3. Negation in early L2: a window on language genesis

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Abstract

Early second language has been defined as a restricted linguistic system that can offer a 'window' on language genesis. In this paper, I model the acquisition of negation by L2 (adult) learners as a sequence of constraint rankings in the framework of Optimality Theory. The rankings shift from pragmatics via conventionalization of negation as a focus operator to syntax. Early language is argued to follow the same path. The transition from protolanguage to language is located in the shift from pragmatic combinations of symbols to semantic recursion over propositions as visible in the use of negation as a truth-functional operator. In this view, semantic recursion precedes and drives syntactic recursion.

3.1 Negation, L2 and language genesis

Section 3.1 sketches the background and basic assumptions of the research. We establish the study of restricted linguistic systems as a possible window on language genesis (section 3.1.1). The empirical phenomenon studied in this paper is negation (section 3.1.2). The transition from a protolanguage not involving the concept of proposition to a language stage in which semantic recursion over propositions is visible in the use of negation can be modeled in Optimality Theory (OT) (section 3.1.3). OT has a clear concept of language acquisition. Section 3.2 presents the data on negation in L2 acquisition, based on the so-called ESF project (Perdue, 1993). The ESF project involves two European projects on adult L2 acquisition *'The structure of learner varieties* and *'The dynamics of learner varieties',* and a number of spin offs by research teams from different European universities. Section 3.3 models the transition from pragmatics to syntax in the early stages of L2 acquisition of negation in an OT framework. Section 3.4 formulates possible inferences towards a similar transition in language genesis in an OT system that starts from general cognitive constraints and gradually adds specific linguistic constraints.

3.1.1 Restricted linguistic systems as 'windows' on language genesis

Early second language acquisition is a restricted linguistic system that might provide a 'window' on language genesis, according to Jackendoff (2002), Botha (2004). The uniqueness and complexity of human language make it an important target for evolutionary study. Early stages of human language have left no traces, so the evolution of language is not directly recoverable. It needs to be reconstructed in the context of neo-Darwinian evolution theory and modern linguistic theory (Botha, 2003). Various proposals have been made, but no final agreement has been reached, as is obvious for instance from the recent debate between Hauser, Chomsky and Fitch on the one hand and Pinker, Bloom, and Jackendoff on the other (cf. Pinker and Bloom, 1990; Hauser, Chomsky and Fitch, 2002; Pinker and Jackendoff, 2004; Fitch, Hauser and Chomsky, 2005). This paper offers an empirical contribution to the debate by focusing on the notion of recursion in the conceptual system (semantics) and its interaction with the computational system (syntax).

The paucity of evidence concerning what happened in the very early stages of language evolution makes it attractive to look for indirect evidence that might help us understand the evolutionary process (Botha, 2003). I will follow Bickerton (1990, 1998), Calvin and Bickerton (2000) and Jackendoff (2002), who take language to originate in 'protolanguage'. Via intermediate stages, with more or less gradual or sudden transitions, this protolanguage developed into full language. The study of synchronic varieties of language intermediate between protolanguage and full language may help us understand this process (Bickerton, 1998: 354). Examples of such restricted linguistic systems are pidgins, (early) stages of first and second language acquisition, home signs invented by deaf children of non-signing parents, and aphasia. In a series of papers, Botha (2004, 2006a, b, 2007) discusses the potential of the 'windows' approach on language genesis, and points out the merits and limitations of various windows (pidgins, home signs). Given the wealth of data available within the ESF project, early L2 acquisition is a particularly promising window. Lack of time and space prevents us from working out the patterns in other restricted linguistic systems in this paper.

3.1.2 Negation as semantic recursion

The empirical phenomenon under investigation is negation. Negation is a universal category of natural language (Dahl, 1979). No animal communication system has a full-fledged notion of negation (Horn, 1989; Jackendoff, 2002). Recent research on animal cognition suggests that a concept of pre-logical negation might be available in the cognitive representation of higher animals

(birds, dolphins, primates). On the basis of a review of the literature on animal cognition, Heine and Kuteva (2007) conclude that trained animals are able to develop notions of rejection and refusal, and even of non-existence. However, none of these non-human animals clearly has acquired a notion of denial, that is, the ability to deny the truth or falsity of a given assertion. Accordingly, animals could be ascribed a notion of pre-logical negation, but not full, truth-conditional negation. One obvious reason for this fundamental difference between human language and animal communication systems would be that human language constitutes a recursive system, and animal communication systems possibly lack this feature (Hauser, Chomsky and Fitch, 2002). Negation in natural language is recursive because it functions as a propositional operator: semantically, it takes a proposition p as its argument, and builds a new proposition ¬p out of it. Syntactically, it also involves recursion: it is an optional element that builds a new sentence when added to a sentence. This paper emphasizes the relevance of recursion in the conceptual system (semantics), and the way it feeds into the computational system (syntax) for the debate on language genesis.

Full language implies a notion of proposition that can be operated on by propositional operators. We can model negation as a propositional operator in terms of the connective ¬ from first-order logic. Without making claims about the psychological reality of first-order logic, I will assume that (something equivalent to) first order predicate logic is part of (modern) human cognition, because this logic models important parts of human reasoning. Thus, full languages typically have well-formed expressions that express meanings like ¬p. Full recursion with negation is rare in natural language, i.e. we seldom find instances of multiple negation as in 'She didn't not talk to me,' and tri-negative interpretations seem to be blocked altogether. Corblin (1996) argues that we don't find more than two semantic negations in natural language, because of performance limitations on the processing of complex embeddings. This paper focuses on sentences containing a single negation, because I am interested in the recursion step, not in performance limitations.

Not all occurrences of the linguistic marker *no* or *not* need to be associated with the truth-functional connective ¬. Negative utterances can function as speech acts indicating rejection, internal desire, refusal as well as truth-functional negation or falsity. Rejection and refusal are sometimes described as affective or pre-logical negation (Horn, 1989: 164). I will adopt the conservative position that rejection and refusal are not be properly characterized as signaling semantic recursion over propositions. Clearly, these uses of negation are rooted in the discoursal context, relating the speaker's utterance to actions or utterances of the interlocutor. However, I will base the

claims of negation as semantic recursion in L2 acquisition and in language genesis on instances of negation that are clearly truth-functional in nature.

Protolanguage does not or does not necessarily involve the same notion of proposition and truth-value as full (modern) language. Protolanguage involves linear order of concatenated symbols, organized by pragmatic principles like 'Focus Last' (Jackendoff, 2002: 246-249). It is not necessary to ascribe to the speakers of a protolanguage the conceptual notion of proposition to allow them to combine symbols in this way. A conservative approach would be to posit that protolinguistic utterances are well-formed speech acts that convey meaning, but do not denote propositions with a truth-value. Such a view implies that the notion of proposition emerges somewhere in the transition from protolanguage to full language. It is difficult to make that transition visible in factual language use, because it is a conceptual one, rather than something that can be observed on the basis of linguistic output. The behavior of negation can be used as a pointer under the assumption that one cannot use a propositional operator until one has a concept of proposition. Given that negation is a very foundational concept for human beings, expressions for ¬p would closely follow the introduction of the notion of proposition. Under this scenario, the emergence of a truth-functional operator like negation corresponds with the transition between a protolanguage not involving the conceptual notion of proposition, and a language stage that does. Whether this stage counts as 'full' language or not depends on the criterion one wants to use to characterize 'full' languages. Negation as recursion would certainly be a possible cut-off point, and the one I will adopt here.

3.1.3 Optimality Theory and language acquisition

One complication that arises in a study of negation from an evolutionary perspective is that systems of negation in natural language are widely diverging, as the result of highly complex grammaticalization processes, as is well known from typological and theoretical research on negation. How can we retrace the evolutionary path hidden under this bewildering variety? In de Swart (2008), I explore the range and limits of this variation by exploiting the tools of bidirectional Optimality Theory. Optimality Theory (OT) is a theory of grammar inspired by connectionism. Given that language is a symbolic system, rules (constraints) are defined in symbolic terms. However, language is embedded in the brain, so Prince and Smolensky (1997), and Smolensky and Legendre (2006) develop a 'brainstyle' view of grammar in terms of a harmonic system of interacting, soft constraints. In OT, grammatical well-formedness is associated with a harmony function over a connectionist network. OT uses variable rankings of violable and potentially conflicting constraints to model

aspect of natural language. If constraints that are ranked higher do not discriminate between candidates, we see the force of lower ranked, 'weak' constraints at work. This phenomenon is called the 'emergence of the unmarked'. In line with the windows approach, I will use the emergence of unmarked negation in early L2 acquisition as the basis for my hypothesis on language genesis.

OT constraints come in two types: faithfulness constraints and markedness constraints. Faithfulness constraints specify input-output relations. In OT syntax, a faithfulness constraint relates features of the input meaning that a speaker wants to express to particular formal features of the output syntactic structure. Markedness constraints are output oriented only. They penalize marked (long, complex, infrequent) forms and favor unmarked (short, simple, frequent) expressions. Faithfulness and markedness constraints frequently conflict: a faithfulness constraint might drive the speaker to use a more elaborate form that is penalized by a markedness constraint. In OT, this conflict is resolved by the ranking of constraints: lower ranked constraints can be violated in order to satisfy a higher ranked constraint. Constraints are universal, but the ranking of constraints is language specific. Different grammars arise from the interaction within a fixed set of constraints.

