Linguistic Theory
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Principles and Parameters in language acquisition and language change

1 Introduction

In spite of surface differences, languages share a great number of properties. Assuming that there is an independent module for language in the brain (called the language faculty or the language acquisition device, LAD) born with us, we can offer an explanation for the observation that, in spite of the difficulties (the complexity of language, the problems related to the input), children pick up their first language relatively fast and surprisingly easily with only few wrong turns. This language faculty has been claimed to contain a universal base, a universal grammar (UG) which contains the core shared properties of language together with parameters that allow for cross-linguistic variation. The present study focuses on this notion of the language faculty and how it affects language acquisition and language change. Our approach is going to be contrastive in nature with a systematic discussion of data from mainly but not exclusively English and Hungarian.

2 The Principles and Parameters model

Based on the above, our task is the following: modelling language in a way that can account for its universal properties but at the same time also allows for differences between them. One of the most influential theories undertaking this task is the Principles and Paramaters (P&P) model discussed in Chomsky (1981) claiming that the language faculty contains universal principles accounting for the shared properties of languages. Principles work in tandem with parameters, which can be defined as (binary) choices accounting for the differences between languages and also language change as we will see later.

One way to put it could be saying that when we are born “we know too much”, our task during the process of language acquisition is choosing the right parameters of our mother tongue or tongues.

Let us consider a simple example from the domain of word order facts. A Verb Phrase (VP) may be made up of a transitive verb (Vtranz) and its object (O).[1] It is easy to see that this in itself does not define the order of the two constituents. However, within a language the order has to be specified, to put it bluntly, in order to be able to speak (and when doing so we have to put words one after the other, language is linear) we have to choose between the OV or the VO order.

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[1] Of course other options are also possible, intransitive verbs can form a VP alone, ditransitive verbs like *give* have two objects, complex transitive verbs like *put* have an object and another complement.

Within the P&P model then, language acquisition can be defined as selecting and fixing the parameters characteristic of the language being acquired. How can it be carried out? This is the point when the role of the input becomes important, and when it becomes clear why it is not enough to be born with the language faculty: Based on the input we receive from the environment (i.e. people talking, using language around us) we have evidence for a given parameter setting. If we can hear lots of OV patterns the value set for the OV/VO parameter is going to be OV, and, predictably, a lot of VO orders are going to lead to a VO setting. Language acquisition therefore is not simply repetition, imitation, but an active process of observation and rule-formation.[2]

To give an example for a principle, a universal property of language we could mention structure dependence. What it means is that in language there are no counting rules, language is not simply a linear construct, but is organised in a hierarchical way with certain groups of words forming units that undergo different syntacic processes together. One construction that we can use to illustrate this is yes/no questions.

During the process of language acquisition children are exposed to structures like the following:

(1) a. Daddy is sleeping.
b. We are going to eat.

The matching yes/questions are easy to form:

(2) a. Is Daddy sleeping?
b. Are we going to eat?

Based on these pairs of sentences there are (at least) two ways to form the rule for yes/no question formation, a structure-dependent and a structure independent one. According to the structure- independent rule a yes/no question can be formed by taking the second word of the sentence and placing it into initial position. It is easy to see that the structure-independent rule does not work: as soon as we have subjects made up of more than one word, we need to abandon it, (3c) is ungrammatical, almost seems to be gibberish.

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[2] So much so that children usually do not respond to adult corrections, as illustrated by the following conversation between father and child:

Child: Want other one spoon, Daddy.
Father: You mean, you want the other spoon.
Child: Yes, I want other one spoon, please Daddy.
Father: Can you say "the other spoon"?
Child: Other . . . one . . . spoon.
Father: Say "other".
Child: Other.
Father:"spoon".
Child: Spoon.
Father:"Other spoon".
Child: Other . . . spoon. Now give me other one spoon? (Braine, 1971)

(3) a. The cats are sleeping.
b. Are the cats sleeping?
c. *Cats the are sleeping.

Based on the new pattern a rule according to which we use the first auxiliary to form yes/no questions could be hypothesized, but even this is not enough, see (4).

(4) a. The cats that are sleeping should be chasing mice.
b. Should the cats that are sleeping be chasing mice?
c. *Are the cats that sleeping should be chansing mice?

The right rule then is one that identifies the relevant auxiliary to be the one following the subject of the sentence. The important observation, also discussed in Craig-Lillo-Martin (1999), is that children never make structure-independent types of mistakes during the process of language acquisition. It cannot be explained by saying that they are more complex: they are not. We cannot say that the human brain cannot function in structure-independent ways: it can, .e.g. in mathematics. But it cannot function in a structure-independent way in the realm of language, which makes structure-dependence a good candidate for a language universal.

