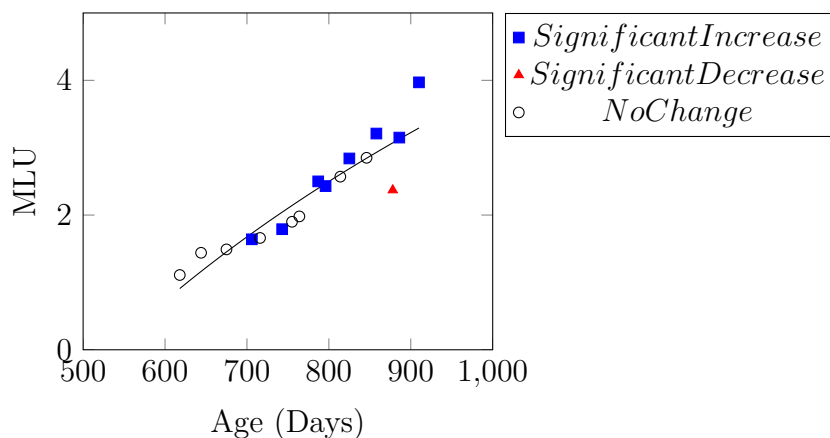


Figure 2.6: Hendrik MLU over Time

pronoun percentage and overt case-marking percentage (shown in red and green, respectively) trend upwards at a consistent rate. The lowest line in the figure is Hendrik’s verbal agreement—it is basically non-existent. This suggests a problem with the the verbal extended projection. Because of the large discrepancy between verbal and nominal morphology, the percentage of verbs which exhibit some tense, mood, or aspect morphology was also tracked, shown with the violet X marks. The trend here indicates that verbal morphology is increasing, at a similar rate as nominal elements, though relatively delayed. It appears that Hendrik’s difficulty is just with agreement.

Whether Hendrik’s lack of agreement is an issue with representing person features in general or just with agreement in particular can be seen in the analysis of pronouns. Table (2.10) shows the first appearance of a particular feature combination and the point at which a partial paradigm was evidenced. For pronouns, this means the appearance of a person-number combination in at least two case forms. For verbs, a partial paradigm for person agreement consists of the use of correct agreement mor-

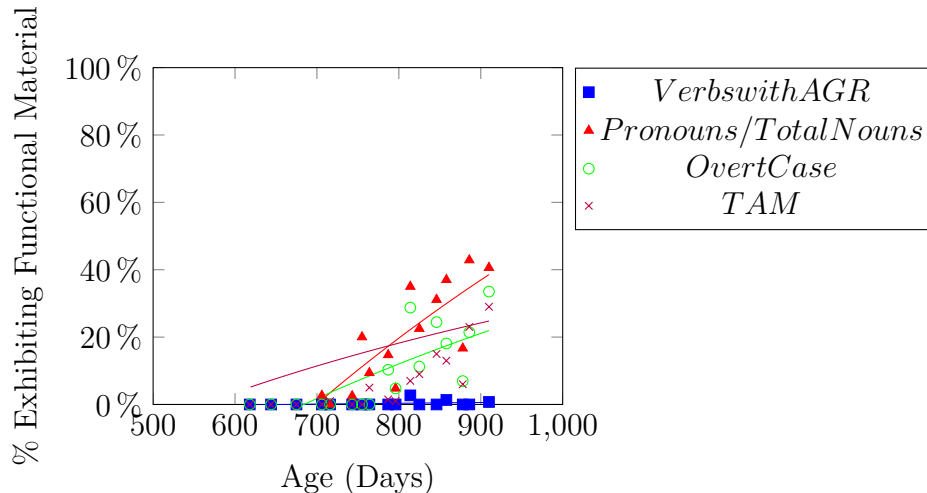


Figure 2.7: Hendrik Functional Heads Over Time
(%)

phology for a feature set on at least two distinct verbs. Hendrik was slow to make use of this kind of functional morphology; the first seven sessions did not have any example of person or number features. By 2;02.24, first-person plural and singular pronouns are observed, but it's not until several sessions later than first person plural is really acquired, while another instance of the singular does not occur until 2;04.28. This is the same session that finds a third-person plural pronoun. Second person never occurs.

Hendrik's data is surprising for a few reasons. Primarily, the low amount of person features throughout is notable—no other child is so slow to use pronouns and agreement. He did make early use of demonstratives—the first use was at 1;11.11 with evidence for a case paradigm appearing already at 2;01.27. This is indicative of nominal functional features, but it is independent of true person/number features.

Age

	2;02.24	2;03.26	2;04.08	2;05.30
1SG	<div style="border: 1px solid blue; padding: 2px;"> mina seda nägi 1SG.NOM DEM.PRT see <i>I see it, 2;02.24</i> </div>			<div style="border: 1px solid gray; padding: 2px;"> mina võta-n selle sina selle . 1SG.NOM take.1SG DEM.GEN 2SG.GEN DEM.GEN <i>I'll take it, you it., 2;05.30</i> </div>
2SG	<div style="border: 1px solid gray; padding: 2px;"> aita-d korista-da? help.2SG clean-IMP <i>Will you help clean?, 2;02.24</i> </div>			<div style="border: 1px solid blue; padding: 2px;"> mina võta-n selle sina selle . 1SG.NOM take.1SG DEM.GEN 2SG.GEN DEM.GEN <i>I'll take it, you it., 2;05.30</i> </div>
3SG		<div style="border: 1px solid blue; padding: 2px;"> teda tegi 3SG.PRT make.PAST <i>I made him, 2;03.26</i> </div>	<div style="border: 1px solid gray; padding: 2px;"> see käi-b? DEM go-3SG <i>Does this go?, 2;04.08</i> </div>	
1PL	<div style="border: 1px solid blue; padding: 2px;"> äla mine meie tup meie NEG go.IMP 1PL.GEN room 1PL.GEN <i>Don't go into our room, us!, 2;02.24</i> </div>			

Figure 2.8: Hendrik Example Utterances
 Blue boxes are for pronouns, gray boxes for agreement

P,#	Category		2:02.24	2:03.05	2:03.26	2:04.08	2:04.28	2:05.06	2:05.30
1SG	Pronoun V-Agr	First 7 Sessions Contain no ϕ features	■				■	■	■
2SG	Pronoun V-Agr		■						
3SG	Pronoun V-Agr		■	■	■	■	■	■	■
1PL	Pronoun V-Agr		■		■	■	■	■	■
2PL	Pronoun V-Agr								
3PL	Pronoun V-Agr						■		

Table 2.10: Hendrik Acquisition of Person/Number Features

■ Pronouns, ■ AGR

First Use light shaded, Evidence for Partial Paradigm dark shade

A more thorough look at the sorts of utterances Hendrik was producing at the time of each milestone for the different person and number combinations can be seen in Figure (2.8). Each box in the figure shows a particular utterance of Hendrik's at the time when the person/number combination was first acquired. Unlike Andreas, who generally acquired the agreement morphemes before corresponding pronouns, most of Hendrik's agreement came second, an expected outcome given the general paucity of agreement. The only place where agreement occurs before the pronoun is for 2SG, though it suggests that there is a dropped pronoun which triggers the agreement. The total lack of agreement forms for plural subjects is not surprising either, given that plural pronouns only appear as first person.