The OT model has been exploited to describe the language acquisition process by Tesar and Smolensky (1998). They posit that the learner starts out with a grammar in which markedness constraints are ranked above all faithfulness constraints, and develops a series of grammars getting closer and closer to the grammar of the target language s/he is acquiring. If formal structure is blocked by the high ranking of the markedness constraints, the learner may not be able to produce any output. If the markedness constraints only concern formal features, the learner may start to understand the language before he or she is able to produce language, when the learner has access to the faithfulness constraints. This approach allows comprehension to precede production, a phenomenon we find in both L1 and L2 acquisition. The task of the learner is to rerank the constraints, and find the right balance between faithfulness and markedness constraints. Reranking takes place in small steps (one constraint at a time), which allows for intermediate stages.

Under the assumption that the constraints are universal, we could assume that the adult learner has access to the constraints thanks to the grammar of their mother tongue. This position would imply access to Universal Grammar in the process of second language acquisition. However, the debate in the literature leaves the issue of full access to UG by L2 learners undecided, and I do not want to be committed to it. Researchers working on L2 acquisition in the context of the ESF project have argued that learners rely on pragmatic

principles to structure their utterances in the early stages of L2 acquisition (cf. Klein and Perdue, 1992; Klein and Perdue, 1997; and others). Syntactic principles do not come into play until later stages. I will follow their idea that in L2 acquisition, grammar is developed again. In order to model the acquisitional path, I propose a sequence of OT systems, in which pragmatic principles of utterance structure are gradually replaced by syntactic rules (section 3.3). In section 3.4, a similar development will be postulated for language genesis. But let us first look at the data on L2 acquisition from the ESF project.

3.2 Negation in L2: data and analyses

We present some preliminaries and early observations on negation in L2 (section 3.2.1), and then define the main stages of L2 acquisition from the ESF project in section 3.2.2. Sections 3.2.3 and 3.2.4 spell out the patterns of negation in the pre-basic and basic variety. Negation in Swedish L2 French speakers functions as a test case (section 3.2.5).

3.2.1 Preliminaries

An important debate in L2 acquisition concerns the distribution of labor between transfer from L1, Universal Grammar (UG), and the cognitive strategies of (adult) speakers who have already mastered a first language. Is the output the result of interference with L1, or is it the result of general linguistic or cognitive strategies? Wode (1981) is an early reference bringing the complexity of this issue to the foreground in relation to the acquisition of negation. Wode's subjects are German speaking children acquiring English as a second language in the United States. They produce utterances showing apparent first language influence, such as (1):

(1) John go not to the school. (Wode, 1981: 98)

In standard modern German, the marker of negation is placed after the finite verb (in main clauses), but of course in English, negation requires *do* support. So the production of English utterances like (1) can be an effect of interference with the German L1. However, Wode points out that his subjects did not produce such sentences early on. Their first attempts at negation were utterances like (2) and (3):

(2) No, Tiff. (Wode, 1981: 98)
(3) No sleep. (Wode, 1981: 98)

They do not produce sentences such as (1) until they have acquired the rule of negation for auxiliaries, i.e., when they produce utterances like (4):

(4) It's not finished. (Wode, 1981: 100)

Wode concludes that first language influence appears in later stages of L2 acquisition, but not in the earliest ones. Most early studies focused on English as a target language, and corpus data were not available on a large scale. Data on a wider range of languages are now available through the ESF project (Perdue, 1993). In this project, longitudinal data have been collected from untutored adult learners (mostly immigrants with no or very limited language training). The focus of the project is on European languages as L2 (English, German, Dutch, French, Spanish). In this section, we discuss the data that have been collected in the ESF project, and the analyses that have been proposed for the different developmental steps taken by L2 learners.

3.2.2 Stages of L2 acquisition and the role of negation in them

The results of the ESF project support the view that different inquisitional stages of the learner can be described as separate linguistic systems. Even if the transitions are not always sharp, it is possible to distinguish three developmental stages, referred to as the pre-basic variety, the basic variety, and the post-basic variety. The pre-basic phase is based on nominal structure. The structure of the utterance is driven by pragmatics, in particular topic-focus articulation ('Focus Last). The utterances consist of two or three constituents (typically nouns, some adjectives and adverbs, no or almost no verbs). The appearance of verbs leads to a new stage of the grammar. The presence of a verbal element allows the building of a relational structure around the kernel of the verb: the notion of predicate-argument structure emerges. The schematic structure of the sentence is NP_1-V or NP_1-V-NP_2 or NP_1-Copula-NP_2/Adj or V-NP_2. During this stage, the verb form shows no morphological reflections of tense, person, number, and there is little or no functional structure. In the post-basic stage, verbal inflection and functional structure appear, and the grammar becomes closer to the target language. There is more variation in the features of the post-basic variety, depending on the target language. However, the pre-basic and the basic variety share many features that are independent of the source language (the L1 of the user) and the target language (the L2 of the learner). It is those features that qualify early L2 acquisition systems as a potential window on language genesis. If learners appeal to 'older' general cognitive principles in the early stages of second language acquisition, we can

take the production in the pre-basic and basic variety to display features of historically early language. Such utterances are then viewed as 'living' fossils. The acquisition of negation by L2 learners with different first language backgrounds and different target languages is described by Bernini (1996), Perdue, Benazzo and Giuliano (2002), Stoffel and Véronique (2003), Giuliano (2004) and others.

3.2.3 Negation in the pre-basic variety

At the very beginning of the learner's process, holophrastic (or anaphoric) negation is used to deny the assertability of a proposition previously mentioned in the discourse.[1]

(5) IN c'est un accident. (Giuliano, 2004: 116)
'It is an accident.'
SF non + *un* manifestation.
'No, a demonstration.'

Holophrastic negation has the function of denial, refusal, rejection or correction, so it does not necessarily function as a propositional (truth-conditional) operator. Already in the pre-basic variety, we find combinations of holophrastic negation with a complete utterance. Dimroth et al. (2003) emphasize the clausal scope of the negator in examples like (6) and (7).

(6)	a.	MAD	nee hier huis	(Dimroth et al., 2003: 74)
			no here house	
	b.	MAD	veel eten nee	
			much eat no	
(7)	a.	PG	nein tasche eh links	
			no bag uh to the left	
		PG	nei platz eh *gazett*	
			no place uh newspaper	

[1] In the examples, IN indicates the interviewer. SF indicates that the speaker's L1 is Spanish, her L2 is French. IE: L1 is Italian, L2 is English. MAD: L1 is Moroccan Arabic, L2 is Dutch. PG: L1 is Polish, L2 is German. IG: L1 is Italian, L2 is German. The data consist of transcriptions of oral material. + indicates a pause. * indicates material borrowed from another language (usually the source language). The paraphrases may insert material not pronounced (between ||). The examples come from different sources. I have followed the author's transcriptions as closely as possible.

In (6a), *hier* functions as the topic, and *huis* as the predicate or focus. The negator *nee* precedes the combination of the topic with the predicate, and takes scope over the entire utterance. Dimroth et al. (2003) claim that the anaphoric origin of the negation operator may explain why forms like *nee* and *nein* are used as opposed to the target form of sentence negation, i.e. *niet* or *geen* in Dutch, and *nicht* and *kein* in German.

Giuliano (2004) also emphasizes the role of topic-focus structure in the pre-basic variety. Besides the holophrastic use of the negator in (5), she discusses the integration of negation in the utterance structure. She claims that the negative utterances in the pre-basic variety come in two versions: NEG + X and X + NEG, where X=N, Adj, Adv. In utterances with the structure X + NEG, X is the topic, and negation functions as the comment. Relevant examples of X + NEG include the following:

(8) IN il y a des taxis (Giuliano, 2004: 116)
SF non + taxis non
'No, taxis no.'

(9) IN so you are having an easy time yes? (Giuliano, 2004: 308)
IE For me yes + for my manager the restaurant no.

(8) is qualified as a topic-focus structure, where the topic of conversation is taxis, and *non* is the comment on *taxi*. Just like Bernini (1996), Giuliano observes that negation functions as a focus operator in constructions NEG + X, in the sense that X is the constituent that is affected by negation:

(10) SF *ahì no* [nepa] là (Giuliano, 2004: 117)
(there, not there/don't look there))

(11) PE daughter's dad + no job (P,B&G, 2002: 858)[2]
(the little girl's father doesn't have a job)

It is sometimes difficult to distinguish holophrastic (anaphoric) negation from non-anaphoric, focus-related negation in this phase, as illustrated by (12).

[2] PE stands for a Punjabi learner of English.

(12) IN Are there English people in the factory? (Giuliano, 2004: 316)
IE No Italian
IN Only Italians?
IE yeah + *solo italiani*
IN mm
IE No English
IN No English?

In 'no Italian', negation has an anaphoric function. In 'no English', the negator functions as a focus operator and affects the constituent *English* to its right. In the pre-basic variety, holophrastic negation, NEG + X and X + NEG make up the inventory of negative expressions of the L2 speaker.