2.1 Word order in the languages of the world

The OV/VO parameter is only one of the word-order related parameters. Another major parameter distinguishing the languages of the world in terms of word order groups languages into fixed word order languages and free word order ones. Languages with fixed word order can be either structure configurational, where word order is defined by grammatical functions like subjecthood and objecthood, or discourse configurational, where it is discourse functions such as topichood or focushood that define the ordering of sentence elements. English is very easily identified as one of the structure configurational languages with an SVO order, while Hungarian, formerly described as a language with free word order has proven to be a discourse configurational language upon closer inspection. The next section presents some data illustrating some of the main differences between the two languages.

2.2 English and Hungarian data

Based on what we can see in the examples in (5) it is easy to see why Hungarian used to be described as a free word order language. The three constituents of the sentence, the subject, the verb and its object can appear in every possible order.[3] As we can see, the English translations are always the same.

(5)	Péter	meg-hívta	Mari-t.	Peter invited Mary
	Peter-NOM	Preverb-invited	Marit-ACC	
	Marit meghívta Péter.			Peter invited Mary
	Péter Marit meghívta.			Peter invited Mary

[3] Languages with a rich case-system are more likely to allow for the "freedom" of word order attested in (1). The presence of the *–t* object marker makes it easy to idetify the nominal expression as the object of the sentence irrespective of its position.

Marit Péter meghívta.	Peter invited Mary
Meghívta Marit Péter.	Peter invited Mary
Meghívta Péter Marit.	Peter invited Mary

So why do we still say that Hungarian is not a free word order language? It is because the word order patterns attested above are not the only orders we can observe, at least when the verb has a preverb as well. In those cases when there is an emphasized element called focus in the sentence, e.g. because it introduces new information as an answer to a question, or there is an idea of contrast involved, the focused constituent has to appear directly in the position preceding the verb, so much so that in these sentences the preverb appears *after* the verb. This is what we can see in (6).[4] The focused constituent is preceded by the topic containing old, known information, *Péter*, the subject of the sentence in (6a), and *Marit*, the object in (6b).

(6) a. Kit hívott meg Péter? (Who did Peter invite?)
Péter Marit hívta meg.
Marit (hívta meg Péter).

b. Ki hívta meg Marit? (Who invited Mary?)
Marit Péter hívta meg.
Péter (hívta meg Marit).

The fact that there is an obligatory position for the topic and focus constituents in Hungarian indicates that the language is discourse configurational.

2.3 Word order with quantified expressions

When a Hungarian sentence contains a quatified expression it either appears in the postverbal domain (7a), or, when appearing preverbally, its position is between the topic and the focus. Accordingly, in (7b) Mary is a focus, as also indicated by the exhaustive interpretation indicated by *csak* 'only' characteristic of the preverbal focus position, while in (7c) it is a topic, 'only' cannot be inserted in that position. That is, (7c) contains two topics.

(7) a. Péter (csak) Marit hívta meg minden nap.
Peter only Mary invited PV every day
'It is (only) Mary Peter invited every day.'

b. Péter minden nap (csak) Marit hívta meg.
'It is (only) Mary Peter invited every day.'

[4] Focusing goes together with focus stress on the emphasized constituent, and when there is no preverb appearing together with the verb it is the sole indicator of focussing. See the contrast between (i) and (ii) where capitals indicate focus stress. (i) is a neutral sentence without a focus stress, in (ii) the constituent directly before the verb receives focus interpretation due to the extra stress on it. Note that the word order of the two sentences is the same.

(i) Péter könyvet vett.
(ii) Péter KÖNYVET vett. (As an aswer to 'What did Peter buy?' or a correction: It is a book that Peter bought (and not a sandwich))

c. Péter Marit minden nap meghívta.
As for Peter, Mary was invited by him every day.

Based on the data discussed so far we can come up with (8) as the generalisation on Hungarian word order. The data in (9) give examples for some of the different patterns.

(8) Hungarian word order:

(Topic(s))> (Quantified Expression(s))> (Focus) > Verb > (Other)

(9)	a. Topic > Verb > Other	Péter meghívta Marit. Marit meghívta Péter.
	b. Topics > Verb	Péter Marit meghívta. Marit Péter meghívta.
	c. Verb(al focus) > Other	Meghívta Marit Péter. Meghívta Péter Marit.

Similarly to having multiple topics in a sentence, it is possible to have more than one quantified expression as well (10), (11). If they appear in the preverbal domain of a Hungarian sentence, the interpretations are going to be different as indicated by the English translations. This leads to the conclusion that word order in Hungarian is also determined by the scope of quantified expressions.

(10) a. Többször is mindenkit meghívtam.
'I invited everyone several times.' several times >> everyone

b. Mindenkit többször is meghívtam.
'Everyone was invited by me several times.' everyone >> several times

(11) a. Ebben a teremben mindenki két nyelvet beszél.
'Everyone speaks two languages in this room.' everyone >> two languages

b. Ebben a teremben két nyelvet mindenki beszél.
'Two languages are spoken by everyone in this room.' two languages >> everyone

If we have a look at the English translations of the Hungarian sentences we can see that the word order of a simple neutral English sentence is Subject > Verb > Object. SVO sentences are ambiguous with respect to the intrepretation of quantified expressions, but English also has a way of disambiguating quantifier scope. The passivised sentences in the translations result in a so-called wide scope interpretation for the object appearing in the subject position meaning that the two languages have to be the same in (11b). The difference between the two languages is that in Hungarian scope-based ordering a "cheap" operation, it is what word-order is based on, while in English it is a costly process leading to further morphological changes (in the form of the verb and the use of an auxiliary).