Hendrik’s case acquisition is more complete and also indicates access to nominal functional features. Full nominals appear in the widest variety of cases, while the pronouns and demonstratives appear only with the grammatical cases, somewhat similar to the preferences Andreas showed. Reminiscent of Hegarty (2005), this might reflect some difficulty with multiple features on a single functional head— combining person, number, and case on D might be more challenging than suffixing a case-marker to a noun. Demonstratives appeared much earlier than pronouns, often around the same time full nominals appeared with that case. Table (2.11) shows the order in which they rolled out.

	1;08.13	1;09.09	1;10.10	1;11.11	1;11.21	2;00.13	2;00.25	2;01.04	2;01.27	2;02.06	2;02.24	2;03.05	2;03.26	2;04.08	2;04.28	2;05.06	2;05.30
NOM				<i>dem</i>													
GEN									<i>dem</i>								
PRT									<i>dem</i>								
ILL																	
INE																	
ALL																	
ADE																	
COM																	
Pronouns																	
Nominals																	

Table 2.11: Hendrik Case Acquisition

■ Pronouns, ■ Nominals

First Use light shaded, Evidence for Partial Paradigm dark shade

As with Andreas, it is also possible that input is responsible for the differences. As Table (2.12) shows, pronouns do tend to appear in the grammatical cases a large majority of the time. For Andreas, the percent of genitive and partitive combined

equaled the semantic cases for both types of nominals. For Hendrik, pronouns occur in GEN and PRT three times more often as other cases, while full nouns are like Andreas. Demonstratives pattern like personal pronouns- they are very rarely in semantic forms and have a weaker preference for nominative case. This frequency is clearly seen in the production– demonstratives do not appear in semantic cases. Nonetheless, they appear well before pronouns for the three grammatical cases- like lexical nouns.

	Pronouns	Substantives	Demonstratives	Total
Nominative	71.27%	40.34%	64.8%	52.96%
Genitive	14.12%	18.91%	17.3%	16.96%
Partitive	7.80%	12.72%	12.6%	10.71%
Semantic	6.81%	28.03%	4.6%	19.37%

Table 2.12: Hendrik: Percentage of Cases in Input

The final question to address is whether there are significant trends to discover in Hendrik’s use of subjects and possessors. The data shows that Hendrik lacks agreement morphology, but he does make use of other verbal morphology. This morphology reflects that the T head is available, but it is non-adult like. Whether the lack of agreement also leads to issues with subjects can be seen by examining this data. If there is a dearth of subjects, the lack of agreement may be indicative of a larger problem with T beyond the missing agreement. If subjects are used and their use increases, it seems Hendrik’s problem is with agreement alone. Turning to possessors, it has been shown that nominal morphology has increased steadily, suggesting that the features and structures of the DP are growing. With this growth, the potential for possessors is also increasing: Figure (2.9) clarifies whether this growth is, in fact, occurring .

Looking at subject and possessor growth, we do not see a clear picture- neither subjects nor possessors seem to consistently move with time. Possessors, in blue, seemingly randomly bounce around in the middle sessions, stabilizing around 5%, while subjects grow a small amount. This little amount of growth still fails to support

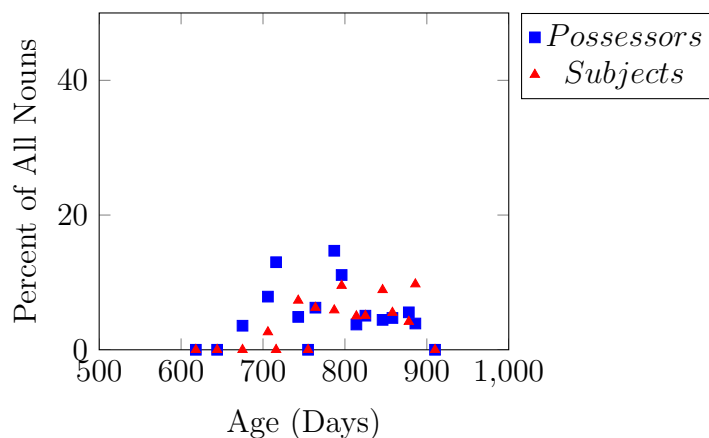


Figure 2.9: Hendrik Subjects and Possessors Over Time

any relationship between agreement and subjecthood, as even this little growth seems independent from non-existent agreement morphology. Hendrik, like Andreas, does not produce results that indicate a relationship between possessors and subjects, nor with these types of nominals and other functional elements in their respective domains.

The final aspect looks at the development of Hendrik's syntax at various milestones. Table (2.13) shows his longest nominal and verbal phrases at the stage where he showed evidence of achieving three important heads in each domain: N, Poss, and D for the nominals, and V, T, and C for verbs. Like Andreas, each pair of parallel heads appears in the same session—the first session shows N and V, followed by Poss and T a few sessions later, and finally D a couple sessions later. C is not attested overtly, though the longest utterance (included in the table) is a question, indicating a null [+WH] element. In the adult grammar, [+WH] is indicated by the morpheme *kas*. Hendrik's avoidance of a vocabulary item that instantiates only formal features in C is reminiscent of his avoidance of agreement morphemes.

	Largest Nominal Projection	Largest Verbal Projection
<p>1;08.13 First N First V</p>	<p>tita uu <i>baby new(?)</i></p>	<p>ei a <i>isn't</i></p>
<p>1;10.10 First Poss First T</p>	<p>onu auto . <i>uncles's car</i></p>	<p>auto tuli <i>Car came.</i></p>
<p>2;01.04 First D</p>	<p>see muu <i>this other one</i></p>	<p>Ninnu katki tegi? <i>Ninu made it broken?</i></p>
<p>Overt C unattested</p>		

Table 2.13: Hendrik Structure Development

Importantly, the development is not just a matter of utterance length. The very first session shows several two word utterances, but no utterances that show evidence of an actual extended projection. Likewise, intermediate sessions before POSS and T were accounted for had longer utterances that still did not exhibit the same level of functional complexity. This pattern whereby each posited head occurs at the same time as its complement supports the analysis that verbal and nominal structures are developing in parallel. Hendrik’s problems with agreement notwithstanding, his development is very much like the other children, as we’ll see in Section (2.3).

2.2.3 MARTINA

Martina’s six recordings range from 1;03.15 until 1;11.28, with around 370 utterances in each file. There are actually several more transcripts available; however Martina was a precocious learner. By 2 years, her MLU was as high as Andreas at 3, and her initial MLU was nearly what Hendrik’s was at the end of his recordings. MLU consistently goes up across the sessions, as seen in Figure (2.10). The blue circles on the graph indicate sessions with statistically significantly higher MLU than the previous session. These indicate that each session except for the last shows real growth in her linguistic capacity.

All Martina’s functional categories also increase steadily, shown in Figure (2.11), and all at very similar rates, as can be seen from the nearly parallel trendlines indicated. There does appear to be something like a jump in the appearance of agreement and case after the first session, which may correspond to the jumps seen in the other children around 2 years (though recall that Hendrik’s agreement did not undergo a rapid increase). All the variables coded for appear to follow similar trajectories—nothing in particular stands out as aberrant except for the exceptionally early age.