3.2.4 Negation in the basic variety

In the basic variety, the verb emerges as the kernel of the utterance. Argument structure (involving thematic arguments like AGENT, THEME, GOAL) evolves along with the verb-noun distinction. The verb does not bear morphological finiteness features yet. It is typically used in an invariant form that does not reflect tense, person, or number. Although we still find some examples of X + NEG, its use diminishes in favor of the constructions NEG + X, and, in particular NEG + V. The dominant phrase structure of negative utterances in the basic variety is (NP) + NEG + V (+ Y), where V is morphologically non-finite, and Y = NP, PP or AdvP (Perdue, Benazzo and Giuliano, 2002; Giuliano, 2004: 350). Examples of NEG + X include the following:

(13) SF *en* la cite [*nepade*] classe (Giuliano, 2004: 126)
(à la cité il n'y a pas de classe)
'In the cité there are no classes.'

(14) SF [el demãnd] à la dame *por* [mãZe] (Giuliano, 2004: 126)
(Elle demande à la dame pour manger.)
'She asks for the lady to eat.'
SF *y* [*nepade*] l'argent *por* [pãZe]
(et il n'a pas d'argent pour payer)
'And he does not have money to pay.'

In the examples (13) and (14), the copula remains implicit, but the negation is clearly propositional in nature. In (15) and (16), negation precedes a lexical verb:

(15) IN Est-ce qu'il y a un travail que vraiment vous n'aimeriez pas du tout faire?
Is there a kind of work you would really not like to do at all?
SF Ah oui + nepade komprende *por* français à travail de kusin.
(ah oui + je ne comprends pas à cause de mon français le travail de cuisine.)
'Ah, yes, I don't understand because of my French the kitchen work.'
(Giuliano, 2004: 127)

(16) SF mon mari eh [eskri] *y* [kompri] bien le français
(mon mari écrit et comprend bien le français)
'My husband writes and understands French well.'
SF mais moi [*nepadekriBir*]
(mais moi |je| n'écris pas)
'But me, I don't write.' (Giuliano, 2004: 127)

The L2 speaker of French that produced the data in (15), (16) frequently uses an unanalyzed form *nepade* as the marker of sentential negation. It always appears preverbally, even though *pas* in modern French is post-verbal.[3] We find a similar phenomenon of a frozen negation form in the following L2 English example:

(17) IN What other things could you see in the room?
IE I [*dont*] see very well.
(I didn't see very well.) (Giuliano, 2004: 268)

The form *dont* looks like the combination of *do* and enclitic *n't*, but it is most likely morphologically unanalyzed, because it doesn't inflect for person, tense or number. *Dont* always occurs before the lexical verb.

Dimroth et al. (2003) analyze negation in the basic variety as a link between topic and focus. They provide examples like the following to support their views:

(18) MAD ik niet *hapis* gaan (Dimroth et al., 2003)
I not prison go

[3] Post-verbal occurrences of *pas* are frequent in formulaic speech, as in *Je sais pas* ('I don't know') or *Je comprends pas* ('I don't understand'). Giuliano takes these to be remembered as 'chunks', and claims they do not tell us much about the grammar of the speaker.

(19) IG meine kind nix in schul (Dimroth et al., 2003)
my child nothing in school

The structure (NP) + NEG + V (+ Y) is then an instance of the pattern topic + link + focus, with the possibility of an implicit, anaphoric topic.

Perdue, Benazzo and Giuliano (2002) and Giuliano (2004) suggest that the structure NEG + V is a characteristic of the basic variety independently of the source and target languages at hand. The target in the acquisition of French is for *pas* to follow the finite verb. The target in the acquisition of English is for *not* to follow the auxiliary (*have, be,* modals) if there is one in the sentence, and to introduce *do*-support with lexical verbs. These structures do not systematically arise until the post-basic variety, where auxiliaries are acquired, and morphology and functional structure emerge. Giuliano (2004) extensively discusses the possibility of influence from the source language. Her data come from Spanish and Italian learners of French and English respectively, and both Spanish and Italian have preverbal negation, so this would be a natural possibility of transfer. However, Giuliano argues that transfer is unlikely to explain the data in full. In her view, we would not expect L2 users to come up with idiosyncratic forms like *nepade* in preverbal position if the input contains post-verbal *pas*. Moreover, preverbal *ne* is frequently dropped in the informal, spoken French of the input, so the L2 learner does not really get support for a preverbal negation from the input. Giuliano (2004: 219) favors an explanation in terms of 'natural syntax', and assumes that preverbal negation is the typologically unmarked option. Accordingly, preverbal negation might be the first hypothesis about the position of negation to be entertained by the L2 learner. It is not until the post-basic variety that learners acquire the correct (i.e. target language) placement of negation, along with verb morphology and a richer syntactic structure. Not all L2 learners reach this stage: some never progress past the basic variety.

3.2.5 Swedish learners of French: a test case.

Researchers in the ESF framework emphasize that learners with different source languages and acquiring different target languages show many similarities in their acquisitional path. The presence of NEG + V in the basic variety is one of the features that could be labeled as an overall tendency. However, in most of the cases we have seen so far, the L1 languages had preverbal negation (Italian, Spanish), or discontinuous negation (Moroccan Arabic). We should test the hypothesis of preverbal negation emerging as the unmarked case in a context in which both the L1 and the L2 have post-verbal negation. If we find preverbal negation with such L2 speakers, this would

support the hypothesis that preverbal negation is a feature of the basic variety. The study of Swedish learners of French, reported by Sanell (2005) could very well provide the relevant ingredients. Swedish has a post-verbal position for negation, just like German. Formal French has a discontinuous negation *ne* + V + *pas*, but the spoken language only preserves the post-verbal negation *pas*.

Sanell's L2 learners of French are highly tutored: they are high school students, college students, and university students training to be language teachers. Sanell uses the classification developed by Bartning and Schlyter (2004) to describe the various stages of L2 acquisition. The initial stage in this classification resembles the pre-basic variety from the ESF framework. The post-initial stage seems roughly parallel to the basic variety. The intermediate stage could be equated with the post-basic variety, and the advanced stages are definitely past the levels distinguished in the ESF framework. In the initial stage, the post-initial stage and the intermediate stage, constructions with preverbal negation are found. Relevant examples include *non* preceding the lexical verb in (20) and (21), *ne* seul preceding the lexical verb in (22), (23), and *pas* preceding a finite lexical verb (24):

(20) E: e:h/eh ils non comprendre comprendre.
(Ils ne comprennent pas)
'Eh, they don't understand.'
I: Les Français ne comprend + comprennent pas l'anglais.
(Les Français ne comprennent pas l'anglais)
'The French don't understand English.' (Carin: 1, GD) *initial stage*

(21) I: tu as travaillé?
'You have worked?'
E: non + non travaillE non non
(Non, non, je n'ai pas travaillé)
'No + no I haven't worked no no.' (Carin: 1, GD) *initial stage*

(22) E: eh mais mais je ne nétudiE chaque jour
(Eh, mais mais je n'étudie pas chaque jour)
'Eh, but but I don't study every day.' (Vera: 4, GD) *post-initial stage*

(23) I: Plusieurs fois par semaine?
'Several times a week?'
E: par se- # je ne comprends.
(Parce que, je ne comprends pas)
'Because, I don't understand.' (Pelle: 1, GD) *post-initial stage*

(24) I: qu'est-ce que # c'est le soleil qui te désoriente?
'What is it # it is the sun that disturbs you?'
E: non no (RIRE) non eh je je seulement / je je seulement pas vois mon/
mon <schema> (Pelle: 7, GD) *post-initial stage*
(Non non, seulement, je ne vois pas mon schéma)
'No no, no it is just that I don't see my schema.'

The numbers are fairly low: we are talking about a total of 18 utterances in the initial, post-initial and intermediate stage together.[4] The number of utterances involving post-verbal negation by means of *pas* in the same three stages is 145, 11 of which already occur in the initial stage. A relevant example includes the following:

(25) E: oui. (I:mm) et mais/ le garçons est plus gentiLS. (RIRE)
(Oui, mais les garçons sont plus gentils.)
'Yes, but the boys are nicer.'
I: sont plus gentils que les filles? + Xc'est Xvrai. Ah bon.
'Are nicer than the girls? It's true. Ah well.'
E: (RIRE) SIM mais il est / il est deux filles / qui n'est pas. <NEJ>. Qui eh n'est pas (SOUPIR) //
(Mais il y a deux filles qui ne sont pas)
'There are two girls who are not.'
I: il y a deux filles/
'There are two girls.'
E: eh je ne // est ce je n'aime pas.
(Eh, que je n'aime pas)
'Eh, that I don't like.' (Heidi: 1, GL) *initial stage*

Just like L2 speakers in the ESF project, Sanell's learners produce early occurrences of post-verbal *pas* in formulaic sequences. In the post-initial stage, there are 82 occurrences of sentence negation, almost all of which in line with the target language.

The presence of preverbal negation in the L2 French of Swedish learners is quite surprising. This cannot be an influence of the source language, for

[4] Sanell renders the L2 French in standard French. The English translations are mine.

negation in Swedish is post-verbal. Even though the numbers are low, the appearance of NEG + V constructions in the L2 French of Swedish learners provides support for Giuliano's hypothesis that preverbal negation is part of 'natural' syntax.