The following section discusses English and Hungarian from a diachronic perspective.

3 Old English and Old Hungarian

3.1 OV/VO in Old English

In the case of Old English, written records are available as evidence for OV order being the base order in embedded clauses (12).

(12) ...Þæt he his stefne up ahof
...that he POSS.3SG voice up raise.Past
'...that he raised his voice.' (Bede 154.28; Roberts (2007))

However, in certain constructions deviation from the base order was allowed leading to a so-called right dislocated pattern, where certain constituents turn up on the right of the verb(13).

(13) ...Þæt ænig mon atellan mæge [ealne Þone demm]
... that any man relate can all the misery
'that anyone can imagine all that misery.' (*Orosius* 52.6-7; Roberts (2006))

3.2 Proto- and Old Hungarian

Since the earliest written records are from Old Hungarian, which was already a language with discourse based Topic > Focus > Verb order, reconstructing what Hungarian was like before written records requires detailed intra- and inter-language studies. É. Kiss (2011, 2013) argues that in Proto-Hungarian preverbal constituents had a dual function: on the one hand based on syntactic functions leading to an SOV order, on the other a discourse-based order, leading to the Topic > Focus > Verb pattern. This means Proto-Hungarian was both structure and discourse configurational. While it is true that a typical subject is a topic and an object tends to be the (at least information) focus of a sentence, these functions do not always coincide. The first written records of the Hungarian show a language with a split of information structure and grammatical functions resulting in today's orders (14):

(14) Topic + Focus: preverbal position

S + O + Other: postverbal position

Evidence for the claim that Hungarian used to be an SOV language as well comes from some remnant constructions of today's Hungarian indicative of an OV (in more general terms head-final) order in today's Hungarian. While in an SVO (in more general terms head-initial) language we tend to have prepositions, which is what we find in English, Hungarian has postpositions (15). English as a head-initial language has auxiliaries in a position preceding the verb, while in Hungarian past conditional constructions the auxiliary (one of the very few auxiliaries of Hungarian) has to follow it (16).

(15) a ház mögöt
behind the house

(16) sietett volna
hurried would.have

3.2.1 Data

The written record showing that Hungarian was already discourse configurational as early as the 12th century is the so-called *Halotti beszéd és könyörgés* (Funeral sermon and prayer from the end of the 12th century, the first written record of considerable length). It contains about 50 sentences, with 11 pronounced subjects[5] out of which 3 follow the verb, 8 precede it. Those preceding the verb are topics, foci, or quantificational in nature. Post-verbal subjects have no such roles. The data indicate that both preverbal subjects and objects need information structure properties (they have to be topic, focus or quantified) in order to appear in the preverbal domain of the sentence. Sentence (17) contains a question word. Similarly to English, Hungarian question words undergo wh-movement to a dedicated position in the left periphery of the sentence.[6] In sentence (18) we have an *is*-phrase, which can also appear in the left periphery of clauses. The first sentences are from Old Hungarian, the second from Modern Hungarian.

(17) Miv vogmuc/Mik vagyunk/What we are

(18) Hog es tiv latiatuv szumtuchel
Hogy ti is lát-játok a szem-etek-kel
that you also see-2PL the eyes-your-with
'That you can also see it with your eyes.'

The part of the funeral sermon and prayer that provides evidence for the postverbal order of neutral constituents is the split possessive construction in (19). What we can see there is that the possessive nominal expression, which is expected to form the unit [oz gimilsnek vize] 'the water of the fruit' is split into two parts: the possessor in dative case *oz gimilsnek* appears in the preverbal domain with the possessed *vize* 'water' appearing postverbally.[7] In several languages of the world including English the result would be ungrammatical. What accounts for the grammaticality of the construction in Hungarian is that, as indicated by the use of the definite article, the constituent *oz gimilsnek* 'the fruit's' has already been introduced into the discourse and functions as the topic of the sentence, while *vize* 'water-POSS' is information structurally neutral, so its most natural position is after the verb.

(19) Es oz gimils-nek wl keseruv uola víz-e…
and that fruit-DAT so bitter was water-POSS
És **a gyümölcsnek oly** keserű volt **a vize (=leve)**…
And **the fruit's water(=juice)** was so bitter…

This section has shown that, both English and Hungarian are assumed to have been languages with an underlying OV order, which changed to VO in the history of these languages (with

[5] Another differerence between English and Hungarian is that Hungarian is a pro-drop language meaning that pronominal subjects can be left unpronounced as the person and number marking on the verb makes it redundant.
[6] This position has been argued to be either Spec,CP or Spec,FocP.
[7] It has to be noted that Hungarian has two types of possessive constructions, one where the possessor has dative case, as in the example discussed above and one with a nominative/unmarked possessor. The possessive construction can be split only when the possessor is marked for dative case.

information structure also determining word order in the case of Hungarian). Having introduced some data from the history of English and Hungarian, the following section focuses on the driving force behind language change.