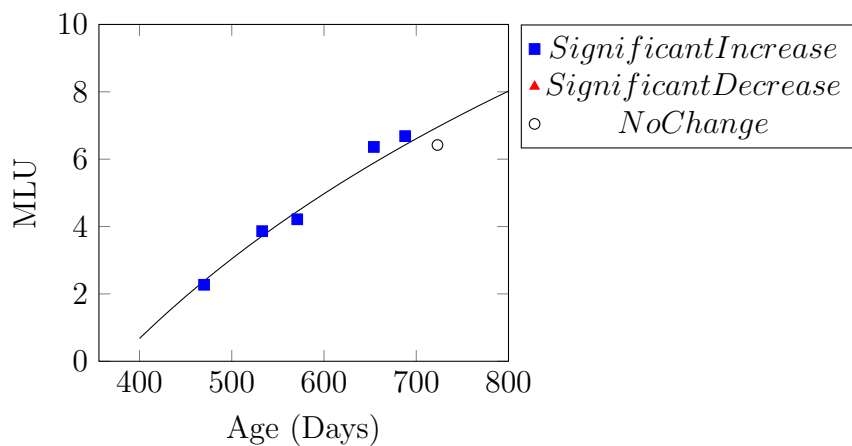


Figure 2.10: Martina MLU

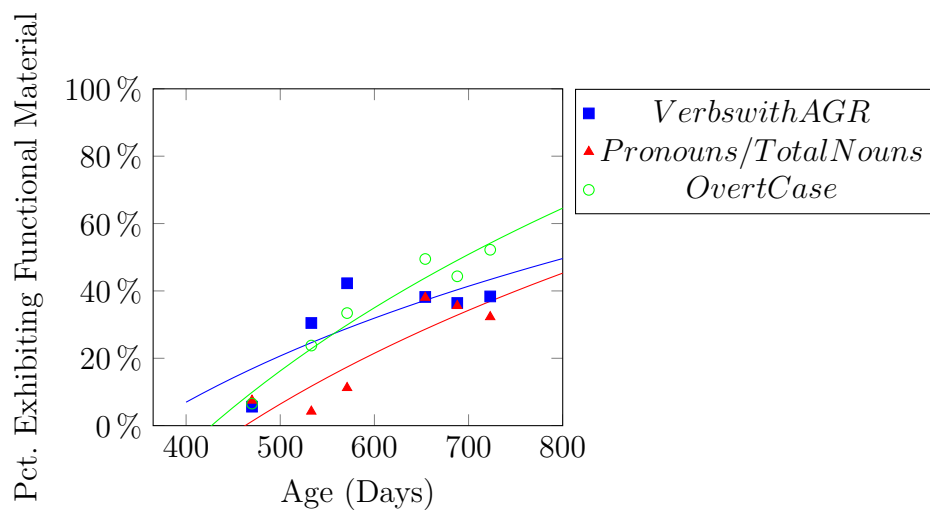


Figure 2.11: Martina Functional Heads Over Time (%)

Martina's acquisition of person and number features, depicted in Table (2.14) happens so early it is difficult to discern any real patterns. By the second session, verbal agreement, indicated in gray, is at least used one time for all but second person plural. Given that her interlocutor is primarily her mother, it is not surprising to see 2PL lacking. Still, a few generalizations can be made. Like Andreas and much different from Hendrik, verbal agreement appears either at the same time or before the corresponding pronoun, with the exception of the relatively rare second-person plural. Singular features are always acquired before their plural counterparts, and first and third persons appear before second. All of this is in accord with the predictions made by Harley and Ritter (2002).

P,#	Category	1;03.15	1;05.18	1;06.26	1;09.19	1;10.23	1;11.28
1SG	Pronoun						
	VERB AGR						
2SG	Pronoun						
	VERB AGR						
3SG	Pronoun						
	VERB AGR						
1PL	Pronoun						
	VERB AGR						
2PL	Pronoun						
	VERB AGR						
3PL	Pronoun						
	VERB AGR						

Table 2.14: Martina Acquisition of Person/Number Features

■ Pronouns, ■ AGR

First Use light shaded, Evidence for Partial Paradigm dark shade

Figure (2.12) shows examples of utterances from sessions where particular feature combinations were first attested. As with Andreas and (again) in contrast with Hendrik, Martina's agreement consistently appears before the corresponding pronoun. When the pronouns do occur, they are in the nominative case and they occur along with the agreement marker, with the exception of the first-person singular example,

where the verb is left without agreement. This shows that the verb phrases are always much more elaborated than the noun phrases where the pronouns occur— the first instance of these pronouns occur alongside verbs that not only show agreement but in most cases take complements— even *wh*- complements in several cases. Taken together, this suggests a general VP-extended projection that is developing earlier than corresponding parts of the NP.

Martina's case acquisition pathway is similar to the others (grammatical before semantic, case on nouns before pronouns), though the patterns shown in Table (2.15) are more robust. Personal pronouns appear at least once in seven of the different case forms, though real acquisition is only achieved with the grammatical cases and allative. Martina distinguishes herself from the others by the variety of cases used— neither of the other children exhibited the same wide range. Unlike the others, her use of demonstratives more closely tracks with the other pronouns. Other nominals occur in nearly all the Estonian cases and are mostly acquired before the personal pronouns are acquired for the grammatical cases. This highlights again the difference between how case works with the two types of nominals.

As was done for the other children, Table (2.16) shows the distribution of types of case morphology in her input. A similar distribution is seen here as with the other children: grammatical cases account for a large majority of pronouns and a substantial though reduced portion of full nominals. Demonstratives differ the most from her peers; they occur mainly in subject or object cases, with the semantic cases appearing less frequently. This difference seems to be reflected in their similarly low frequency in Martina's production.

The final question is how Martina's use of subjects and possessors changes over time. With the most consistent increase in all categories and the fullest paradigms for case, agreement, and pronouns, Martina might offer the clearest example of how

Age

	1;03.15	1;05.18	1;06.26	1;09.19
1SG	<div data-bbox="321 583 516 646" style="border: 1px solid gray; padding: 2px;"> vaata-n [v]aata watch-1SG watch <i>I watch, 1;03.15</i> </div>	<div data-bbox="509 485 704 548" style="border: 1px solid blue; padding: 2px;"> mina taha [v]üid 1SG.NOM want win <i>I want to win, 1;05.18</i> </div>		
2SG		<div data-bbox="526 789 756 852" style="border: 1px solid gray; padding: 2px;"> tah-s-id tommati? want-PAST-2SG tomato.GEN <i>Do you want a tomato, 1;05.18</i> </div>		<div data-bbox="878 680 1073 743" style="border: 1px solid blue; padding: 2px;"> kus sa lähe.d? where 2SG.NOM go-2SG <i>Where are you going?, 1;09.19</i> </div>
3SG	<div data-bbox="321 978 516 1041" style="border: 1px solid gray; padding: 2px;"> issi tee-b. daddy do.3SG <i>Daddy does it., 1;03.15</i> </div>		<div data-bbox="594 884 821 947" style="border: 1px solid blue; padding: 2px;"> ta käi.b kisuki 3SG.NOM go.3SG tape recorder <i>It goes, the tape recorder, 1;05.18</i> </div>	
1PL		<div data-bbox="496 1167 691 1251" style="border: 1px solid gray; padding: 2px;"> lähe-me turu.le go-1PL market.ALL <i>We'll go on to the market, 1;05.18</i> </div>	<div data-bbox="634 1073 829 1136" style="border: 1px solid blue; padding: 2px;"> mis me tee-me What 1PL.NOM do-1PL <i>What shall we do?, 1;06.26</i> </div>	
2PL			<div data-bbox="878 1283 1073 1346" style="border: 1px solid blue; padding: 2px;"> mis te tegi-te what 2PL do-2PL <i>What are you doing?, 1;09.19</i> </div>	
3PL			<div data-bbox="878 1388 1089 1451" style="border: 1px solid gray; padding: 2px;"> mis te tegi-te what 2PL do-2PL <i>What are you doing?, 1;09.19</i> </div>	<div data-bbox="878 1503 1146 1566" style="border: 1px solid blue; padding: 2px;"> siis tule-b nende-le kiilla minna then come.3SG 3PL.ALL visit go.INF <i>Then he'll come to go visit them., 1;09.19</i> </div>
		<div data-bbox="526 1608 797 1671" style="border: 1px solid gray; padding: 2px;"> need ka jätku s66-vad DEM.PL.NOM also ice bunny eat-3PL <i>They bunnies also eat them, 1;05.18</i> </div>		