3.3 An interpretation of the L2 data on negation in OT

This section starts with the constraints relevant to negation (section 3.3.1). Sections 3.3.2 through 3.3.5 offer an OT analysis of holophrastic negation, negation in the pre-basic, basic and post-basic variety respectively. Section 3.3.6 sums up the developmental path.

3.3.1 OT constraints governing negation

Elsewhere (de Swart, 2006, 2008), I have developed an analysis of negation in Optimality Theory. The insights of that work on universal aspects of negation, and cross-linguistic variation can be used model the L2 process. The system is based on the balance between the two constraints FNeg and *Neg:

- **FNeg**
  Be faithful to negation, i.e. reflect the non-affirmative nature of the input in the output.
- ***Neg**
  Avoid negation in the output.

FNeg is a faithfulness constraint, because it establishes a relation between the input and the output. *Neg is a markedness constraint, because it is exclusively output related. From the formulation of the constraints, it is clear that FNeg and *Neg are in conflict. If the message to be conveyed is negative, FNeg drives the speaker to use a negative form. However, *Neg drives the speaker to avoid negative forms, without any regard for the meaning the speaker intends to convey. The OT grammar strikes a balance between the conflicting constraints by ranking them in a particular order. Weaker constraints may be violated in order to satisfy stronger constraints. The actual form the speaker chooses is the optimal form under a particular constraint ranking. L2 acquisition is a developmental process, during which the rankings gradually change. The reranking of constraints models the development of the grammar towards a ranking that corresponds with the grammar of native speakers of the target language.

The evolutionary bidirectional learning algorithm of Jäger (2003), Mattausch (2005, 2007) uses frequency asymmetries in the input meanings to

derive Horn's (1984) division of pragmatic labor. The Horn system in which unmarked (frequent) meanings are paired up with unmarked (short, simple) forms, and marked (rare) meanings are paired up with marked (long, complex) forms arises as an evolutionary stable system of communication (Van Rooy, 2004). De Swart (2008) applies this algorithm to negation, and shows that FNeg and *Neg emerge as the relevant constraints in this model. This outcome correlates with the typological observation that negation is a universal category in the world's languages (Dahl, 1979). The constraints FNeg and *Neg are thus well grounded.

The constraints FNeg and *Neg provide the foundation of the negation system. In the OT syntax, the constraint ranking FNeg >> *Neg forces the overt realization of negation. This is derived from the following tableau:

Tableau 3.1: Negative sentences (production)

Meaning ¬p	Form	FNeg	*Neg
	S	*	
☞	not S		*

The input in tableau 3.1 is a meaning, and the output candidates evaluated by the grammar are forms. All the generation tableaux have this set-up. The left to right order of the constraints indicates that FNeg is stronger than *Neg. This implies that a violation of FNeg (indicated by an asterisk) is 'worse' than a violation of *Neg. In other words, a violation of *Neg is tolerated if this allows the candidate to satisfy the higher ranked constraint FNeg. The optimal candidate is the one marked by the pointing hand. In tableau 3.1, it is the candidate form that realizes the semantic input ¬p as 'not S'. Even though this output violates *Neg, it is the best possible way of satisfying the constraints under this ranking. The ranking FNeg >> *Neg reflects the generally accepted view that negative statements are cross-linguistically more marked in form than their affirmative counterparts (Payne 1985, Horn 1989, Haspelmath 1997), as illustrated by the overt marker of negation in (26).

(26) a. John is *not* sick. [English]
b. *Ou* petetai Sokrates. [Ancient Greek]
Not flies Sokrates.
'Socrates doesn't fly'

c. Dokumenty *ne* obnaružilis [Russian]
Documents not were found.
'Documents were not found.'

d. Mtoto ha-ku-lia. [Swahili]
Child neg-past-cry.
'The child did not cry.'

Obviously, negation should not only be produced (by the speaker), it should also be understood (by the hearer). The production of negative forms is determined in the OT syntax; the interpretation of these forms is determined in the OT semantics. In the OT semantics, FNeg is satisfied if a form marked as negative is mapped onto a negative meaning. *Neg is satisfied if the meaning representation does not involve a negation. Under the constraint ranking FNeg >> *Neg, we get the following tableau:

Tableau 3.2: Negative sentences (interpretation)

Form not S	Meaning	FNeg	*Neg
	P	*	
☞	¬p		*

The input in tableau 3.2 is a form, and the output candidates evaluated by the grammar are meanings. All the interpretation tableaux have this set-up. If FNeg outranks *Neg, we obtain a negative meaning as the optimal interpretation of sentences like (26).

As far as the position of negation is concerned, a constraint that plays an important role in many languages is NegFirst:

♦ NegFirst (focus version)
Negation precedes its focus.

The tendency for negation to be expressed early in the sentence has been observed by Jespersen (1917) and Dahl (1979). Horn (1989: 293) dubs the principle NegFirst, and describes it as the preference of negation to precede its focus (1989: 446). As a result of NegFirst, negation precedes the constituent it modifies, occurs early in the sentence, occupies a preverbal position, etc. Given that verbs are the core predicative part in (full) sentences, the grammaticized version of NegFirst that we see play a role in natural language is often the one that requires negation to be preverbal:

- NegFirst (grammaticized version)
  Negation precedes the (finite) verb.

Typologically speaking, NegFirst is a tendency, not a hard rule. Therefore, it works well as a soft, violable constraint, which can be ranked higher or lower in the hierarchy in order to reflect the role it plays in the grammar. NegFirst is ranked high in Romance languages, in which we find an asymmetry between negative indefinites in preverbal and in post-verbal position. As illustrated for Italian, a preverbal negative subject is incompatible with a marker of sentential negation (27b), whereas a sentence with a post-verbal negative subject would be ungrammatical without a marker of sentential negation (27a) (examples from Corblin and Tovena, 2003):

(27) a. *(Non) è venuto nessuno [Italian]
*(SN) is come nobody.
'Nobody has come.'
b. Nessuno (*non) è venuto.
Nobody (*SN) es come.
'Nobody has come.'

The high ranking of NegFirst in the grammar of Italian requires the presence of *non* in contexts like (27a) in order to satisfy this constraint, whereas the preverbal position of the subject in contexts like (27b) is sufficient to satisfy NegFirst. An extra negation marker is not necessary in that case, and is accordingly blocked for economy reasons.

Although NegFirst is a ranked high in many languages, also outside of Romance, it is not in Germanic languages like Dutch and German. In these languages, we find a post-verbal marker of sentential negation (28a), and free use of post-verbal negative indefinites without the support of a marker of sentential negation (28b):

(28) a. Jan komt niet. [Dutch]
Jan comes sn
'Jan doesn't come.'
b. Floor zegt niets.
Floor says nothing
'Floor doesn't say anything.'

The contrast between Italian and Dutch can be accounted for if the ranking of NegFirst in the grammar of negation varies across languages.[5] In sections 3.2-3.5, we show how the constraints FaithNeg, *Neg and NegFirst are gradually acquired and ranked by L2 learners.

3.3.2 Holophrastic negation

In section 3.3 above, I assumed that the L2 learner starts out with the markedness constraints ranked above faithfulness constraints. I model this by ranking a meta-constraint *Structure above a meta-constraint Faith. Under this setting, no language is produced, and no utterances are interpreted. This is the null stage of L2 acquisition. During the acquisition process, more and more faithfulness constraints are ranked about the corresponding markedness constraints, and comprehension and production follow. If we apply this idea to the faithfulness and markedness constraints related to negation, we expect the learner in the null situation to have the setting *Neg >> FaithNeg, and thereby not produce any output for negative utterance. The ESF data show that holophrastic negation is produced early on. According to Perdue, Benazzo and Giuliano (2002: 863), 'it seems that a word for negation is essential.' This implies that learners switch to the ranking FaithNeg >> *Neg in the pre-basic variety. Note that the input in tableau 3.3 is *not*(p), where *not* stands for pre-logical negation.

Tableau 3.3: Generation of holophrastic negation

Meaning *not*(p)	Form	FaithNeg	*Neg
	(S)	*	
☞	no (S)		*

In holophrastic negation, p and S may remain implicit, so negation is typically anaphoric (cf. example 5 in section 3.2.3 above). Holophrastic negation may also be added to a complete utterance (cf. examples 6, 7 in section 3.2.3 above), in which case S is overt. Given that FaithNeg >> *Neg is the universal ranking in natural languages (cf. tableau 3.1 in section 3.3.1 above), the ranking posited in tableau 3.3 may not come as a surprise.

[5] The situation of English negation involves *do*-support, so it is more complex, and will not be discussed here. The interested reader is referred to de Swart (2008) for discussion and an analysis.

However, the early emergence of negation in L2 acquisition indicates the relevance of the function of negation for L2 speakers over many other features of the target language to be acquired.

3.3.3 Negation in the pre-basic variety

In the pre-basic variety, utterances are organized on the basis of pragmatic principles ('Focus Last'), rather than rules of syntax. Pragmatic principles are easily formulated as violable constraints in an OT framework (cf. de Swart, 2008).