4 Why do languages change?

Languages change for a number of reasons and in a number of ways. The changes that are the most spectacular are the ones taking place in a relatively short time span: the changes in the lexicon of a language. These lexical changes can be the result of borrowings or simply the fact that the world is changing around us. The present discussion focuses on a much slower type of change, syntactic change, the kind of change affecting the structure of a language. Of course this kind of change can also be driven by external influence but the grammars of languages tend to change even without it. Roberts (2007) claims that the process of language acquisition has a central role in this. This is what we are turning to now.

4.1 Language acquisition

Babies identify the properties of their mother tongue based on the input they receive. Roberts (2007) points out that by its very nature, language acquisition cannot be perfect. While we seem to be sharing the same language, there are always tiny little differences that are usually undetected. However, they accumulate with time and this is one of the factors that has led to the word order changes seen in section 3. Though we are born with the language faculty making language acquisition possible, there is no direct relationship between the grammar of the generation providing the input and the grammar of the generation receiving it. The second generation (and, essentially, every generation mastering language) has to reconstruct the grammar based on indirect evidence. Grammar itself is a mental entity resulting in the corpora that serve as the input for language acquirers, and based on this their own grammar can be constructed as illustrated in (20).

(20) Generation 1: G1→ Corpus1

Generation 2: G2→ Corpus 2

Based on this, Roberts (2007) claims that imperfect language acquisition has a crucial role in language change.

Let us have a simplified look at the process of language acquisition returning to the OV/VO, or, in more general terms the head-initial/head-final parameter. This parameter is one of the major parameters languages are characterized by. A consistently head-final language has OV and Verb-Auxiliary order, postpositions, with relative clauses preceding the noun head. In head-initial languages we expect to have prepositions, VO and Auxiliary-Verb orders with relative clauses following the noun head and further correlations can be established (21).

(21) The head-directionality parameter as worded by Roberts (2007:96): for all heads H, does the structural complement of a head H precede or follow H in overt order?

Head-initial properties:

- VO — *buy a book*
- Preposition > Noun Phrase — *with a student*
- Auxiliary > Verb — *can swim*
- Article > Noun — *the cat*
- Noun > Relative clause — *books that we read*
- Complementizer > Sentence — *…that we read the book*

Head-final properties:

- OV
- Noun Phrase > Postposition
- Verb > Auxiliary, etc.

Of course in most of the langauges of the world certain constructions have head-intial patterns while others are head-final, as attested in the Hungarian examples as well. At the same time it is easy to see that consistent patterns lead to the faster acquisition of a given parameter. This leads to a question regarding the approximate time of the acquisition of the headedness parameter.

Traditionally it was assumed that the acquisition of grammar could not begin before 2 years of age, as a minimal lexicon was thought to be required for forming a system of grammar. Of course it makes a lot of sense not to expect small children to be able to identify the headedness parameter before they have any notion of word category, a distinction between verbs and nouns being a minimum requirement. However, as argued in Gervain (2010) babies can do better: there is evidence that they can set the headedness parameter when they are as young as 8 months old.

In order to prove it, babies acquiring languages with highly consistent headedness patterns had to be selected with as little "noise" as possible. Turkish, Japanese and Basque are languages with consistent OV patterns, Italian, English and French are good testing grounds for the VO parameter. The crucial observation is the following: several of the pairs listed in (21) contain constituents where one member is a closed class item, the other an open class one. Closed class items are relatively few in number, whereas open class items have a greater number of words. What it translates into is that closed class items appear quite frequently in the input, while the same open class items can be found more rarely. This produces patterns which differ for children acquiring head-initial as opposed to head-final languages: [frequent-rare] and [rare-frequent] sequences, respectively. The Japanese data in (22) and the Italian data in (23) illustrate this point. The data in (a) show the OV/VO parameter of the languages in question, in (b) we find the matching prepositional or postpositional structures.

(22) a. ringo-wo taberu Japanese
apple.ACC eat
'eat an apple'

b. Tokyo kara
Tokyo from
'from Tokyo'

(23) a. mangia una mela Italian
eat an apple
'eat an apple'

b. su-l tavolo
on-the table
'on the table'

It is easy to see that there are far fewer pre- or postpositions than nouns in any given language. This means that OV languages like Japanese are characterized by noun phrase-postposition, that is [rare-frequent] patterns, while VO languages like Italian have preposition-noun phrase, that is [frequent-rare] sequences (24). The experiment described below is built on this observation.[8]

(24)	Tokyo kara	sul tavolo
	Tokió -ból	az.rá asztal
	'Tokióból'	'az asztalon'
	[rare frequent]	[frequent rare]