Figure 2.12: Martina Example Utterances
 Gray boxes are for agreement, blue boxes for pronouns

		1;03.15	1;05.18	1;06.26	1;09.19	1;10.23	1;11.28
NOM	Pronoun	<i>dem</i>					
	Nominal						
GEN	Pronoun				<i>dem</i>		
	Nominal						
PRT	Pronoun	<i>dem</i>					
	Nominal						
ILL	Pronoun						
	Nominal						
INE	Pronoun						<i>dem</i>
	Nominal						
ELA	Pronoun						<i>dem</i>
	Nominal						
ALL	Pronoun						
	Nominal						
ADE	Nominal						
ABL	Nominal						
TRA	Nominal						
TER	Nominal						
ESS	Nominal						
ABE	Nominal						
COM	Pronoun				<i>dem</i>		
	Nominal						
Pronouns							
Nominals							

Table 2.15: Martina Case Acquisition
First Appearance (light), Paradigm (dark)

	Pronouns	Substantives	Demonstratives	Total
Nominative	68%	41%	73%	51%
Genitive	12%	21%	12%	18%
Partitive	5.6%	15%	12%	11%
Semantic	14%	24%	4%	20%

Table 2.16: Martina: Percentage of Cases in Input

possessors and subjects develop over time. Figure (2.13), depicting the percentage of nouns that were subjects (red) and possessors (blue), does show some sort of an initial increase in subjects, though no such trend can be gleaned from possessors, which starts low and stays low. This is a recurring pattern for child language, as will be seen in Chapter ??.

Table (2.17) shows the longest nominal phrases and verb phrases at the points in her data collection that Martina first showed the relevant projections. Nouns and verbs both appeared by the first session, and both tense and possessors appeared in the next session. This session was also the first instance of a determiner appearing, unlike the other children who did not use determiners until after they had shown signs of acquiring the Poss head. C shows up immediately afterwards. These hypothesized structures provide another glimpse into how the two projections seem to be acquired in parallel, even though the actual rates of subject and possessor inclusion do not follow this pattern.

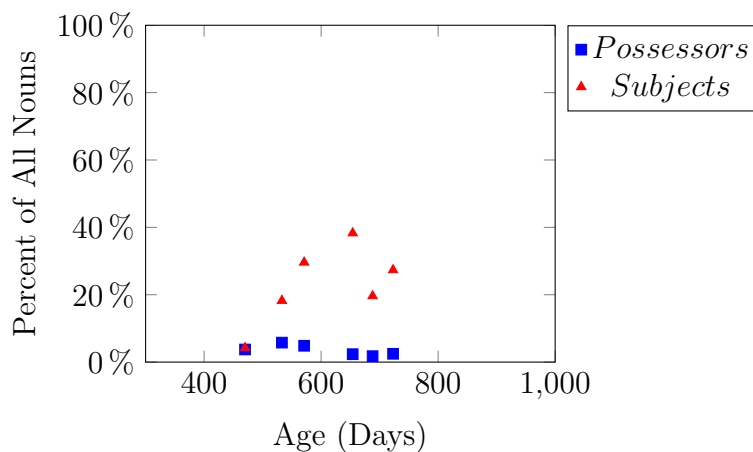


Figure 2.13: Martina Subjects and Possessors Over Time

Martina's data showed consistent growth in nominal and verbal morphology, having acquired nearly all the various features being tracked. Nonetheless, there did

	Largest Nominal Projection	Largest Verbal Projection
<p>1;03.15 First N First V</p>	<p>mõmmi paatsi <i>teddy-bear shirt</i></p>	<p>ei tee mubi <i>don't make truck</i></p>
<p>1;05.18 First Poss First T</p>	<p>Makkus sünnipäev <i>Markus's birthday</i></p>	<p>kinkis traakuk onu <i>Uncle gifted a book</i></p>
<p>1;05.18 First D</p>	<p>seda tomatit <i>this tomato</i></p>	<p>1;06.26 First C</p> <p>mis me teeme? <i>What do we do?</i></p>

Table 2.17: Martina Structure Development

not seem to be any relationship between the acquisition of these features and her use of subjects and possessors. The final section specifically compares Martina and the other two Estonian learners; some possible explanations for the different patterns will be discussed.

2.3 COMPARISON AND SUMMARY

With the individual children's acquisition paths discussed, this section turns to a comparison of their paths and what their similarities and differences can show. Each of the factors discussed in the previous sections will be addressed in turn. Table (2.18) summarizes some of the important milestones in their syntactic development.

	N/V		Poss/T		C/D	
	Age	MLU	Age	MLU	Age	MLU
Andreas	1;07.24	1.1	1;10.22	2.6	2;01.12	4.0
Hendrik	1;08.13	1.1	1;10.10	1.5	2;01.04	1.98
Martina	1;03.15	2.27	1;05.18	3.86	1;05.18 (D)	3.86
					1;06.26 (C)	4.22

Table 2.18: Summary of Acquisition Points for Parallel Structural Positions

An important note must be made regarding the method of comparison. In the previous discussion of the individuals, all comparisons were made with respect to the age of the child. In this section, that comparison must necessarily change. Figure (2.14) shows a best-fit curve for the change in each child's MLU over the time they were analyzed.

This graph shows that each child develops at a different period of time. This is to be expected, of course, but it also means that comparing the children at particular ages will not suffice to make appropriate conclusions. If we talk about what a child is doing at a certain age, we cannot expect another child to be at a comparable stage.

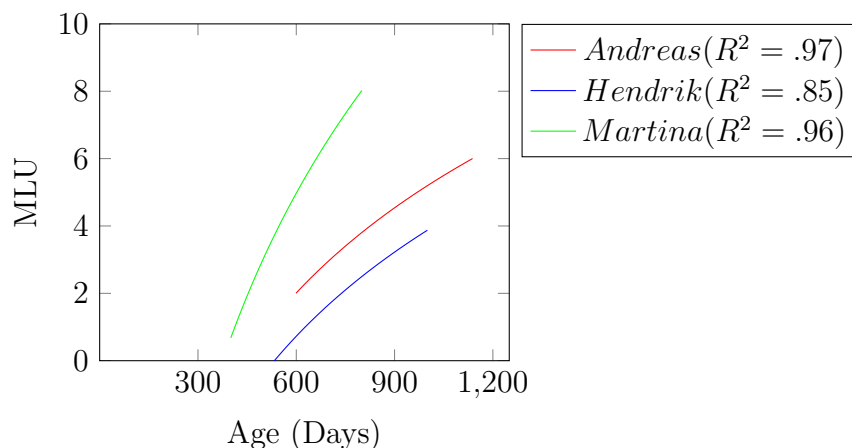


Figure 2.14: Estonian Children MLU Comparison

To work around this, all comparisons between the children will be done based on their MLU.