- **FocusLast**
  New information comes last in the utterance

FocusLast comes into play in word order in general. Here, we focus on the role of topic-focus articulation in the placement of negation. If we assume that FaithNeg is ranked higher than *Neg, and FocusLast is the relevant constraint determining word order, we arrive at the patterns X+NEG and NEG+X described for the pre-basic variety (Giuliano, 2004). If the input meaning construes X as the topic, and negation as the comment, X+NEG is the optimal form (tableau 3.4). The same constraints in the same order guarantee that an utterance of the form X+NEG leads to the optimal interpretation in which X is topic, and negation is the focus (tableau 3.5):

Tableau 3.4: X is topic (production of X+NEG)

Meaning X_{top} not_{foc}	Form	FNeg	*Neg	FocusLast
	X	*		
☞	X NEG		*	
	NEG X		*	*

Tableau 3.5: X+neg (interpretation of X as topic)

Form X NEG	Meaning	FNeg	*Neg	FocusLast
	X	*		
☞	X_{top} not_{foc}		*	
	X_{foc} not_{top}		*	*

Negation is expressed in the pre-basic variety, because of the ranking FNeg >> *Neg. The topic-focus structure of the input translates into linear order in the production tableau 3.4. Conversely, linear order is interpreted in terms of information structure (tableau 3.5). The constraint FocusLast thus decides the word order in the production, and the topic-focus articulation of the message in the interpretation.

Tableau 3.6: X constitutes the focus of negation (production)

Meaning Neg X_{foc}	Form	FNeg	*Neg	FocusLast
	X	*		
	X NEG		*	*
☞	NEG X		*	

Tableau 3.7: neg + X (interpretation of X as the focus of negation)

Form NEG X	Meaning	FNeg	*Neg	FocusLast
	X	*		
	X_{top} Neg_{foc}		*	
☞	NEG X_{foc}		*	*

In tableau 3.6, the input meaning construes X as the focus of the utterance, and we see that NEG + X is produced as the optimal form. The difference in form is perceived as a difference in meaning (tableau 3.7).

The four tableaux sum up the two possible form-meaning pairs in the pre-basic variety. The ranking FNeg >> *Neg guarantees the expression of negative forms and the interpretation of these forms in terms of negative meanings. Besides FNeg and *Neg, we need FocusLast to relate word order variation to information structuring concepts like topic and focus.

The fact that negation in the pre-basic variety interacts with topic-focus articulation indicates that negation is sensitive to focus in the early stages of L2 acquisition. Of course, the focus sensitivity of negation is a well-described phenomenon in semantics (cf. Rooth, 1985; Kratzer, 1989; and others). The standard view on focus operators is that they split the sentence into a background and a focus. Only the focused material is affected by the operator; background material remains outside of its scope. For negation, this is illustrated in (29), where the different parts of the sentence that can be associated with focus are marked with the subscript f:

(29) Mary didn't buy a red sweater
  a. Mary didn't buy a $[red]_f$ sweater. (She bought a green one)
  b. Mary didn't buy a $[red\ sweater]_f$. (She bought a green vest)
  c. Mary didn't $[buy]_f$ a red sweater. (She borrowed one)
  d. $[Mary]_f$ didn't buy a read sweater. (Sue did)

The different readings in (29a-d) indicate that focus has truth-conditional effects. Negation is thus qualified as a focus operator that associates with focus to determine the truth conditions of the sentence. In the pre-basic variety, we see the focus-based use of negation in tableaux 3.6 and 3.7. The structure NEG + X arises when X is in focus. However, we also find a different use, namely that in tableaux 3.4 and 3.5. The structure X + NEG arises when negation itself is in focus, and functions as a predicate over the topic X. The use of negation as a predicate is possible in the pre-basic variety, because the L2 speaker uses a nominalized structure in this stage. Verbs as designated expressions for predication do not appear until the basic variety. In the absence of a notion of lexical category in the pre-basic variety, all lexical items can be freely used as topic or focus in a two word utterance in which topic comes first and focus comes last. Negation is no exception, as the existence of X + NEG alongside NEG + X proves.

3.3.4 Negation in the basic variety

In the basic variety, the verb emerges as the kernel of the utterance. Argument structure (involving thematic roles like AGENT, THEME, GOAL) evolves along with the noun-verb distinction. Negation is pre-dominantly preverbal in this

stage, according to Perdue, Benazzo and Giuliano (2002) and Giuliano (2004). That is, the overall structure of negative utterances is (NP +) NEG + V (+ Y), where Y=NP, PP or AdvP. This aligns with the early English L2 data from Wode (1981). Sanell's (2005) data show infrequent, but surprising patterns of preverbal negation in the L2 French of Swedish learners in the initial, post-initial, and intermediate stage. Giuliano (2004) qualifies the preverbal position of negation as an instance of 'natural' syntax.

It is tempting to relate this pattern to the emergence of NegFirst as the relevant constraint governing the position of negation in the utterance. However, such a ranking cannot directly be linked to the preceding stage of the pre-basic variety, that we defined in terms of FocusLast and FNeg >> *Neg in section 3.3.3. The reason is that FocusLast is a general pragmatic constraint, whereas NegFirst (grammaticized version) is an item specific, syntactic constraint. Under the assumption that L2 acquisition involves a gradual change in constraint ranking, the one cannot simply replaced by the other. The L2 speaker faces two tasks: relate negation to the newly developed noun-verb distinction, and make the transition from information structure to syntactic structure. We model this as a development in two steps.

In the transition to the basic variety, a grammatical structure arises with the verb as the kernel of the utterance. In order to give negation scope over the utterance as a whole, the verb becomes the focus of negation. In two-word utterances involving negation, the structure NEG + V is a direct successor of NEG + X, and is primarily used to express negation of the verb, or by extension, negation of the VP, and of the utterance as a whole. So far, this can be handled by the existing constraint setting, as illustrated in tableau 3.8, (to be compared to tableau 3.6 in section 3.3.3 above).

Tableau 3.8: V constitutes the focus of negation (production)

Meaning *not* V_{foc}	Form	Fneg	*Neg	FocusLast
	V	*		
	V NEG		*	*
☞	NEG V		*	

The introduction of a clear distinction between nouns and verbs, and the thematic roles evolving along with it immediately triggers another development. In utterances expressing affirmative statements, the linear order NP + V (+ NP) becomes the standard format for predicate-argument structures

in which the controller (the NP) is first and the focus/predicate (the V or V+NP) is last. Including negation in this format leads to a problem, because negation is neither the controller (it is not an agent), nor the predicate (negation does not have thematic argument structure). Dimroth et al. (2003) characterize negation as a link between topic and focus. The linear order NP + NEG + V (+ NP) reflects the structure topic + link + focus. The emergence of propositional, focus sensitive operators involves a new category of expressions next to the verb-noun distinction that marks the transition from the pre-basic to the basic variety. The emergence of focus operators requires an integration of the operator-scope structure into the word order. Both information structure and operator-scope have a natural tendency to align with the left-right order of constituents. De Hoop and de Swart (2000) postulate a mirror principle $\alpha < \beta$, which models this.

- **Mirror principle $\alpha < \beta$**
  $\alpha < \beta$: topic < focus: operator < scope, i.e. the linear order of two syntactic constituents α and β corresponds to the order topic-focus in the information structure, which corresponds to the order operator-scope.

So far, the relation between word order and information structure has been captured by means of the constraint FocusLast. With the acquisition of scope bearing operators, the learner has to generalize this constraint to include scope bearing operators as spelled out in the mirror principle. Tableau 3.9 illustrates how the generalization of FocusLast to the mirror principle leads to the ranking NP + NEG + V (+ NP):

Tableau 3.9: Production of NP + NEG + V (+ NP) (mirror principle)

Meaning $\neg x_{top}$ $[V\ y]_{foc}$	Form	FNeg	*Neg	$\alpha < \beta$
	NP V NP	*		
	NEG NP V NP		*	*
☞	NP NEG V NP		*	
	NP V NP NEG		*	*

According to the input meaning, the first argument (the agent) is the topic of the utterance. The verb cluster (V + second argument) is in focus. Propositional negation typically affects the verb, or the verbal cluster as the

kernel of the utterance. All candidates that realize negation in the form violate the constraint *Neg in order to satisfy the higher ranked constraint FaithNeg. The mirror principle then decides the position of negation in the utterance. A clause initial position of negation is less optimal than a preverbal position, in which the operator immediately precedes its focus. Under this constraint ranking, an input in which negation affects the verb induces placement of negation in a position immediately preceding the verb.

NegFirst (focus version) is nothing but a particular instance of $\alpha < \beta$ in relation to negation. The identification of negation as a scope bearing operator, and the extension of FocusLast to the mirror principle $\alpha < \beta$ implies that the learner has adopted the constraints NegFirst (focus version) and FNeg >> *Neg:

Tableau 3.10: Production of NP + NEG + V (+ NP) (NegFirst, focus version)

Meaning $\neg x_{top}$ $[V\ y]_{foc}$	Form	FNeg	*Neg	$NegFirst_f$
	NP V NP	*		
	NEG NP V NP		*	*
☞	NP NEG V NP		*	
	NP V NP NEG		*	*

In parallel to the development of the structure NP + NEG + V (+ NP), we find that the structure X + NEG diminishes in use and gradually disappears, as shown in section 3.2.3 above. This supports the view that in the basic variety, negation can no longer be viewed as a predicate or a comment on the topic expressed by X, because verbs emerge in this stage as the expressions of predication by excellence. In the learner's input to the production system, we still find NEG X_{focus} (as in tableau 3.6, section 3.3.3) but no longer X_{topic} NEG_{focus} (as in tableau 3.4, section 3.3.3). Once negation is no longer usable as a predicate, it is de facto conventionalized as a focus operator linking the topic and the predicate. Given that the use of negation as a focus operator is the typical situation in the target language (cf. 29), this restriction means that the L2 output gets closer to the target language production. This improves the communicative situation, and supports the development.