4.2.2 Methodology

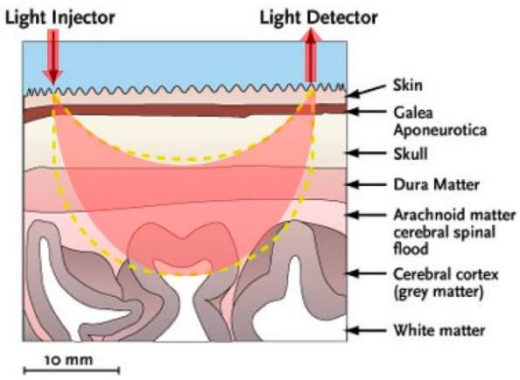
In order to be able to draw conclusions on when babies can first identify the headedness parameter of their mother tongue we need the following:

- babies acquiring consistently head-initial and head-final languages
- very simple input that differs in terms of [frequent-rare] and [rare-frequent] patterns
- ways of measuring the babies reaction to the different inputs

The babies participating in the experiment were babies exposed to Italian and Japanese. The very simple input required was a simple artificial grammar described in section 4.2.3. The babies' reactions were measured in different ways: based on looking times, heart rate and a non-invasive method (near infraread spectroscopy) measuring the infants' brain activity (25).

(25) Near infrared spectroscopy: the way it works. (pictures taken from Gervain (2010))

[8] In more recent work Gervain and Werker (2013) discuss the role of prosody cues of word order in 7-month-old bilingual infants. Besides the rare-frequent vs. frequent-rare patterns, prosody can be a cue for different word order patterns as well.



4.2.3 The input

The input we are exposed to during the process of language acquisition contains a nearly uninterrupted flow of rare and frequent constituents (26), very often lexical categories and functional markers associated with them[9]. Without any e.g. categorial information the same sequence can be identified as resulting from the repetition of either a frequent-rare or a rare-frequent pattern.

(26) …frequent rare frequent rare frequent rare…
…[frequent rare] [frequent rare] [frequent rare]…
…frequent] [rare frequent] [rare frequent] [rare…

Babies were exposed to a flow of simple CV syllables some of which systematically appeared more frequently in the input than others. The frequent syllables can be identified to be *ge* and *fi* in (27). Smaller chunks of syllables were also used to provide unambiguously head-initial and head-final patterns. The chunks in (28a) are head-initial (frequent-rare) patterns, in (28b) we can see head-final ones.

(27) …gefofibugedefikogepafimoge…

(28) a. fifogebi

firugemu
gedofide
gerifipe

b. bagebofi

kafipage
kufiduge
ragenafi

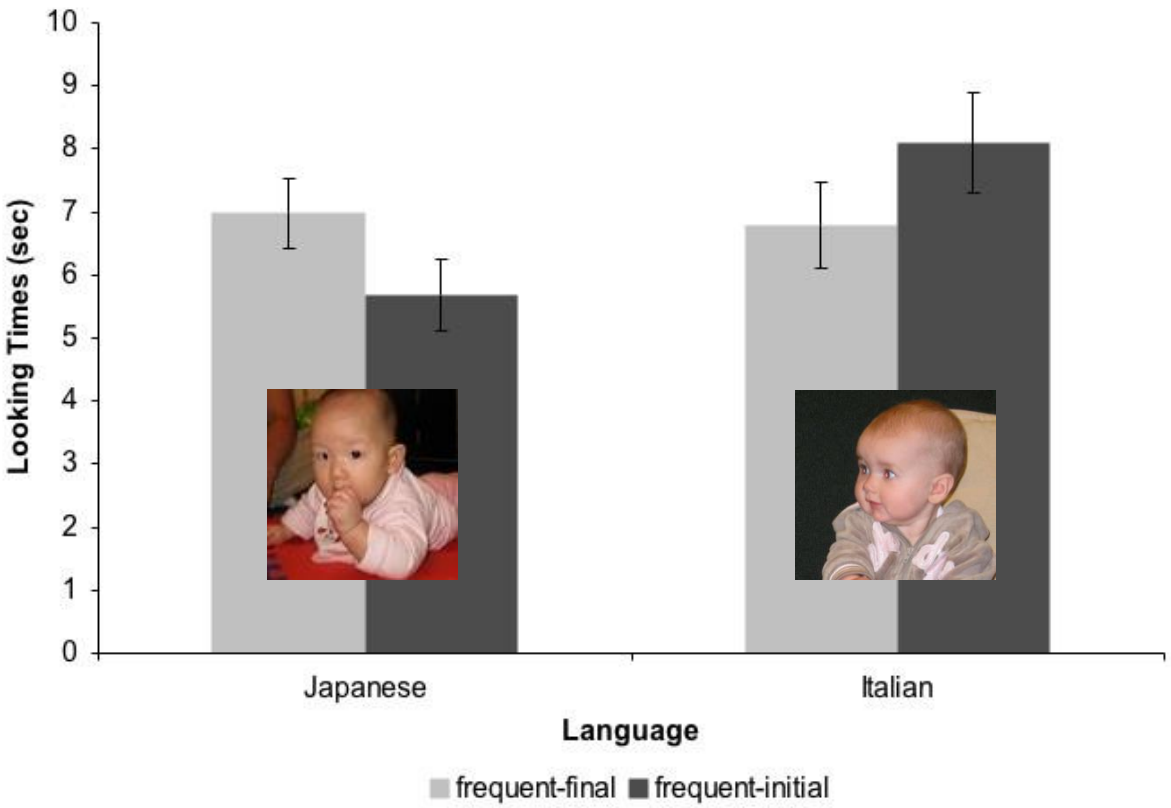
[9] Of course the overall picture is much more complex than this. The length of phrases is subject to substantial variation, and at times certain constituents typically functional in nature do not have phonetic forms. It is due to factors like these that the babies needed a simple artificial grammar as input.