The second point to be made from this figure is that it also shows some broad similarities and differences between the three children. Andreas and Hendrik show very similar trajectories for MLU. Though Martina seems to be around 150 days earlier than Andreas for any MLU, their rate of increase is very similar. The high R^2 values (.85 being the lowest) indicate that this curve fits the data well and growth is steady.

This figure also shows how Hendrik contrasts with the other two. His MLU is significantly behind both the others, achieving by three years what Andreas had around two and Martina around 18 months. The rate of increase is also much slower—at around 600 days he and Andreas are at nearly the same point, with an MLU around two, however by the end, Andreas's utterances are nearly double his.

We can expect that Andreas and Martina will, all other things being equal, show similar results for any particular data comparison. Ways that they are different, if they appear, will require a further look because their overall productive language ability seems similar. The flip side of that is that we expect Hendrik to be different from the other two. If Andreas or Martina, who show very quick MLU growth, nonetheless show other developmental trajectories like the relatively delayed Hendrik, this will need explanation. With this broad MLU overview in mind, the discussion may move to the details of the functional categories to be examined.

Recall that the reason for tracking the particular elements chosen is to give a sense of the development and growth of functional elements in the child's grammar. The first aspect to address is the prevalence of overt case morphology, which is taken as an indicator of the existence of full DPs. For Estonian, this can be a bit of a tricky area to pin down. For the semantic cases, it is easy to decide whether a particular noun has overt case morphology, as there are clearly different case suffixes that are unambiguous. On the other hand, nominative, genitive, and partitive forms have no entirely regular forms, and often two or more will share the same form.

For simplicity's sake, however, all clearly non-nominative nouns were counted as having overt case. This has the affect of slightly under-counting prevalence of non-nominative case when nouns have identical nominative and genitive forms. Because this was consistently done for each child and session, the comparison should still be reliable for showing relevant differences.

Initial sessions with the children contain plenty of nouns, though relatively little syntax, thus little to suggest functional structure beyond *n*. Some typical example utterances are shown in (5), below:

(5) a. must kiisu
 black kitten
Andreas, age 1:10.22

b. kommi ei
 candy NEG
Hendrik, age 2:01.04

c. see kati
 DEM broken
Martina, age 1:03.15

These kinds of utterances definitely indicate nouns, but there is no evidence in them for extended projections, just a nominal being combined with an attributive adjective (5a), a negation marker (5b), and a predicative adjective (5c). These indicate Merge and suggest headedness, but they do not indicate anything more complicated. Any noun with overt morphology must, by assumption, have functional structure. Other evidence for functional structure could be demonstrative determiners or quantifiers, however these are always optional. Case, on the other hand, is necessary once acquired. As the children approach the levels of case-morphology supply that matches their input, it shows that their production is becoming more adult-like. Examining Figure (2.15) reveals that all three children have similar amounts of case markers at given MLUs.

The dotted line segments along the vertical axis show the level of overt case in each child's input, with the colors matching the color that child's line. Andreas's and Hendrik's input levels are nearly identical, with Martina's just slightly below

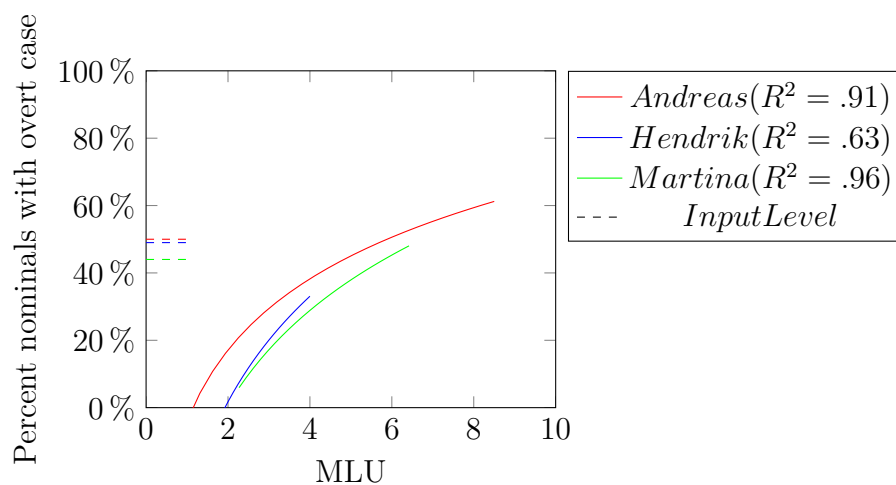


Figure 2.15: Estonian Children Case Comparison

them. Their closely-aligned input is mirrored by the similarities in the output. For the MLUs where there is data for all children (between 2-4, roughly), the lines are nearly on top of each other. Because Andreas's and Martina's trends approach their input level, it seems that, quantitatively, they have a rather adult-like use of case marking. Hendrik is on his way there. Taking into consideration Hendrik's slower MLU growth suggests that his delay in producing longer utterances is not the result of a difficulty with nominal morphology—case is supplied as often as by the other children— and pronouns, another indicator of functional DPs, appear more often.

Another look at case is provided in (2.16). For each child, there are four sets of lines representing the acquisition of each of the grammatical cases and semantic case, with the dotted line in each set representing case on pronouns and the solid showing case on full nominals. The lines represent the MLU achieved by each child when the case is first acquired, while the symbols show the very first example of each case marker. The graph allows us to compare when different cases were acquired on

which nominal elements across the children. One important consideration is whether the syncretism of accusative and genitive is hiding any important differences in the acquisition of genitive case. To determine this, each child's data was examined at the earliest stages where distinct case forms were first being acquired. Though there were many instances of genitive nouns that were objects rather than possessors, this did not change the point at which a POSS-assigned genitive case could be said to be acquired for any of the three.

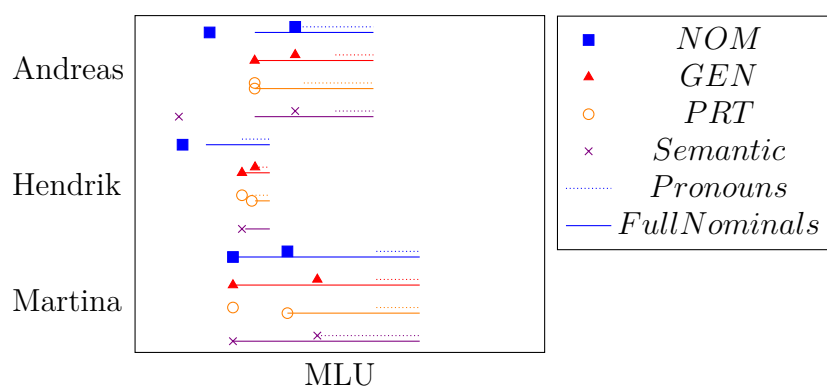


Figure 2.16: Estonian Case Acquisition Timeline

Symbols indicate first appearance of particular case form; line segments indicate point at which case form was considered *acquired*, which was determined by its appearance on multiple nouns/pronouns.

The large differences in the children's MLUs when different cases are acquired shows some independence between MLU and these features, though the fact that many cases are acquired so early may obscure initial differences. There are some general patterns that are shown. With one exception, case is acquired on nominals before pronominals. The exception is Hendrik's early use of a partitive pronoun, shown by the orange lines in the middle of the graph. Hendrik's MLU does not get to the same length as the other children, though he acquired pronoun paradigms much earlier— even under an average utterance length of four, Hendrik has a variety of pronouns, which Andreas and Martina do not achieve until beyond six.