As far as the semantics is concerned, the introduction of a noun-verb distinction implies that the L2 user has acquired lexical categories, as well as a concept of predicate-argument structure and thematic roles. Negation is outside

the noun-verb distinction, and is a member of a separate category of linking expressions. Dimroth et al. (2003: 70) take linking expressions to validate the relation between the state of affairs described in the predication part of the utterance, and its topic. Negation gets a truth-functional interpretation, because the linking relation shows the conceptualization of the utterance as conveying a full-fledged proposition, based on predicate-argument structure. Negation is now conceived as a scope-bearing operator, involving semantic recursion. This is reflected in the interpretation we propose for the grammar of negation in the pre-basic variety:

Tableau 3.11: Interpretation of NP + NEG + V (+ NP)

Form NP NEG V NP	Meaning	FNeg	*Neg	$NegFirst_f$
	x_{top} $[V\ y]_{foc}$	*		
☞	$\neg x_{top}$ $[V\ y]_{foc}$		*	
	$\neg x_{foc}$ $[V\ y]_{top}$		*	*

In the structure NP + NEG + V (+ NP), negation needs to be interpreted because of the high ranking of FNeg. The role of NegFirst in the semantics is to interpret the part of the utterance that follows negation as its focus, i.e. its domain of application. This rules out the interpretation in which x (the agent) would constitute the focus of negation. The transition from the interpretation tableaux 3.5 and 3.7 (section 3.3.3) to the interpretation tableau 3.11 reflects a major change in the conceptualization of utterances. In tableaux 3.4 through 3.7, the semantics of negation is written in terms of the (pre-logical) negation *not* because we had no evidence that truth-functional negation was involved. In tableau 3.10, the semantics of negation is written in terms of the first-order logical connective ¬, because the validation of the relation between topic and predicate relies on the notion of a proposition with a truth-value.

In sum, the introduction of a lexical noun-verb distinction pushes the learner to conventionalize negation as an expression that associates with focus, because it loses its status as a possible predicate. The conventionalization of negation as a focus operator is visible in the decreasing use of structures like X + NEG. With the noun-verb distinction in place, a new category of propositional operators is introduced (the link between topic and focus in Dimroth et al., 2003). This new category is embedded in the utterance structure thanks to a generalization of the FocusLast principle to a mirror principle for focus operators. The emergence of the mirror principle is visible in the appearance of

structures NP + NEG + V (+ Y). The qualification of negation as a linking expression implies the identification of negation as a truth-functional operator that applies to propositions. Negation in the basic variety thus signals the emergence of the notion of proposition and semantic recursion in the conceptualization of utterances. This conceptual change is the foundation for the development of syntax.

3.3.5 Towards the post-basic variety

When the learner moves towards the post-basic variety, pragmatic word ordering principles gradually give away to syntactic orderings. NegFirst (grammaticized version) reflects a typologically unmarked variant of the placement of negation, because of the way word order mirrors information structure:

Tableau 3.12: Production of NP+NEG+V (+NP) (NegFirst, grammaticized version)

Meaning $\neg x_{top}$ $[V\ y]_{foc}$	Form	FNeg	*Neg	$NegFirst_g$
	NP V NP	*		
	NEG NP V NP		*	*
☞	NP NEG V NP		*	
	NP V NP NEG		*	*

Giuliano (2004) assumes that the L2 learner conceptualizes such an unmarked position as the first hypothesis to entertain about the placement of negation in the target language (cf. section 2.4 above). We can refine her view here and assume that NegFirst (grammaticized version) comes naturally as the first hypothesis about the placement of negation for the L2 learner to entertain in the process from topic-focus articulation to syntactic structure based on a grammatical operator-scope configuration. The conventionalization of negation as an operator that associates with focus is the driving force behind this hypothesis.

Note that there is no change in output (production) in the switch from the mirror principle (tableau 3.9) via NegFirst (focus version) (tableau 3.10) to NegFirst (grammaticized version) (tableau 3.12). Accordingly, it is difficult to determine whether occurrences of preverbal negation in the learner variety are driven by information structure (negation as a focus operator) or by syntax (negation as preverbal). When the learner moves beyond the topic-link-focus

structure and develops more complex syntactic structure, NegFirst can be tested as a syntactic hypothesis for the expression of propositional negation in the target language. It will turn out to work for languages like Italian and Spanish, but not for French, Dutch and German. Learners who have acquired the syntactic position for negation in their target language are free to express propositional negation with a negator in post-verbal position, because their word order structuring principles do no longer require operators to be adjacent to their scope.

Learners vary as to how fast they move from information structure to syntax, but preverbal negation marks the transition from a pragmatic utterance structuring with no lexical categories (in the pre-basic variety) to a fully syntactic structuring of the utterance (in the post-basic variety). The fact that we find NegFirst effects in all the L2 production data discussed in section 3.2 above gives us a glimpse of this process.

3.3.6 The developmental path

The developmental path of negation in L2 acquisition can be summed up as a series of OT grammars corresponding to the following five stages:

Table 3.1: Five stages in the development of negation in L2 acquisition

Stage 0	*Structure >> Faith	no L2 production/comprehension
Stage 1	FNeg >> *Neg	holophrastic negation
Stage 2	FNeg >> *Neg, FocusLast	negation in pre-basic variety
Stage 3	FNeg >> *Neg, $\alpha <$ β/NegFirst (focus)	negation in basic variety
Stage 4	FNeg >> *Neg, NegFirst (grammaticized)	negation in post-basic variety (L2 of target languages with preverbal negation)

Stage 0 corresponds to the stage preceding the acquisition of the target language. In this stage, there is no linguistic output whatsoever in L2, so no output of negation either. Stage 0 corresponds with our hypothesis that in the initial stage of L2 acquisition, all markedness constraints are ranked above all faithfulness constraints (cf. section 3.1.4 above). Gradually, faithfulness constraints emerge. Stage 1 models this for the emergence of holophrastic negation: FNeg is ranked above *Neg, which allows the expression of negation in L2. No combinatorics are available yet. In stage 2, the additional constraint FocusLast allows the structuring of utterances based on topic-focus articulation. No distinction is established between lexical categories, so all

lexical items (including negation) can be placed in focus position or topic position. Accordingly, we find the structure X + NEG as well as NEG + X. The distinction between nouns and verbs in the basic variety leads to the introduction of a third category of linking expressions. In stage 3, the mirror principle captures the conventionalization of negation as a focus operator. As a result, the structure X + NEG disappears, and we find NEG + V as a typical instance of NEG + X. Instances of preverbal negation in L2 varieties indicate the relevance of the mirror principle, because we find instances of preverbal negation even if the source language and/or the target language do not have preverbal negation in their grammar. The transition of the basic variety to the post-basic variety corresponds with a transition from pragmatic structuring of utterances to syntactic rules governing word order. The grammaticized version of NegFirst emerges as the first hypothesis to test about the syntax of negation.

Independent support for the view on negation developed in this paper is provided by the studies of Perdue, Benazzo and Giuliano (2002) and Dimroth et al. (2003), which do not only bear on negation, but study negation in relation to the L2 acquisition of focus particles like *only*, *also*, the iterative adverb *again*, temporal adverbs of contrast like *already, still, no more*, modals, and markers of illocutionary force. Perdue et al. find that focus operators are acquired in a fixed order, with negation preceding additive and restrictive particles (*also, only*, and equivalents), which in turn precede the temporal items. In terms of the OT approach developed in this paper, the observation that the development of focus particles closely follows the acquisitional path of negation means that the identification of negation as a linking operator, leading to a generalization of FocusLast to the mirror principle $\alpha < \beta$ opens up the same route for a whole domain of focus sensitive operators. The development from pragmatic structure (pre-basic variety) to full syntactic structure (inflectional morphology and functional structure) in the post-basic variety is then mediated by the emergence of predicate-argument structure based on the verb-noun distinction, and operator-scope relations based on focus sensitive particles, modals, etc.

3.4 Implications for language evolution

If restricted linguistic systems provide a window on language evolution, we can use the OT analysis to formulate a hypothesis about the emergence of semantic recursion in language genesis. I adopt the current stance in the literature that a certain primate conceptual structure pre-dates the emergence of language (cf. Tomasello and Call, 1997; Jackendoff, 2002; Hauser, Chomsky and Fitch, 2002; Hurford, 2003; Gärdenfors, 2003; and others). Hurford (2003: 45) states that 'While apes may perhaps not be capable of storing such complex structures

as humans, it seems certain that they have mental representations in predicate-argument form.' According to Gärdenfors (2003: 142), most layers of the human thought had emerged in evolution before we started to speak. I assume that social life is the driving force behind language in one way or another, whether for gossip (Dunbar, 1998), hunting and teaching (Calvin and Bickerton, 2000), planning future actions (Gärdenfors, 2003) or otherwise. I am committed to the view that language emerged for communicative purposes. Communication has to do with the interaction between people. Utterances convey a message between a speaker and a hearer, which is anchored to the outside world. The OT analysis developed so far has its roots in this communication process, and allows us to capture both directions of optimization: production and interpretation.