4.2.4 Results

Babies with either a head-initial or head-final background were exposed to both types of input and their reactions were measured in different ways. The table in (29) shows that based on looking times, babies were systematically more interested in the patterns of the languages they were acquiring: while Italian babies showed more interest in head-initial input, Japanese babies payed more attention to head-final data. The other dignostics based on heart rate and near-infrared spectroscopy showed similar results.

The results of the experiment lead to the conclusion that the OV/VO choice is made very early, 8 months old babies could detect the difference. In order to be able to fix this parameter value you do not need a lexicon (the knowledge of - even a minimum number of - words).

(29)



4.3 Language change

We saw in the previous sections that in order to successfully identify the value of the VO/OV parameter as early as 8 months of age the input has to be consistentently head-initial or head-final. In a lot of the languages of the world the input contains both head-initial and head-final structures and there can be other (e.g. discourse) factors determining word order as well.

When the input is not as clear with respect to a certain parameter value as it was for Italian and Japanese concerning headedness, it is not simply the case that the values of the parameters are set later, but the system is also less stable, more prone to change.

When the input is ambiguous with respect to the value of a parameter, the resulting grammar is not necessarily the same grammar as that of the parents. The differences between generations are usually very subtle, unnoticable, but with time they may accumulate. This section focuses on potential triggers for the change in the word order of English and other languages.

4.3.2 OV/VO in Old English

Section 3.1 showed that Old English was a language with an OV order based on written records that contain sentences like (12) repeated here as (30).

(30) ...Þæt he his stefne up ahof
...that he POSS.3SG voice up raise.Past
'...that he raised his voice.'

In certain constructions, however, deviation from the base order was allowed, and this is potentially confusing for the new generation of speakers acquring the language. In Old English, for example, Right Dislocation was allowed, making it possible for certain constituents to turn up on the right of the verb (31).

(31) ...Þæt ænig mon atellan mæge [ealne Þone demm]
... that any man relate can all the misery
'that anyone can imagine all that misery.'

With time more and more constiutuents appeared in this position, and after reaching a critical number the result is a VO language today.

In a number of languages the structure of the matrix clause substantially differs from the structure of embedded clauses, German being the most well-known example. The basic word order of German has been identified to be OV, but the evidence for it comes from embedded clauses only, since in matrix clauses we have a so-called V2 pattern, where the finite verb is always the second constituent of the clause and has to be preceded by constituents of different types and functions. What it means is that the verb does not appear in its base position in matrix clauses, but moves to a higher position in the left periphery of the clause (the CP domain). This often leads to a word order where the object follows the verb blurring the underlying OV order.

The structure of simple sentences, therefore, does not necessarily offer enough evidence for the word order parameter and the base position of the verb. Lightfoot (1991) argues that children recreate grammar based on simple sentences. What all this translates into is that if the OV order is not present in a simple sentence, the setting of the respective parameter is not that straightforward. The absence of the OV order in itself does not make parameter setting

impossible, but in these cases there should be other indicators of OV order. What can they be? Let us compare some relevant Modern Dutch and Old English data. While Old English has lost its OV order, Modern Dutch is an OV language in spite of the fact that it has an obligatory V2 pattern in its matrix clause as well, similarly to German. The question is what clues it offers language acquirers for successfully idetifying the OV value for the headedness parameter.

The sentences in (32) contain Modern Dutch data where a verb and its particle appear in different orders. In (32a) we have a Verb-Object-Particle order. (32b) shows what we can call the base position of the verb in a sentence containing a modal auxiliary. What happens in (32a) is that the finite verb, and only the verb undergoes movement to the left periphery of the clause resulting in the V2 pattern. In (32b) finiteness is associated with the modal, so in that case the lexical verb does not undergo movement. (32b) shows the base position of the lexical verb to be a position after the object. In (32a) evidence for the OV base order is indirect, but still available: the particle itself is stranded in its base position, functioning as the indicator of the base position for the verb as well.