Relating this to subjects and possessors suggests a closer look at genitive and nominative case-marking, which are assumed to be related to the extended projections of the noun and verb, respectively. For Andreas and Hendrik, we see that genitive pronouns are acquired after nominative. For Martina, they are acquired at the same time. This suggests that the capacity for subjects comes somewhat before the capacity for possessors. In Section (2.1), it was suggested that accusative case is syncretic with nominative and genitive forms, which has the unfortunate effect of blurring the acquisition of the grammatical cases. If some nouns that are genitive on the surface are underlyingly accusative, this creates more potential distance between when NOM and GEN are acquired. Because nominative never comes second, it still shows a preference for T-related morphology.

Another attempt at understanding the children's grammar related to DPs is their use of pronouns, which is depicted in Figure (2.17). The dashed lines along the vertical axis indicate levels of pronouns in the input, while the solid lines show the growth in percentage of nouns that are pronouns. Following Abney (1987) and others, pronouns are functional, represented as a D. Though there is no complement, the D represents the highest level of a nominal's extended projection. Growth of this category indicates a developing ability to produce functional structure and make use of the kind of projections necessary for assigning case and agreeing. Children's facility with these features, like case-morphology, demonstrates an ability to produce functional structure.

Input is again similar for the two boys, with Martina's input supplying relatively fewer pronouns. In production, however, each of them uses consistently higher and higher percentages of pronouns in their speech. Andreas and Martina show very similar patterns, though Hendrik has a quite impressive rate of pronoun use. As noted previously, Andreas has the habit of referring to himself as *Atsu*, which surely reduces

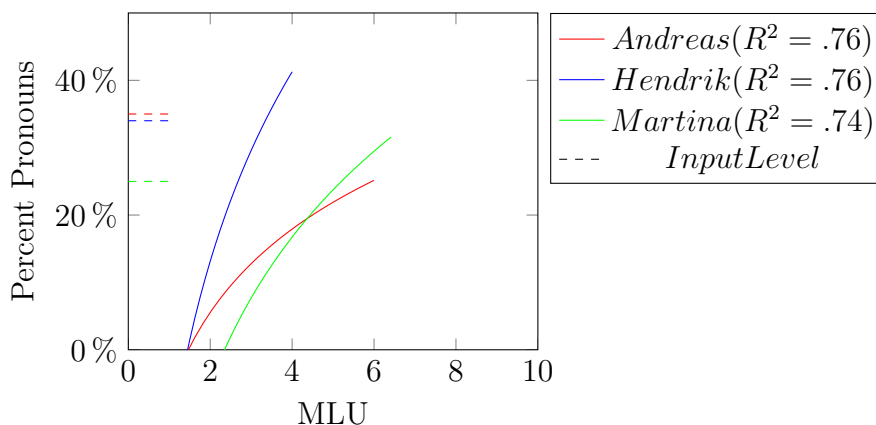


Figure 2.17: Estonian Children Pronoun Comparison

his rate of pronouns, though it is unknown whether this would significantly impact his overall production rate. Though the trends indicated here do not model the data as well as seen for MLU above, the R^2 values above .7 suggest a reasonably good fit for all.

Moving into the development of functional material in the verbal extended projection takes us first to verbal agreement. Figure (2.18) shows the growth in agreement morphology compared against MLU, with the input levels again shown along the vertical axis. Martina and Andreas (green and red, respectively) are nearly identical, with Hendrik's agreement basically missing. The possibility that Hendrik simply is not exposed to agreement is rejected by the input rates that are nearly identical to the other children's.

The difference between Hendrik's capacity for functional material in the nominal domain compared to verbal agreement is striking. Whether Hendrik's issue is one with morphological agreement or one with morphology more general to the verbal domain should be able to be seen via analyzing how often tense and aspect are

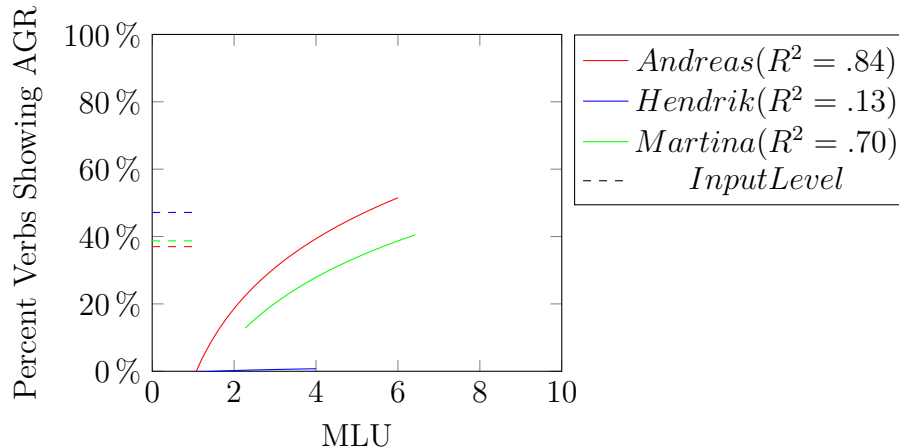


Figure 2.18: Estonian Children Verbal Agreement Comparison

marked compared to the other children. Hendrik's facility with other indicators of functional features might also suggest a difference in his ability to manage elements in the extended projections of nouns versus verbs.

Figure (2.19) shows the percentage of verbs that appear with additional morphology (tense, mood, and aspect) plotted against MLU. Once again, Martina and Andreas are rather similar. Unlike with agreement, Hendrik also appears to be in control of this element of morphology. Though much less consistently growing than the other two, as indicated by the relatively poor fit of the trendline shown in the figure, Hendrik produces verbal morphology at a slightly greater rate than the other two. This indicates that Hendrik's problem is specifically with ϕ -features and agreement, not an issue with projecting an additional head in the syntax. Whether this issue also extends to subject- and possessor-related elements will be addressed in the pages ahead.

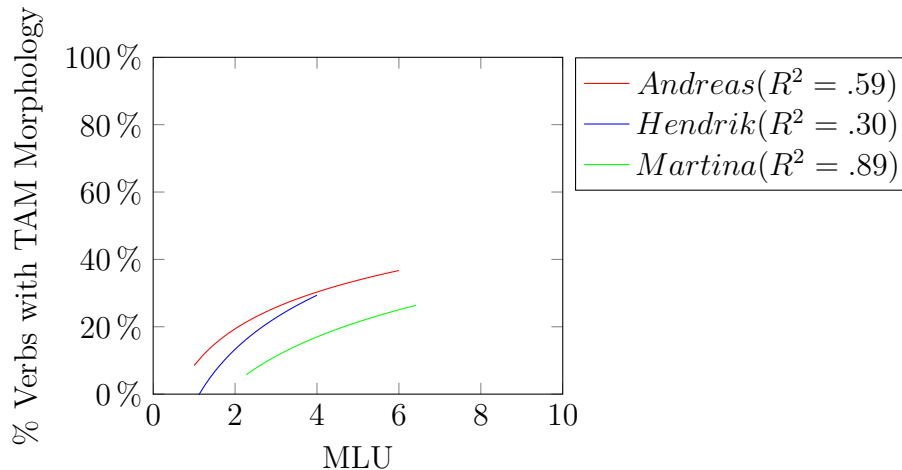


Figure 2.19: Estonian Children Verbal Morphology Comparison

With a thorough comparison of the development of functional material related to the extended projections of the noun and the verb, the initial research question can be posed. The first question asked whether there is a relationship between genitive case-assignment by Poss the DP to nominative case-assignment by T. Table (2.20) repeats the case acquisition data from Table (2.16) with some more information added.