If we take language to emerge from animal cognition, a gradual development is most likely (Tallerman, 2007). The five main stages I postulate are the conceptual stage (before language emerges), the holophrastic stage (communication with single-word utterances), the protolanguage stage (communication with utterances structured by topic-focus articulation), language with semantic recursion (communication with sentences involving propositions and operators), and syntax-based language (communication with sentences structured by syntactic principles). It is outside the scope of this paper to give a full description of all aspects relevant to each of these stages, but I will focus on the development of negation.

3.4.1 Conceptual stage

In terms of the OT analysis developed here, I assume that a (pre-linguistic) conceptual stage corresponds with a system in which all the markedness constraints are at the top of the ranking. In the conceptual stage, no linguistic output corresponds to the meaningful input. This is consistent with the observation that linguistic isolates do not develop a (first) language if not spoken to, even though they have the mind of a modern human being. Of course, I do not mean to say that all the faithfulness and markedness constraints that we use to describe modern, full languages were in place in the mind of the early humans. But we can assume that a proto-constraint that avoids any linguistic structure, say *Structure was ranked higher than a proto-constraint about input-output correspondences, say Faith, that would lead to the expression of some meaningful input into some linguistic form. Postulating a proto-constraint Faith only makes sense for cognitive agents who have enough of a mental representation to allow correspondences between an input meaning and an output form, and to have a communicative intention that drives the expression of some input meaning.

The ranking *Structure >> Faith that we use to characterize the conceptual stage corresponds to stage 0 in L2 acquisition as spelled out in tableau 3.1 in section 3.6 above. The main difference between L2 acquisition and language genesis in this stage concerns the richness of the conceptual representation supporting the general faithfulness constraint. So the proto-Faith constraint in language genesis is much more restricted in terms of the input meanings it can support than the faithfulness constraints in modern language. As suggested already, I take pre-logical negation to be part of the pre-existing conceptual structure of early hominids, but not necessarily full truth-functional negation.

3.4.2 Holophrastic stage

In the step from the conceptual stage to the holophrastic stage, some aspect of the proto-faithfulness constraint moves above the proto-markedness constraint, and a concept gets expressed that was not expressed before. There is no need to assume this to be a single transition; it can very well be a stepwise development during which the proto-constraints *Structure and Faith gradually split up into versions of faithfulness and markedness related to all kinds of conceptual inputs, and formal outputs.

Because of the basic function of negation in communication, there is strong conceptual pressure to express this concept. Given the asymmetry between affirmation and negation, and Horn's distribution of pragmatic labor (cf. section 3.3.1), this leads to marking of negation rather than affirmation. Accordingly, I expect the order FNeg >> *Structure to be achieved fairly early in the evolution of human language. Because negation is both syntactically and semantically marked, the faithfulness constraint FNeg is immediately mirrored by the markedness constraint *Neg, and we obtain the order FNeg >> *Neg. This is the ranking that we adopted for holophrastic negation in L2 acquisition (stage 1 in table 3.1, section 3.3.6).

The earliest expression of negation can be postulated to be holophrastic negation. Holophrastic negation can be interpreted as denial, rejection, refusal, disagreement, in other words as a general 'negative' attitude with regard to some proposal, request, action in the context of use. Holophrastic negation does not have to be interpreted as truth-functional negation. We have described this as pre-logical negation (section 3.1.2). Accordingly, it does not require cognitive capacities corresponding with recursion. Thus we are not making overly strong claims that might be incompatible with the more limited brain capacity of early humans.

Holophrastic negation is inherently context-dependent. 'No' only means something if the interlocutor knows what is under consideration in the situation

of use. What negation bears on need not be linguistically overt (it can be an action, movement, or non-verbal communication act in the situation), but it is likely to be a communicative act. That is, holophrastic negation would be uttered in reaction to the actions, attitude or words of some other human being, rather than as part of inner thought, or as a reaction to a rainstorm, a falling rock, or an animal of prey approaching. In that sense, holophrastic negation is an important feature of communication as an interaction between two participants.

Holophrastic negation is potentially part of human language from the stage onwards where single forms were uttered with a single or a (deictically) complex meaning. Under the view that social life is the driving force behind language in one way or another, negation is likely to be part of the earliest stages of human communication. In all social settings, manipulation and negotiation play a role in the gathering and distribution of food, in the hierarchy of power, in the distribution of labor, in shared gossip, in teaching children, etc. Communicative acts like requests, acceptance, disagreement and refusal/rejection are normal aspects of such social processes. That is not to say that refusal, disagreement and rejection could not be expressed non-verbally (cf. Horn, 1989: 166). Gestures, general body language, tone and pitch of voice are all potential means for the expression of discoursal negation without the use of words. This only confirms that the concept of (pre-logical) negation pre-dates its linguistic expression. Once humans started using words, it is likely that they developed forms for the expression of the basic acts that constitute manipulation and negotiation processes in a social setting. In that sense, having a word for negation is an advantage even in the small lexicon of a (holophrastic) protolanguage.

3.4.3 Utterances structured by topic-focus articulation (protolanguage)

Under the assumption that holophrastic communication is successful in the social life of early hominids, we may assume there is evolutionary, environmental and/or cultural pressure driving the enrichment of language. For a while, this can be covered by a growing vocabulary. But once a certain threshold on the number of vocabulary items is reached, concatenation of symbols emerges as a more economical strategy by natural selection, as shown by Nowak et al. (1999, 2000). Communication based on concatenation of symbols is harder, because the speaker has to come up with a device for linear order (in spoken language), and the hearer needs to have knowledge of multiple lexical items. However, it has the advantage of allowing speakers to formulate messages that were not learned beforehand. The advantages of this more complex form of communication only come out when speakers want to

communicate about larger sets of events. Nowak et al. take this to be the case only for humans.

Nowak et al. (1999, 2000) provide a model and a motivation for the linguistic systems of early hominids to switch from holophrastic communication to a system based on utterances that involve concatenation of symbols. Researchers differ in opinion as to how the move from holophrastic utterances to utterances combining multiple words is realized. Two opposing views are defended by Wray (1998, 2000) and Tallerman (2007 and references therein). Both Wray and Tallerman assume that a holophrastic phase historically precedes the stage of language in which combinatorics arise. But Wray defends the view that the holophrastic message was fractioned into composing parts (holistic view), whereas Tallerman takes them to be reanalyzed as single words that can be combined to form complex utterances (synthetic view). The fact that negation lends itself to a holophrastic use makes it possible to hypothesize that negation is already part of the holophrastic stage. Holophrastic negation in early L2 is realized by the expression of anaphoric negation in the target language: English *no*, French *non*, German *nein* (cf. section 3.2.3 above). Although we find unanalyzed forms like *nepade* in L2 French, and *dont* in L2 English, these expressions do not arise in the holophrastic stage, but are part of the pre-basic or basic variety in which combinatorics are already in place. Thus, they cannot be taken to support Wray's claims. The fact that holophrastic negation, as we find it in early L2 isn't fractioned when complex utterances arise, but is reanalyzed as a single word that builds an utterance based on topic-focus articulation might be taken to support Tallerman's synthetic view, rather than Wray's holistic approach. As far as the evolution of negation is concerned, my model fits in better with the synthetic view.

We have seen that the pre-basic variety organizes utterances on the basis of topic-focus articulation, which can be summed up with the pragmatic principle Focus Last. In this phase, there are no verbs yet in the learner's grammar. If we project this onto the protolanguage of early humans, along the lines defended by Jackendoff (2002) and the windows approach (Botha, 2004), we can hypothesize that lexical categories didn't exist yet in the earliest stages of protolanguage. In the absence of a category distinction between noun-like expressions and verb-like expressions, any constituent can either function as a topic or as a focus, as a thing we predicate something of, or as a predicate of something.

If we assume that holophrastic negation pre-dates protolanguage, we need to see how negation is integrated in the newly developed linear order of concatenated symbols driven by topic-focus articulation. The functioning of

negation in the pre-basic variety shows that negation takes its place in this structure just like other symbolic expressions. In the protolanguage stage, negation can either be the comment on some topic X (in the structure X + NEG), or associate with some other element that functions as its focus (in the structure NEG + X). The relevant constraints involved in the expression of negation in this stage are FNeg >> *Neg. The relevant constraint governing the placement of negation in the utterance is FocusLast. Thus, the protolanguage system of negation is characterized by the same constraint setting as that of the pre-basic variety (stage 2 in table 3.1, section 3.3.6).