Modern Dutch

(32) a. Jan **belt** de hoogleraar **op.**
Jan calls the professor up
'Jan calls up the professor.'

b. Jan moet de hoogleraar **opbellen.**
Jan must the professor upcall
'Jan must call up the professor

[Roberts 2007:184,(73)]

When we have a look at similar data from Old English in (33), what we can see is that there are no data similar to the ones we saw in Modern Dutch; the particle undergoes movement to the left periphery together with the verb, it cannot be stranded. This results in the loss of the "signpost", a visible marker for the base position of the verb. In tandem with the right dislocation structures the construction contributes to the gradual disappearance of any evidence for an underlying OV order in English.

(33)Stephanus **up-astah** Þurh his blod gewuldorbeagod.
S. up-rose through his blood glory-crowned
(*Homilies of the Anglo-Saxon Church* **I**, 65; Roberts 2007:185, (76))

As (34) shows, the VO order can come about in one of two ways: at the beginning of the change from an OV language to a VO one the underlying representations contain a trace for the object in a position preceding the verb. Of course a VO order can also be base generated. What happens in the period of transition from an OV to a VO language is that the representation containing a trace becomes a representation without it. As long as there is some evidence for assuming the presence of a trace (see e.g. the Modern Dutch data in (32)) the

representation containing the trace is supported by the input. If such evidence ceases to be available assuming base generated VO orders is a more economical option, hence the one entertained by language acquirers. Of course the surface order is going to be the same Verb followed by a noun phrase order in both of the cases, what happens is that a representation containing a trace is reanalysed as one containing base generated orders with no movement once evidence for movement is no more available.

(34) VO order: $[_{VP}\, t_i\ V\ NP_i\,]$ → $[_{VP}\ V\ NP]$
OV base + movement VO base

Robert (2007) notes that the only constructions that show the original OV order in the 15th century texts are sentences containing object DP that are either negative or quantificational. Since both DP types can easily be the result of movement similarly to Hungarian topics, foci and quantified DPs, at this point the language is ready for being reanalysed as a VO language. How and why this reanalysis happens is discussed in the next section on the logical problem of language change.

4.4 The logical problem of language change

What happens when the value of a parameter changes is the following: a given parameter is set to a certain value by the generation providing the input, but based on the input provided by them the next generation ends up with a different parameter setting. This reanalysis, a change in the assumed syntactic structure without surface changes (see (34)), has been claimed to be one of the major triggers of language change. Answering how reanalysis works is all the more challenging because setting the major parameters happens very early, before the two-word stage. For this reason it cannot be observed in actual production. The next section discusses some of the attempts to answer this question.

4.4.1 Reanalysis as the result of abduction

According to Andersen (1973) discussed in Roberts (2007) reanalysis is the result of abductive change. Abduction, as opposed to induction and deduction, is built on a faulty reasoning. In the case of induction we generalise a law based on observations where the result intrinsically follows from the observed cases: based on the observation that human beings die we can conclude that man is mortal. Deduction proceeds from a law and a case to a specific result: if all man are mortal and Socrates is a man we can conclude that Socrates is mortal. In the case of abduction the connection between the case and the law identified is not intrinsic but accidental, and as a result it is open to error. The statement ‘x is mortal’ and the law that all men are mortal do not imply that x is a human being. It is conclusions like this that are defined as abduction. It is easy to see how the process of language acquisition illustrated in (20) is open to abductive change: since there is only indirect evidence for the grammar of Generation 1, Generation 2 can identify parameters that are different from the generation providing the corpus due to the fact that the corpus is often compatible with more than one grammar.

4.4.2 The Inertia-principle, P-ambiguity, and markedness

Abductive change leaves plenty of room for accidental changes and in itself does not explain the systematic patterns that we find in language change cross-linguistically. Of course we do not want to allow parameters to vary randomly from generation to generation, and Roberts and Roussou (2003) also observe that "convergence with the adult grammar 'happens most of the time'." In a stable system the grammars of the two generations are the same. To account for this Keenan (2002) and (Longobardi 2001:278) proposed a principle for syntactic change, the Inertia-principle stating that a linguistic system does not change without a trigger:

(35) Syntactic change should not arise, unless it can be shown to be *caused* (emphasis by Longobardi).

What it means is this: if there is evidence for the value of a parameter, the matching value will be set. Abductive change can happen when the value of a parameter is ambiguous in the input. Roberts (2007:233) defines P-ambiguity the following way:

(36) a. P-ambiguity:

A substring of the input text S is strongly P-ambiguous with respect to a parameter p_i just in case a grammar can have p_i set to either value and assign a well-formed representation to S.

b. A strongly P-ambiguous string may express either value of p_i and therefore trigger either value of p_i.

c. A weakly P-ambiguous string expresses neither value of p_i and therefore triggers neither value of p_i.