Unlike the previous version of this table, this version also indicates the position where the first subject was attested, the first possessor, as well as the first agreement morphemes and tense marker. In this way, it can be seen whether there is a relationship between the different case assignment and the structural positions available. Andreas and Martina both showed all tense, agreement, possessors, and subjects for the first time during the same session. There was, however, a slight difference between nominative and genitive case-marking, as indicated by the difference between the blue lines and the red lines. If there were a strong relationship between a particular type of case-marking and the structural position associated with that case, then we would

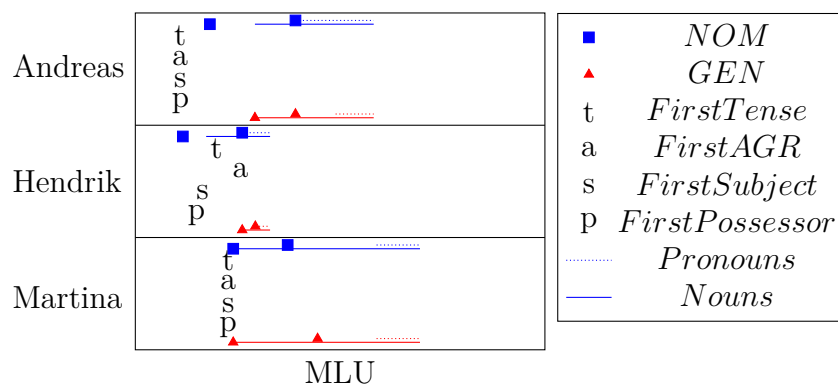


Figure 2.20: Estonian NOM-GEN Case Acquisition Timeline
 Letters indicate the MLU at which an item was first uttered by the child; symbols indicate first appearance of pronoun/noun in specified case.

expect to see that nominative case and tense or agreement to have some association. Likewise, the appearance of subjects would be related to nominative case and possessors genitive case. None of this is seen.

Hendrik provides slightly more informative data, with a slight spread in the first appearance of the important features, as well as a spread between appearance of nominative and genitive case. The relationship is not what would be expected. Nominative case precedes genitive case; however, the items which cluster with nominative (tense, agreement, subjects) actually appear after the first possessor. Whereas Andreas's and Martina's data offers all the morphological data at the very start of the sessions, thus not illuminating things one way or another, Hendrik's data indicated a focus on T-related elements before he moves on to Poss-related ones.

The second research question identified earlier concerns whether the appearance of a particular feature or structural position in one domain predicts its appearance in another domain. This can be divided into two discussions: one for features and

one for structural positions. For features, the idea is that once a feature or feature combination is acquired, it should be accessible to grammatical operations in both verbal and nominal domains. For Estonian, this means that verbal agreement for a feature will appear along with pronouns with the same features.

To determine whether such a relationship exists, the difference in MLU between the sessions where a feature combination was first uttered in a nominal context and first uttered in a verbal context were compared— that is, agreement and pronouns. Numbers closer to zero indicate a close relationship; numbers further from zero indicate a preference for either nominal or verbal environment. The results are shown in Figure (2.21):

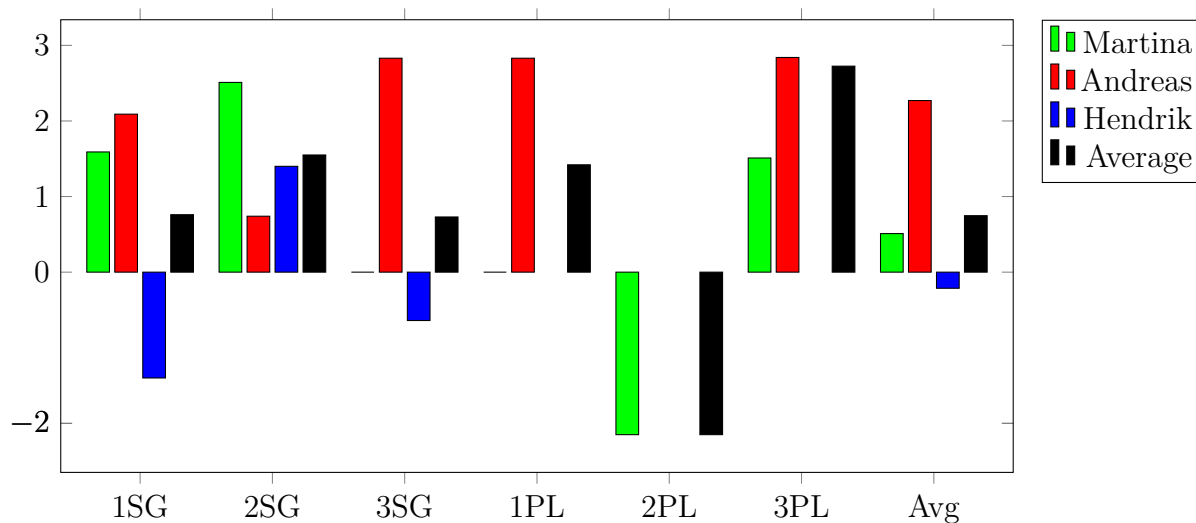


Figure 2.21: Nominal / Verbal Feature Preference

Positive numbers indicate agreement preference; negative numbers indicate pronoun preference

Once again, the data represented in Figure (2.21) suggests no close relationship between the acquisition of features in the verbal and nominal domains. Andreas shows a very strong tendency to acquire agreement morphology first. Martina's data presents a mixed picture, with two of the six combinations appearing at the same time, one favoring the nominal domain, and three favoring agreement. Finally, Hendrik shows

no agreement whatsoever for plurals, and singulars come out mixed. Of the three, Martina is most suggestive of some sort of a relationship between the two domains, but this is mostly due to the very large preference for 2PL; otherwise her data also shows a preference for agreement.

Moving on from shared features in verbal and nominal domains, grammatical functions associated with structural positions will be analyzed next. As outlined in Chapter (??), subjects in sentences are structurally parallel to possessors in DPs. The data for the three children show that the development paths for nominals are largely similar at a given MLU. For verbs, it was shown that agreement morphology, which is a feature of the T head, was not mastered by Hendrik, though other elements of verbal morphology were seemingly acquired by all children. If the parallel between subjects and possessors is used by the children as they learn, then this will be reflected in the data on possessors and subjects. If any differences emerge between Hendrik's possessors and subjects and the others, it suggests that Hendrik's issue is not with T/Agr itself, but a broader issue with functional features within the different extended projections. This was confirmed when Hendrik's tense morphology was shown to be growing just as steadily as the other children.

The comparison between subjects and possessors is interesting structurally, though it is not clear how to best examine this relationship in the actual production data. Though nearly all utterances will have subjects, there is never a requirement that any noun be possessed. Despite the difference in the obligatoriness of subjects and possessors, both are expected to increase over time. Whether this increase in subjects and possessors is related to other morphology, such as tense-marking, agreement, or to each other, for any particular child will show whether the theoretical parallels described are being used in by the children.

With that background in mind, the trends for each child's subject and possessor rates may be examined. Figure (2.22) shows the development of subjects in two different ways⁶. The solid lines plot the MLU against the percentage of all nouns that are subjects. The dashed line plots the percentage of all utterances which contain a subject. These two methods were done to find both the total rate of subjects (the solid line) as well as one that takes into consideration the fact the adjunct phrases will also potentially be growing (the dashed line.)