3.4.4 Semantic recursion

In terms of L2 acquisition, the introduction of a distinction between nouns and verbs gives rise to a grammar in which the verb functions as the kernel of the utterance. Thematic arguments (AGENT, THEME, GOAL, etc.) evolve along with the noun-verb distinction. The analogy with language genesis is that there is a stage following the protolanguage stage described in section 3.4.2, which is characterized by the introduction of lexical categories such as nouns and verbs, and the development of predicate-argument structure as tied to these lexical category distinctions. Heine and Kuteva (2002: 394) identify this as the stage in which 'there might have existed only two types of linguistic entities: one denoting thing-like time stable entities (i.e. nouns), and another one for non-time stable concepts such as event (i.e. verbs)'.[6] Full, modern syntax need not be in place yet. Word order in NP V (+ NP) utterances can still be determined by pragmatic principles such as 'Focus Last'.

As far as negation is concerned, the introduction of lexical categories and thematic arguments leads to the conventionalization of negation as a focus sensitive operator. Negation is neither a verb nor a noun, and predicate-argument structure is complemented with a status of operator linking topic and focus. According to Jackendoff (2002: 253), 'at the one-word stage, relational words are pointless. But once multiple-symbol utterances are possible, many classes of "utility" vocabulary items offer themselves as design possibilities.' In the terminology adopted in this paper, it is crucial that the introduction of linking devices signals the emergence of semantic recursion. Once reflection on propositions can be expressed, we can safely assume that a conception of

[6] Note that not all modern (full) languages have a clear noun-verb distinction. Salish languages have been claimed to have a general lexical category of predicative expressions (cf. Mithun, 1999 for discussion). However, there is no doubt that Salish languages exploit thematic roles in predicate-argument structure. I conclude that the emergence of thematic arguments is crucial. It may co-evolve with a lexical noun-verb distinction, but it doesn't have to.

utterances as denoting propositions is part of human cognition. Given the existence of holophrastic negation, and the continued presence of negation in protolanguage, we expect negation to be one of the earliest expressions of semantic recursion emerging in the genesis of natural language.

FocusLast is not enough to govern the placement of linking devices, but the mirror principle $\alpha < \beta$ permits a generalization of topic-focus articulation to include operator-scope structure. In this way, the conceptual shift from pre-logical to truth-functional negation is embedded within the information structure of the utterance. In terms of language genesis, the appearance of scope bearing operators correlates with the transition from protolanguage to language, because they put semantic recursion in place. Semantics precedes syntax (cf. Calvin and Bickerton, 2000: 136) in the sense that the only word order structuring principles we need in this stage are pragmatic principles based on topic-focus articulation. The OT ranking we need to model this stage is FNeg >> *Neg for the expression of negation, and the mirror principle $\alpha < \beta$ or its item-specific instantiation NegFirst (focus) for the placement of negation in pre-focus (typically pre-verbal) position. The constraint ranking for the stage of early language in which semantic recursion is in place thus corresponds with the ranking we adopted for the basic variety (stage 3 in table 3.1, section 3.3.6).

3.4.5 Towards a syntactic expression of negation

The mirror principle $\alpha < \beta$ provides a general mechanism to insert scope bearing operators in pragmatic word order. The focus-based version of NegFirst is a variant of $\alpha < \beta$ with regard to negation. The next phase of the development I postulate is a transition from pragmatic based word order to syntax. It is possible that phrase structure rules come into this process to govern the introduction of syntactic functions like subject and object. I have very little to say about this step in the evolutionary process, except that it cannot come into place until utterances are conceptualized as propositions carrying truth-values. The emergence of syntax leads to a weakening of the role of the mirror principle $\alpha < \beta$ in the structuring of utterances. As far as the placement of negation is concerned, I assume a transition from the focus based version of NegFirst to the syntactic version of NegFirst. Accordingly, the pre-verbal position is the first syntactic hypothesis to entertain about the placement of negation in a hierarchical phrase structure. The OT ranking we need to model this stage is FNeg >> *Neg for the expression of negation, and NegFirst (grammaticized version) for the placement of negation in pre-verbal position. The constraint ranking for the syntactic stage of early language thus corresponds with the ranking we adopted for the post-basic variety (stage 4 in table 3.1, section 3.3.6).

3.4.6 Genesis of negation

The five stages described in sections 3.4.1 through 3.4.5 amount to a development from a pre-linguistic conceptual notion of pre-logical negation to a holophrastic negation, and from there to a further integration of the negator in the utterance structure. Once negation is recognized as an operator bearing scope of a proposition, we see truth-functional negation and the emergence of semantic recursion. As a consequence of this conceptual step, pragmatic principles of word order gradually give away to syntax. The evolutionary process we posit is summed up in table 3.2.

Table 3.2: Genesis of negation

Stage 0	*Structure > Faith	conceptual stage
Stage 1	FaithNeg >> *Neg	holophrastic stage
Stage 2	FaithNeg >> *Neg, FocusLast	Protolanguage
Stage 3	FaithNeg >> *Neg, $\alpha < \beta$/NegFirst (focus)	language with semantic recursion
Stage 4	FaithNeg >> *Neg, NegFirst (grammaticized)	emergence of syntax

In the zero stage, we have a conceptual representation of (pre-logical) negation, but no linguistic output. Proto-markedness constraints that ban structure are ranked above proto-faithfulness constraints that drive the user towards the expression of meaningful input, so there is no linguistic production. Reranking FaithNeg above *Structure, and postulating a related markedness constraint *Neg allows for the expression of negation in the holophrastic stage (stage 1). From a holophrastic stage, we move to a protolanguage with combinatorics based on topic-focus articulation (stage 2). The introduction of lexical categories leads to the conventionalization of negation as a focus operator. The relation between information structure and word order has been generalized to include the operator-scope configuration (stage 3). Semantic recursion is in place, and this was the criterion we decided to use to characterize the transition from protolanguage to language. NegFirst (focus) is the operator specific instantiation of the mirror principle $\alpha < \beta$. The interpretation of utterances in terms of propositions carrying truth-values provides the basis for the emergence of syntax. It is not until syntax develops as a general ordering principle that the interpretation of NegFirst as 'negation precedes its focus' shifts to 'negation is preverbal' for propositional negation, and NegFirst (grammaticized version) enters the scene as the first syntactic hypothesis concerning the placement of negation (stage 4). From here on,

grammaticalization runs its course, and we enter the normal diachronic development of negation spelled out as the Jespersen cycle (see de Swart 2008).

Notwithstanding the difference in cognitive capacities between modern L2 learners and early humans, we can postulate that the development of early language proceeded in similar ways. In modern L2 learners, we can take the existence of a semantic propositional structure with a concomitant interpretation of negation as a truth-functional operator for granted, because the learners have a modern brain, and a mature knowledge of a full linguistic system (their L1). However, in the view of the ESF project, grammar is created 'again', so L2 learners need not rely on a notion of proposition in their acquisition process. But following Tomasello and Call (1997), Hauser, Chomsky and Fitch (2002), Jackendoff (2002), Hurford (2003) and Gärdenfors (2003) and others, I assume that the cognitive capacity for predicative structures is available in early humans before language develops. The pragmatically based combinatorics in the protolanguage stage reflects this pre-existing conceptual structure. In the evolution of language, the birth of the proposition is coupled with the emergence of truth-functional grammatical operators arising out of focus operators. In this way, the transition from protolanguage to full language is located in the emergence of semantic recursion. Semantics precedes syntax in the sense that semantic recursion can be expressed in a stage in which principles governing word order are still grounded in information structure (topic-focus articulation). Semantics drives syntax in the sense that syntactic rules about the placement of negation follow the emergence of lexical categories, and operator-scope configurations.

3.5 Conclusion

In this chapter, I have attempted to reconstruct the evolutionary stages preceding full language by emphasizing the relevance of semantic recursion to the debate. My point of departure was Horn's (1989: xiii) observation that no animal communication systems include negative utterances, whereas all human languages do. I postulated that the emergence of truth-functional negation could provide us with a criterion to decide whether a particular system of communication qualifies as a full language. I used early L2 acquisition as a window on language genesis, and used data on the acquisition of negation from the ESF project to model the emergence of semantic recursion in early stages of L2. The key turned out to be a conceptual step that added a notion of operator to the predicate-argument structure that emerges out of the verb-noun distinction. The introduction of an operator-scope structure reflects the emergence of semantic recursion, and thereby the birth of language. A

grammatical notion of operator-scope is easily integrated in the utterance structure based on information structure. With semantic recursion in place, grammar develops beyond information structure, and the preverbal position emerges as the unmarked position for negation in the syntax. The reconstruction of this evolution in a sequence of constraint rankings indicates how the OT notion of 'emergence of the unmarked' can be used in developing hypotheses about language genesis.

Syntactic recursion is frequently taken to be the hallmark of human language (cf. Hauser et al., 2002). If the sketch given here of the evolution of negation is plausible, the development of the semantic notion of proposition precedes the emergence of syntactic recursion, and might well be taken to be an important trigger for it. If the presence of semantic negation and syntactic recursion are indeed connected in the way suggested here, a possible implication is that the lack of syntactic recursion and the absence of truth-conditional negation in animal communication systems other than human language might both be rooted in cognitive capacity that lacks semantic recursion. Accordingly, it might be worthwhile strengthening the semantic, conceptual dimension in the comparative research program on language evolution that Hauser et al. (2002) are suggesting.

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