If the value of a parameter is not obvious based on the input, there are (at least) two different options to choose from. If it can be assumed that these representations differ in complexity, it can be proposed that the language acquirer selects the simpler one (e.g. the one without movement, see (34)). One way to identify the simpler value is based on the notion of markedness going back to the Prague School and Jakobson (1941): given a binary opposition, the two values can be marked and unmarked, meaning that the marked value is set only if there is evidence for it in the input. If there is no (e.g. morphological) evidence for the marked value, the unmarked value is set. Unmarked values are more economical, and for this reason more frequent. They appear earlier in the course of language acquisition, and may be reset later to the marked value after sufficient evidence for the marked value of the parameter becomes available. The absence of data suggesting the marked value can be taken as evidence for the unmarked value of the parameter. Marked features have a morphological marking the loss of which leads to the loss of marked values. To give a simple (and also simplified) example we can mention the pro-drop parameter: the subject can be dropped if the inflection on the verb is rich enough to allow it. The loss of the inflectional endings usually leads to the loss of the pro-drop property, unless the language offers other means for the identification of the subject.

4.4.3 An English example: a change in the position of the verb

Early Modern English was a language where the lexical verb could appear before the negative particle (37) or and adverb (38) showing evidence for a high position of the lexical verb. The translations indicate that lexical verbs in Modern English appear in a position lower than in Early Modern English.

(37) if I gave not this accompt to you
'if I didn't give this account to you'
(c1557: J. Cheke, Letter to Hoby; Roberts 2007:134)

(38) The Turkes … made anon redy a grete ordonnaunce
'The Turks … soon prepared a great ordnance.'
(c1482: Kaye, *The Delectable Newsse of the Glorious Victorye of the Rhodyans agaynest the Turkes*; Roberts 2007:134)

Simple sentences in simple tenses (39) are strongly P-ambiguous in Early Modern English as well, the data support both the high position and the low position analysis. The loss of a morphological marker (rich inflection) led to the loss of the high position in Modern English.

(39) a. John walketh.

Let us also consider sentences with modals. English modal auxiliaries were used as main verbs in Middle English:

(40) Wultu kastles and kinedomes?
Wilt thou castles and kingdoms?
(c1225, Anon; Roberts 2007:134)

(41) I shall not konne answere.
I shall not can answer.
(1386, Chaucer; Roberts 2007:135)

Slightly earlier than the loss of movement for lexical verbs, modals became high-position elements appearing before negation and adverbs. When modals were present, lexical verbs of course remained in the lower position. Once modals became high position elements, sentences containing modals were weakly P-ambiguous regarding the position of the verb: since the modal is in the high position, the sentence gives no information for or against the high position for the lexical verb.

(42) I may not speak.

By the 16th century there was much P-ambiguity in the language, and the morphological clue for the movement analysis was also lost. As a result, the simpler grammar with a lower position for the verb (meaning less movement) was identified.

4.4.4 Nicaraguan Sign Language (NSL)

This section discusses an extreme case of language change, or, better to say, language creation that supports the markedness hypothesis and emphasizes the role of unmarked parameters and Universal Grammar. While language change is usually a very slow process, Nicaraguan Sign Language emerged in about a decade in a community of around 500 deaf children in the 1980s brought together by the Nicaraguan government as a result of an education-for-all initiative.[10] The primary aim was to teach the deaf children Spanish by using finger spelling, an attempt that failed. However, the children communicated with each other spontaneously using a sign-language pidgin of their own, which the children under seven years of age turned into a complete language: a language with manual or facial signs for relative clauses, topics, different types of questions, inflections, agreement, etc., that is, a full set of functional and lexical categories. The learners who were under the critical age for language acquisition[11] could fill in the information missing from their grammar with unmarked, default features creating a complete grammar, a full-fledged language.[12]

5 Conclusion

We have been discussing the role of parameters in language acquisition and language change claiming that the language acquisition process is one of the major factors that drive the changes in the syntax of languages. In the Principles and Parameters model language acquisition boils down to parameter setting based on information provided by the input. According to the markedness hypothesis one of the two values of a parameter is unmarked and set as a default if there is no evidence available for the marked value of the parameter. This affects both language acquisition and language change. If evidence for the marked value of a parameter disappears from a language, the value of the parameter will be reset to the unmarked value resulting in language change. Whenever language learners have no information on the value of a parameter they also set the unmarked value. This way a complete language system can be formed by the children, at times from scratch, as we saw in the case of Nicaraguan Sign Language. The consequence of this view of parameters and parameter setting is that there will be no ‘holes’ in the grammar, the result is always a perfect, complete system.

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[10] Modern linguistics has shown that, apart from the fact that gestures are used instead of an oral means of transmission, sign languages show all the structural features of natural language. Different sign languages are also subject to parametric variation. As a result, learning another sign language for somebody already familiar with one may be as challenging as learning any other foreign language. Nicaraguan Sign Language is different from e.g. American Sign Language (I am grateful to the audience for asking this question).

[11] The critical period hypothesis (Lenneberg 1967) assumes that language acquisition is not possible beyond a certain age the end-point of which is claimed to be after puberty.

[12] For an insightful video on NSL watch https://www.youtube.com/watch?v=pjtioIFuNf8
To unwind you might want to watch the following karaoke in American Sign Language, enjoy!
https://www.youtube.com/watch?v=KoVDZJqTmRo

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