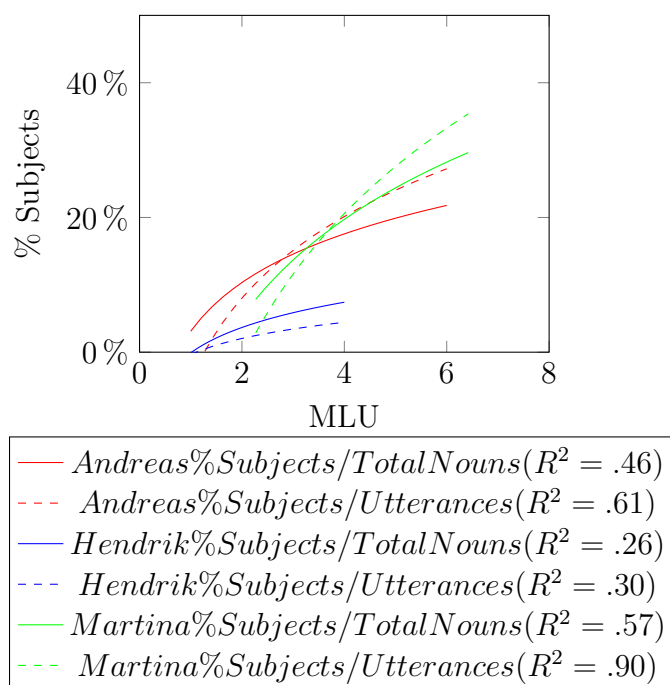


Figure 2.22: Estonian Children Subject Rate

The solid line's low R^2 values indicate a poor fit to the data, with only Martina's production data with a relatively good fit. This is somewhat to be expected, however, as subject growth will likely coincide with object and adjunct growth. The dotted

⁶A noun was considered a subject if it was nominative, appeared along with a verb, and was not the object. This ruled out nominals in utterances smaller than a clause. Pro-drop is a possibility, though potentially null-nouns were not counted as subjects. In many cases, the verb would agree with the subject, though to make sure to not simply be reiterating agreement trends, agreement on a verb was not necessary to consider the noun a subject.

lines in the figure suggest a relatively higher rate of subject inclusion in Martina and Andreas, though it actually reduced the percentage of subjects seen for Hendrik. Nonetheless, for all three children, the subjects/utterance measure reflects a consistent trend more clearly than looking at the percentage of all nouns.

Hendrik's relatively lower dotted line is actually an illuminating result. Recall that Hendrik also has difficulty with agreement marking, indicating at least some discrepancy between his T and the target T. The fact that the solid line shows higher growth indicates his adjuncts and object nominals are increasing at a good rate, but that subjects are not. The semantically meaningful parts of T (being tense, aspect, and mood) are growing, but the functional elements (case-marking, agreement, EPP) are lacking. What remains to be seen is whether there is a similar relationship with possessors with Hendrik and the other two Estonians.

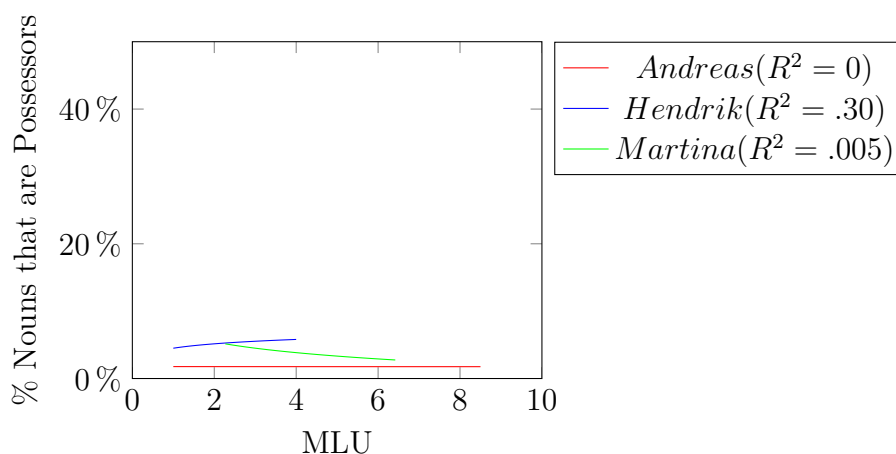


Figure 2.23: Estonian Possessor Percentage

The data for the three Estonian children is graphed in Figure (2.23), with the percentage of all nouns that are possessors compared against the growing MLU. The figure above shows, basically, no relationship between MLU and Possessors. Despite the strong relationship across every other feature tested, the production of possessors

does not seem to grow in relation to MLU. Similarly, the ability to make use of functional projections (measured via use of pronouns or overt case-marking) does not correlate. While functional projections are necessary for case-assignment, agreement, and providing a syntactic position for possessors, their presence is apparently not sufficient for possessors to appear often.

There is possibly another variable that correlates with the rate of possessor use. Perhaps possessors simply increase with time and not with respect to any grammatical variables. This fact was shown to be slightly true in the previous sections. Alternatively, they might not grow as a percentage of all nouns: over the same time period we expect possessors to grow, we also expect to find more nominals in adjunct phrases, so possibly the number of utterances with possessors increased. This comparison, seen in Figure (2.24), indicates a slight increase in the likelihood to find possessors in an utterance as the grammar grows in complexity:

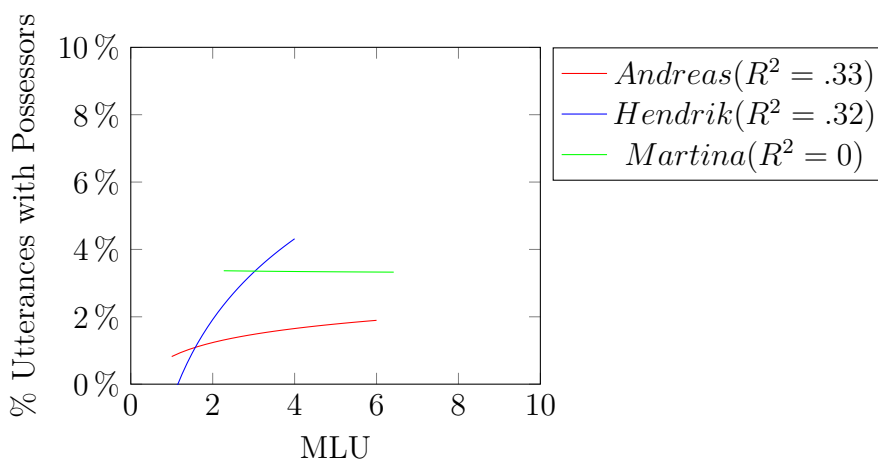


Figure 2.24: Estonian Percentage Utterances with Possessors

The results for Estonian, in summary, do not indicate a relationship between how the children acquire features and case-marking across nominal and verbal domains. Morphological details of each part of the language seem to be acquired independently.

Syntactically, on the other hand, it seems that there is a relationship, with parallel projections in each domain appearing in the children's production at the same time. This might be a characteristic of language acquisition, or it may simply be characteristic of Estonian. Perhaps other languages where the parallels are more explicit, such as Hungarian with its possessor agreement, allow for the parallels to guide the children. Alternatively, the complicated morphology of the Estonian DP might place burdens on the learner that an acquirer of a language such as English, with its simpler nominals, does not face. This could allow the parallels to be more easily accessible. These comparative questions will be discussed in greater detail in Chapter (??).

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